Evaluation of the Relationship between Functional Independence and 
Quality of Life in Patients with Chronic Stroke

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Abstract

Stroke is a primary cause of long-term disabilities. Impact of stroke on individuals can be devastating which include an increased dependency on others for activities of daily living, change in mood and cognition, and disruption of social interactions. Such changes have negative influences on the quality of life (QoL); however, it is commonly neglected. This study aimed to determine the functional independence and QoL in chronic stroke patients and the relationship between these factors. Materials and Methods: In this cross-sectional study, QoL and functional independence of chronic stroke patients (n=63, aged 24-65 years) were assessed by World Health Organization Quality Of Life questionnaire (WHOQOL-Bref) and Barthel index. These participants had experienced only one stroke and had no other orthopedic, neurologic or psychological disorders. Results: The mean age of participants was 46.11±11.93. The mean score of total QoL was relatively low (58.91±12.21) and mean score of Barthel Index was 87.46±13.04. Psychological and environmental domains had lowest and highest scores respectively, and males had a higher QoL in comparison to females in all domains. There was a correlation between functional independence and overall QoL (r=0.001), functional independence was highly correlated with physical (r=0.000) and environmental (r=0.016) domains (P<0.001). Discussion: The results demonstrated that in the majority of participants the QoL was not favorable and is correlated with functional independence level, although further studies are necessary to confirm these findings. The results emphasize more attention to psychosocial aspects of stroke survivors.

Key words: Functional independence, Quality of Life; Stroke

Introduction

Stroke is the second leading cause of death and long-term disability in adults worldwide (1). Signs and symptoms of stroke depend on the involved hemisphere. Since cerebrovascular damages cause dysfunction in Upper Motor Neuron (UMN), the stroke may also develop perception disorders, visual impairments, sensory disorders, cognitive changes, and a set of speech disorders (2), which results in reduced independence in the daily activities of the patients. The stroke-induced disability intensively affects patients socially and physically, and approximately half of the stroke patients required the help of others in their daily activities for a long term after the stroke (1). Daily activities refer to a set of self-care activities including basic activities of daily living (BADLs) and personal activities of daily living (PADLs). Such activities are necessary to social life and guarantee the health and survival of the patients. Daily activities are a part of human functioning arenas including compliance with hygiene, clothing, eating, functional mobility, communicating, and sexual relations (3). Functional independence is the ability to perform such activities without assistance or supervision of others and also is an essential functional aspect of human life (4). Independence in daily activities results in personal satisfaction and more self-confidence, which provide strong motivation for social functioning (5). Different studies suggested functional independence as an essential predictor of quality of life (QoL) (6-8). QoL is the individual’s perception of life conditions based on the cultural background of the community lives in, and also is associated with individual’s aims, expectations, and
standards (9, 10). Different studies showed that the QoL is decreased after stroke (11). A few studies performed in Tehran, Iran, evaluated the level of QoL in patients with stroke and investigated the relationship between stroke and functional independence in such patients.

Robinson et al. demonstrated a moderate correlation between functional independence and QoL 6 months after stroke; however, there was no relationship in the first month (5). Ones et al. indicated that the level of QoL was significantly lower in the cases, compared with the controls and there was significantly lower in stroke survivors compared with healthy individuals and functional status scores. However, the study by Ones et al. had no age limits, and the mean age of the patients in the case group was 62 years (14). Fattahi et al. evaluated the QoL in patients with acute and chronic stroke referring to rehabilitation centers in Kermanshah, Iran, using the 36-Item short form survey (SF-36). Results of their study showed that the QoL was affected by stroke in all evaluated subscales, particularly in the physical (15). Raju et al., assessed the QoL, psychosocial problems and functional independence in patients with chronic and acute stroke. Anxiety, depression, and functional dependence were among the low QoL predictors in their study. They also showed that older ages and severe stroke increases the risk offunctional dependence, although more than 60% of the study participants were above 60 years (16). Ahlsio et al. showed that the increased disability reduces the QoL in patients with stroke; the mean age of the patients in their study was 71 years and about one-fifth of the patients had a previous stroke or transient ischemic attack (TIA). Moreover, they used interview and figures to evaluate QoL in patients, while despite the ease of use, the selected tools were not enough accurate and categorized. In each course of the interview, 20-24% of the subjects could not respond reasonably (17).

In the previous studies, the role of factors influencing functional independence (such as old age) and QoL (such as psychiatric disorders), and the time of assessments (acute/chronic phase of the disease) were neglected (15, 16, 19). Owing to the significant differences between the physical and mental status of patients in acute and chronic phases of stroke, the assessments results were not categorized based on chronic and critical aspects of the disease (15, 18, 19). Also, as per our knowledge, no study evaluated the functional independence of middle-aged and young patients with acute stroke. Owing to the point that QoL is a culture-dependent factor (12, 13), results obtained from different cities and countries cannot be generalized to other regions of the world. There is a high prevalence of stroke and the great importance of determining factors influencing the QoL in such patients, and also there is the lack of enough knowledge about the effect of functional independence on QoL in patients with stroke in Iran. Therefore, the current study aimed at evaluating the relationship between functional independence and QoL in patients with chronic stroke.

