Brief Report

Impact of inpatient rehabilitation on quality of life among stroke patients

Meeka Khanna[1], Dhinla Sivadas[1], Anupam Gupta[1], Partha Haldar[2] (ID), Navin B. Prakash[1]

[1]Department of Neurological Rehabilitation, National Institute of Mental Health and Neurosciences, Bengaluru, Karnataka, [2]Centre for Community Medicine, All India Institute of Medical Sciences, New Delhi, India.

ABSTRACT

Objective: Despite remarkable progression in the treatment of stroke, the life quality and social related events caused by stroke have received limited attention in our country. Quality of life (QOL) assessment is an important part of the evaluation of stroke patients and their management. The objective of this study was to asses QOL in patients with stroke at the time of admission in rehabilitation unit and to assess the impact of inpatient rehabilitation on change in QOL in these patients.

Materials and Methods: Adult patients with first arterial stroke of any duration, with presentation as hemiplegia, were recruited. The clinical outcome scales and 36-Item Short Form Health Survey (SF-36) parameters for QOL were assessed at both admission and discharge. The scales used were Scandinavian stroke scale (SSS), Barthel Index (BI), and modified Rankin Scale. SF-36 scores were assessed after 6 weeks of discharge also.

Results: Ten patients with median age of 36.5 years and median duration of stroke 75 days were recruited. There was significant improvement in functional scores of BI and SSS scales at the time of discharge. Majority of the components of both physical and mental domains of QOL SF-36 questionnaire showed significant improvement. The QOL scores after 6 weeks of discharge did not show significant change except for the emotional well-being.

Conclusion: The QOL in patients with stroke improves with inpatient rehabilitation along with motor and functional scores. Improved functional independence leads to better emotional state after discharge also.

Keywords: Quality of life, Rehabilitation, Stroke

INTRODUCTION

Stroke is one of the leading causes of major disability in India.[1] The consequences of stroke are physical, social, and psychological and are devastating since around 90% of survivors have some type of disability. Stroke is a global public health problem as it results in serious disabilities, functional limitations, and compromised quality of life (QOL).[2]

Even though the emergency treatment and acute care of stroke have improved significantly in recent times, after care and life quality and social related events caused by stroke have received limited attention in our country. QOL assessment is an important part of the evaluation of stroke patients and their management. The purpose of this study was to assess QOL in patients with stroke at the time of admission in rehabilitation unit and to assess the impact of inpatient rehabilitation on change in QOL in patients with

stroke. We also assessed the change in other clinical outcome scores after inpatient rehabilitation.

MATERIALS AND METHODS

This was a follow-up study of patients of stroke admitted for rehabilitation in the inpatient ward of Department of Neurological Rehabilitation of a tertiary care center. The *study participants* included patients aged 18 years and above admitted in the rehabilitation wards with first arterial stroke of any duration, with clinical presentation as hemiplegia. The patients with recurrent stroke, impaired cognition, global aphasia, impaired comprehension, clinical presentation other than hemiplegia, and patients not willing to give informed consent for the study were excluded from the study. The Institute Ethics Committee approval was obtained for the study. The patients were recruited in the period between May 2021 and December 2021.

*Corresponding author: Meeka Khanna, Department of Neurological Rehabilitation, National Institute of Mental Health and Neurosciences, Bengaluru, Karnataka, India. meekakhanna@gmail.com

Study tools

The outcome measures included in the study were: 36-Item Short Form Health Survey (SF-36): This is a self-administered questionnaire measuring the QOL. The questionnaire consists of eight scales with two measures: Physical and mental health. The physical health measure includes physical functioning (ten items), role-physical (four items), bodily pain (two items), and general health (five items). The mental health measure is composed of vitality (four items), social functioning (two items), role-emotional (three items), and mental health (five items). A final item, termed self-reported health transition, is answered by the subject but is not included in the scoring process. Scoring ranges from 0 to 100. Higher scores indicate better health status.[3]

The hospital anxiety depression scale (HADS)

The 14-item HADS consists of two seven-item subscales assessing depression and anxiety. Responses are rated 0–3 in reference to the past week (subscale scores range 0–21). The scores between 0 and 7 are considered as no depression and anxiety while 8–16 as mild, 17–23 as moderate, and ≥24 severe.[4]

Barthel index (BI)

It measures the functional abilities of patients. It is a ten-item scale, to assess patients' ability for ADL activities including feeding, bathing, grooming, dressing (both upper and lower half), bladder and bowel care, personal toilet, transfers, stair climbing, and mobility. It is a 100-point scale and higher suggests more functional independence of the patient.[5]

Scandinavian stroke scale (SSS)

It is a nine items scale. The minimum score is 2 (worst neurological compromise) and maximum score is 58 (without neurological compromise), with items-consciousness, eye movement, arm motor power, hand motor power, leg motor power, orientation, speech, facial palsy, and gait.[6]

Modified Rankin scale (mRS)