Materials and Methods

The current cross-sectional, descriptive-analytical study aimed to evaluate the relationship between functional independence and QoL in patients with chronic stroke in Tehran, Iran. Patients underwent preliminary evaluations based on the inclusion and exclusion criteria as well as their medical records. Accordingly, a total of 63 eligible patients were selected by the convenience sampling method. The inclusion criteria were the first-ever stroke, age range 25 to 65 years, at least six months apart from the onset of stroke, ability to read and write, ability to complete the QoL questionnaire, and lack of psychological disorder and history of hospitalization (and/or taking antidepressant drugs during the study). The exclusion criteria were the presence of other neurologic disorders and orthopedic or rheumatologic comorbidities, and unwillingness to cooperate with the study.

The patients were explained about the aims, objectives, and methodology of the study and after signing the informed consents, they were asked to complete the demographic questionnaire, the world health organization (WHO) QoL-BREF (WHO QoL-BREF), and the Barthel activities of daily living (ADL) index. The demographic questionnaire used in the current study was completed by the subjects themselves; the Barthel ADL index was completed either by patients or their primary caregivers.

The 26-item WHOQOL-BREF is one of the most common questionnaires used to evaluate all aspects of QoL in 4 areas of physical health, mental health, social relationship, and environment. The Questionnaire is scored based on a 4-20 or 0-100 scale, higher scores indicate higher QOL. The Cronbach’s alpha of the questionnaire was 0.84; the reliability of the questionnaire in Iran was assessed by the test-retest that was 0.7 for each area (18, 19).

The Barthel ADL index is a 10-item questionnaire, which evaluates grooming, bathing, feeding, toileting, stepping-up and -down, dressing, bowel control, bladder control, transfer (bed to chair and back), and Mobility (on level surfaces). The Barthel index evaluates the culture-independent factors, and the score range is 0-100. To complete the ADL Barthel index, each item was scored by an expert based on the ADL Barthel index guidelines. Then, the scores were summed. There is a strong correlation between the results of the Barthel ADL index and those of the Fugl-Meyer assessment and the Berg balance scales (20).

The collected data were analyzed with SPSS version 16, using mean ± standard deviation (SD), the Spearman correlation coefficient, and the Mann-Whitney U, and the Kruskal-Wallis tests.
Table 1. Descriptive Data of Functional Status and Quality-of-Life in the Study Subjects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional status (the Barthel ADL index)</td>
<td>87.46 (13.04)</td>
<td>40-100</td>
</tr>
<tr>
<td>Male</td>
<td>89.50 (10.77)</td>
<td>45-100</td>
</tr>
<tr>
<td>Female</td>
<td>85.60 (14.72)</td>
<td>40-100</td>
</tr>
<tr>
<td>Total QoL</td>
<td>58.91 (12.21)</td>
<td>34-75</td>
</tr>
<tr>
<td>Physical health</td>
<td>57.71 (14.23)</td>
<td>25-94</td>
</tr>
<tr>
<td>Mental health</td>
<td>54.90 (14.39)</td>
<td>19-75</td>
</tr>
<tr>
<td>Social health</td>
<td>55.29 (16.62)</td>
<td>19-81</td>
</tr>
<tr>
<td>Environment</td>
<td>68.73 (15.27)</td>
<td>38-94</td>
</tr>
</tbody>
</table>

Table 2. The Correlation between Functional Status and QoL in the Study Subjects (* at 0.05 level; ** at 0.01 level)

<table>
<thead>
<tr>
<th>Statistical Variable</th>
<th>The Spearman Correlation Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional independence</td>
<td>Total QoL 0.406</td>
<td>0.001**</td>
</tr>
<tr>
<td></td>
<td>Physical health 0.626</td>
<td>0.000**</td>
</tr>
<tr>
<td></td>
<td>Mental health 0.247</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td>Social health 0.205</td>
<td>0.106</td>
</tr>
<tr>
<td></td>
<td>Environment 0.303</td>
<td>0.016*</td>
</tr>
</tbody>
</table>

Results

In the current study, 63 chronic stroke survivors and the age range of 24 to 65 years (mean±SD of age: 46.11±11.93 years) were enrolled. Thirty subjects were male, and 33 were female; 33 had right-sided and 30 left-sided hemiplegia. In 18 patients, about 6-12 months were elapsed from the onset of stroke, while it was 12-24 months in 30 subjects, and >24 months in 15 patients.

The level of QoL and functional status of the study subjects are presented in Table 1. Results indicated that the subscales of the environment and mental health got the highest and lowest scores, respectively.

The Shapiro-Wilk test was used to evaluate the normality of the data, and the results showed that the distribution of data was non-normal for total QoL and QoL subscales scores. Owing to the non-normal distribution of data for QoL and functional independence, the Spearman correlation test was used to evaluate the association between QoL and functional independence (Table 2). Results showed a significant correlation between the scores of functional independence and total QoL as well as physical health and environment subscales. The Spearman correlation test indicated no significant correlation between the age and total QoL scores (P=0.146). There was no significant correlation between gender and affected side of body with total QOL score, based on Mann-whitney U test. The Kruskal-Wallis test showed no significant relationship between the time elapsed from the onset of stroke and total QoL score (P=0.692).