It is a commonly used scale for measuring the degree of disability or dependence in patients who have suffered from stroke or other causes of neurological disability. The scale runs from 0 to 6, measuring from perfect health without symptoms to death.[7]

Study implementation

Detailed clinical and neurological examination was performed after admission in the rehabilitation ward. The demographic details of the patients were noted and the QOL scores and other outcome scores were filled within 1 day of admission. All the patients were given customized rehabilitation sessions. A rehabilitation session consisted of physical and occupational therapy, speech therapy, and neuropsychology sessions. Pharmacotherapy and orthoses were prescribed as required by the patients. The patients were reassessed for all the scores at the time of discharge from the rehabilitation ward. The patients were followed up for QOL scores over phone or in-person on outpatient basis after 6 weeks of discharge from the rehabilitation ward.

Statistical analysis

The data collected were entered into EpiInfo and analyzed using R (version 4.0.0-2020-04-24), implemented using user interface of R Studio with appropriate packages. Continuous variables were described with median and interquartile range (IQR), while categorical variables as frequency and percentages. The primary outcome variable was QOL score, collected at the time of admission and discharge, and again at 6 weeks after discharge. All the scores were compared between time points using the non-parametric sign test to test the null hypothesis that the median of differences between matched pairs is zero. $P < 0.05$ was considered as statistically significant.

RESULTS

A total of 13 patients satisfied inclusion criteria, out of which three were lost to follow-up. Thus, ten patients were included for analysis. There were eight men and median (IQR) age of patients was 36.5 (52 and 26) years. The median (IQR) duration of stroke was 75 (145 and 50) days. Nine patients had ischemic stroke, while seven presented with right-sided hemiplegia. Regarding comorbidities, six patients had hypertension and nine had both diabetes mellitus and hyperlipidemia.

[Table 1] shows the comparison of clinical outcome scores and QOL scores at admission and discharge. [Table 2] shows the comparison of QOL scores between discharge and 6 weeks follow-up. There was significant improvement in functional scores of the patient on BI and SSS scales at the time of discharge from the rehabilitation. Majority of the components of both physical and mental domains of QOL SF-36 questionnaire showed significant improvement. The QOL scores after 6 weeks of discharge did not show significant change except for the emotional well-being.

DISCUSSION

The purpose of this observational study was to assess QOL in patients with stroke at the time of presentation in rehabilitation unit and to assess the impact of inpatient rehabilitation on change in QOL in patients with stroke. A total of 10 patients were recruited during the study period. Males were more common and all but one was ischemic strokes. There were seven patients with the right hemiplegia.

Table 1: Comparison of clinical outcome scores and SF-36 scores between admission and discharge.

	Admission median (IQR)	Discharge median (IQR)	*P*-value*
BI*	60 (75, 35)	75 (85, 50)	**0.0313**
SSS*	36 (32, 47)	45.5 (38, 50)	**0.0156**
mRS*	3 (3, 3)	3 (3, 3)	0.99
HADS*			
Anxiety	5 (3, 6)	3 (3, 5)	0.0625
Depression	5 (5, 6)	4.5 (3, 6)	0.063
SF36			
Physical component			
Physical functioning	25 (15, 30)	37.5 (20, 40)	**0.02**
Role limitation-physical problems	20 (0, 20)	30 (10, 30)	**0.03**
Bodily pain	55 (45, 67.5)	65 (60, 70)	**0.004**
General health	45 (35, 60)	47.5 (35, 65)	0.38
Mental component			
Energy/fatigue	40 (30, 45)	47.5 (35, 54)	**0.03**
Role limitation-emotional problems	5 (0, 20)	10 (10, 30)	**0.03**
Social functioning	43.75 (35, 52.5)	50 (37.5, 62.5)	0.13
Emotional well being	48 (40, 60)	50 (40, 70)	**0.02**

*Non-parametric sign test to test that the median of differences between matched pairs is zero, BI: Barthel index, SSS: Scandinavian stroke scale, mRS: Modified Rankin scale, HADS: Hospital anxiety and depression scale, SF-36: 36-Item short form health survey. Bold values indicate significant values

Table 2: Comparison of QOL (SF-36) scores between discharge and 6 weeks follow-up.

	Discharge median (IQR)	6 weeks follow-up median (IQR)	*P*-value*
SF36			
Physical component			
Physical functioning	37.5 (20, 40)	40 (20, 40)	0.99
Role limitation-physical problems	30 (10, 30)	30 (10, 40)	0.25
Bodily pain	65 (60, 70)	67.5 (60, 75)	0.37
General health	47.5 (35, 65)	50 (35, 65)	0.50
Metal component			
Energy/fatigue	47.5 (35, 54)	52.5 (40, 55)	0.63
Role limitation-emotional problems	10 (10, 30)	17.5 (10, 35)	0.12
Social functioning	50 (37.5, 62.5)	56.3 (37.5 65)	0.25
Emotional well-being	50 (40, 70)	55 (50, 80)	**0.03**

*Non-parametric sign test to test that the median of differences between matched pairs is zero. SF-36: 36-Item Short Form Health Survey. Bold values indicate significant values

The median duration of symptoms at admission was 75 days which indicates sub-acute stroke. The effects of plasticity and rehabilitation interventions during this stage can positively change patient outcomes.