Discussion

Results of the current study showed a correlation between independence in daily living activities and QoL, but no association was observed between the variables of gender, time elapsed from the onset of stroke, and the affected side of the body and QoL.

The correlation and association between the functional independence and disability and QoL were also reported in some of the previous studies (14). The results of the current study are in agreement with the studies conducted by Ahlsjo et al., Johnson et al., Jaracz et al., and Haghgoo et al., who suggested a correlation between the functional status (the ability to perform daily living activities) and QoL in stroke survivors (7, 8, 17, 21). The results of the current study also corroborate with the study conducted by Robinson et al., who indicated an association between functional independence and QoL 6 months after the onset of stroke (5). Participation in meaningful/purposeful activities creates a sense of competence in individuals, which results in physical and mental health (22). Studies indicated that patients with stroke experience a wide range of disabilities and activities limitation one year after stroke and even more (23). Patients with activities limitation encounter lower movement, which results in negative impacts on their health status and QoL (24). Hacket et al. performed a study on stroke patients and reported that 60% were dependent on others in their daily living activities, particularly clothing, bathing, transportation, and walking out the door. Further, they stated that the QoL in patients who were dependent on others in their daily living activities was
significantly lower than that of their non-dependent counterparts (25). In a study by Haghgoo et al., limited participation in meaningful activities and depression were addressed as the most important QoL predictors (21). Choi-Kwon et al., found that in the month three after the incidence of stroke, lack of independence in daily living activities, economic and occupational status, and depression were the factors which negatively affect patients’ QoL. Additionally, they also indicated that such factors even influencing patients’ QoL 3 years after the stroke, but dependence to others in daily living activities was the most important influencing factor (26).

Lack of association between demographic variables (age, gender, time elapsed from stroke, and the affected side of the body) and level of QoL was also observed in the current study. Similar studies reported different results about the association between age and level of QoL in patients with stroke. Fatahi et al. suggested that younger patients experience lower QOL (15). In contrast, Jafari et al. showed that the level of QoL was lower in older patients with stroke (27). Moreover, in a study by Ones et al., no significant difference was observed between the QoL scores of patients under 65 years and above (14). Carod-Artal et al., also found no association between age and QoL in patients with stroke (28). Different age ranges and different distribution patterns of patients in the age ranges can explain controversial results in similar studies. Although inconsistent with the results of Fatahi et al. and Jafari et al., the current study tried to neutralize the effects of old ages on the QoL by considering the age range of 24 to 65 years.

Although all male patients in the current study had higher QoL scores compared with those of their female counterparts, no significant difference was observed between the genders in the evaluated areas. The results of the present study are in agreement with those of Ones et al., Jafari et al., and Torfi et al. (14, 27, 29). Storm et al. suggested the female gender as a lower QoL predictor in the onset of stroke (30). Patel et al. also considered the female gender as a predictor for lower QoL in physical aspects for stroke survivors during the first year after the incidence of stroke (31). Also, Khayatzadeh et al. reported significantly lower levels of QoL in females than males (32). Kuroda et al. indicated that differences in QoL level existed between males and females before the incidence of stroke (33). However, it seems that different factors, mainly cultural differences such as family and community support and expectations from each gender, play an important role in QoL of both females and males (29).

Findings of the current study were consistent with those of Khayatzadeh et al., and Ahsio et al., regarding no relationship between QoL and time elapsed from stroke (17, 32). Also, results of the current study about lack of association between the involved side of the body and QoL in patients with stroke were in agreement with those of Khaatzadeh et al. (32). A few studies investigated the effect of affected side of the body on QoL, although their results were contradicted. In a study by Patel et al., right hemisphere lesions were suggested as a determinant and predictive factor for lower QoL (31).

Samsa and Matchar believed that controversies in the results of these studies also may be due to the miscellaneous instruments used to measure QOL and inconsistency of stroke severity (34). They also added the role of different instruments used to measure QoL and inconsistency of severity and signs of stroke in various studies as other controversies in the results of similar studies (35). The limitation of this study includes small sample size because of limited access to patients with stroke and the inability of some older patients to read and write (one of the inclusion criteria).

**Conclusion**

The current study aimed at evaluating the effect of functional independence on QoL in patients with chronic stroke. Hence, impact of different variables, such as independence in daily living activities, on QoL indicated the need for more attention of experts, particularly occupational therapists, to expedite independence in daily living activities in patients with stroke to improve their QoL. The results of the current study showed that stroke survivors need more attention to improve their independence in order to enhance QOL. In addition to routine rehabilitation services, psychological support may be mandatory for them to improve QOL.

It is recommended to evaluate the effect of functional independence on QoL in patients with acute stroke and compare the results with those with chronic stroke in further studies. Also, evaluation of the impact of mood changes and depression on the QoL of these patients should be investigated in further studies.

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None

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**Authors’ contributions:**

All authors made substantial contributions to conception, design, acquisition, analysis and interpretation of data.
References