The change in clinical outcome measures between admission and discharge is statistically significant for BI and SSS scores. This can be considered to be the mixed effect of natural progression of recovery (plasticity) and in-patient rehabilitation program. At the time of discharge, in SF-36, physical components of physical functioning, role limitation, and bodily pain improved significantly. The scores of general health under physical component improved but not significantly. The scores of mental components of fatigue, role limitation – emotional and emotional well-being improved significantly. The social functioning scores under

mental component were better but not significantly. This is in contrast to a study by Tramonti *et al.*, where the authors found that while functional status improved significantly after rehabilitation, individualized evaluation of QOL was less affected.[8] The authors also found that psychological distress was associated with negative outcomes. Our study findings do not show noteworthy psychological issues as the median scores of anxiety and depression were low. A follow-up of QOL after 6 weeks of discharge showed significant improvement of emotional well-being that shows a positive impact of inpatient rehabilitation. The other scores of QOL did not show significant improvement.

A number of studies have shown a significantly lower QOL scores in stroke survivors as compared to healthy controls.[9,10] It has been reported that the degree of

neurological functional impairment is a strong predictor of health-related QOL.[9] Another study also showed that the worse the disability, the lower the health-related QOL.[10] In a study of chronic stroke patients, the authors found that 30% of survivors had depression which affected their health-related QOL negatively and also majority continued to face limitations in their physical activities.[11]

Due to very small sample size in our study, the association of different functional and clinical scales with QOL scores was not analyzed. However, data from one study supported the evidence that different measures of QOL and functional status were not strongly associated to one another.[8] The authors proposed that psychological issues, coping mechanisms, and social support could be significantly related to specific outcome measures.[8] The factors that influence QOL and are strongly correlated with QOL are functional independence, the persistence of hemiplegia and depression.[12]

It is imperative to gain a better understanding of the determinants of QOL after stroke, to target stroke care. Functional independence in walking and activities of daily living with inputs from physiotherapy, occupational therapy along with psychological counseling and cognitive retraining may lead to significant gains in QOL in patients with stroke.

Strengths and limitations

The study was done with a very small sample size and over a short span of time. Long-term follow-up was not done. However, appropriate validated scales were applied to assess the various outcome measures.

CONCLUSION

The QOL in patients with stroke improves with inpatient rehabilitation, along with motor and functional scores. Improved functional independence leads to better emotional state after discharge also.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Kamalakannan S, Gudlavalleti AS, Gudlavalleti VS, Goenka S, Kuper H. Incidence and prevalence of stroke in India: A systematic review. Indian J Med Res 2017;146:175-85.
2. Baumann M, Le Bihan E, Chau K, Chau N. Associations between quality of life and socioeconomic factors, functional impairments and dissatisfaction with received information and home-care services among survivors living at home two years after stroke onset. BMC Neurol 2014;14:92.
3. Lins L, Carvalho FM. SF-36 total score as a single measure of health-related quality of life: Scoping review. SAGE Open Med 2016;4:2050312116671725.
4. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67:361-70.
5. Mahoney FI, Barthel DW. Functional evaluation: The Barthel index. Md State Med J 1965;14:61-5.
6. Scandinavian Stroke Study Group. Multicenter trial of hemodilution in ischemic stroke-background and study protocol. Stroke 1985;16:885-90.
7. Wilson JL, Hareendran A, Grant M, Baird T, Schulz UG, Muir KW, *et al*. Improving the assessment of outcomes in stroke: Use of a structured interview to assign grades on the modified Rankin scale. Stroke 2002;33:2243-6.
8. Tramonti F, Fanciullacci C, Giunti G, Rossi B, Chisari C. Functional status and quality of life of stroke survivors undergoing rehabilitation programmes in a hospital setting. NeuroRehabilitation 2014;13:1-7.
9. Morris JH, Van WF, Joice S, Donaghy M. Predicting health related quality of life 6 months after stroke: the role of anxiety and upper limb dysfunction. Disabil Rehabil 2013;35:291-9.
10. Cerniauskaite M, Quintas R, Koutsogeorgou E, Meucci P, Sattin D, Leonardi M, *et al*. Quality of life and disability in patients with stroke. Am J Phys Med Rehabil 2012;91 13 Suppl 1:S39-47.
11. King KH, Yang SY. Health related quality of life among chronic stroke survivors attending a rehabilitation clinic. Singapore Med J 2006;47:213-8.
12. Laurent K, De Seze MP, Delleci C, Koleck M, Dehail P, Orgogozo JM, *et al*. Assessment of quality of life in stroke patients with hemiplegia. Ann Phys Rehabil Med 2011;54:376-90.