International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Effectiveness of Motor Rehabilitation Bundle on Motor Functions and Functional Ability of Upper Extremity among Patients with Stroke

Anju Rachel

Abstract: ***The present study investigated the effectiveness of motor rehabilitation bundle on motor functions and functional ability of upper extremity among patients with stroke admitted in a tertiary care hospital, Kottayam. A quantitative approach with quasi experimental pre test post test control group design was used for the study. The conceptual framework Betty Neumann's system model theoretically supported the study. Sixty patients with stroke were selected using non probability purposive sampling technique. The data were collected using socio personal and clinical data sheet, upper extremity motor function assessment scale and upper extremity functional index scale. Pre test was conducted on the second day of admission. Motor rehabilitation bundle starts on the 2nd day of admission and continued for 21 days. Post test was conducted on the 21st day after discharge during follow up visit. The effectiveness of motor rehabilitation bundle was computed using Mann Whitney U test. The study result showed that the U value obtained for motor function and functional ability scores of patients with stroke in the control and experimental group was significant at 0.05 level signifying the effectiveness of motor rehabilitation bundle in improving motor functions and functional ability among patients with stroke. The study revealed that there was a strong positive correlation between motor functions and functional ability (ρ =0.61). Study revealed that association of motor functions and functional ability among patients with stroke with selected variables was significant at 0.01 level signifying associations with respect to muscle strength, angle of flexion and angle of extension of affected extremity.***

Keywords: Motor functions; functional ability; Motor rehabilitation bundle; patients with stroke.

1. Introduction

Stroke is the major disease that leads to an increase in the number of people with motor or sensory impairment or loss of function.[2] Stroke is defined as the rapidly developing clinical signs of focal disturbance of cerebral function, with symptoms lasting 24 hrs or longer or leading to death, with no apparent cause other than of vascular origin.[5] It leads to permanent or temporary neurological deficit if ischemia persists or even cause death within 24 hours.[6] Stroke survivors can suffer several neurologic impairments and up to 85% of them experience some degree of paresis in upper limb.[7]

The prevalence of stroke increases significantly with age and other risk factors includes tobacco use, physical inactivity, unhealthy diet, harmful use of alcohol, atrial fibrillation, raised lipid levels, obesity, male gender, genetic disposition and psychological factors.[13] Upper - limb dysfunction in stroke is characterized by paresis, loss of manual dexterity, and movement abnormalities that may impact considerably on the performance of activities of daily living.[14]

Stroke rehabilitation is a progressive, dynamic, goal - oriented process aimed at enabling a person with impairment to reach their optimal physical, cognitive, emotional and function level. The goal of stroke rehabilitation is, help the client to relearn skills lost when a stroke affected part of the brain and it also helps the client to regain independence and improve the quality of life[15].

2. Objectives

1) To assess the motor functions of the upper extremity among patients with stroke.
2) To assess the functional ability of upper extremity among patients with stroke
3) To evaluate the effectiveness of motor rehabilitation bundle on motor functions among patients with stroke.
4) To determine the effectiveness of motor rehabilitation, bundle on functional ability among patients with stroke.
5) To find out the correlation between motor functions and functional ability among patients with stroke
6) To find out association of motor functions and functional ability among patients with stroke with selected variables.

3. Materials and Methods

A quantitative approach was used for the study. The study design selected was quasi experimental pre test post test control group design. Non probability purposive sampling was used to select 60 patients with stroke admitted to Government Medical College Hospital. Kottayam. Patients with stroke who are hemodynamically stable, able to do exercise and have a minimum of 10 degree of flexion in the upper extremity, willing to participate in the study, able to follow the instructions in Malayalam, and age group between 35 to 75 years were included in the study. Those excluded from the study were patients with stroke who are having cognitive impairment, visual and hearing impairment and Glasgow coma scale score less than thirteen. To assess motor functions and functional ability among patients with stroke, Upper extremity motor function assessment scale and upper extremity functional index was used before starting the therapy. Motor rehabilitation bundle was demonstrated to the patients on the second day of admission and thereafter the patient performs the exercises with the help of leaflet under the supervision of investigator for six days in the hospital and thereafter the patient performs the exercise in their home under the supervision of the caregiver for the next 2 weeks. The effectiveness of motor rehabilitation bundle on motor function and functional ability was assessed

on the 21st day after discharge during follow up visit using upper extremity motor function assessment scale and upper extremity functional index respectively. The obtained data was tabulated and analysed in terms of objectives of the study using descriptive and inferential statistics.

4. Results

4.1. Findings related to sample characteristics

Data indicated that 36.7% of patients in the control group and 40% of patients in the experimental group were in the age group of 56 - 65 years and half of the patients in the control group (50%) and experimental group (53.3%) were males. Majority of the patients (76.7%) in the control group and (70%) in the experimental group were married and 53.4% in the control and experimental group had primary education. Most of the patients (46.7%) in the control group and (43.3%) in the experimental group were daily wagers and in the control group 40% and in the experimental group 43.3% were unemployed. Majority of the patients (56.7%) in the control group and (50%) in the experimental group were supported by spouses. About half of patients in the control group (50%) and in the experimental group (53.3%) had no unhealthy habits. Most of the patients in the control group (56.7%) and in the experimental group (80%) had ischemic stroke and no previous history of stroke. Majority of the patients in the control group (80%) and in the experimental group (83.3%) had comorbidities. Majority of the patients in the control group (63.3%) and in the experimental group (86.7%) had muscle strength of 3 for the affected extremity and 93.3% of patients in the control group and 100% in the experimental group had muscle strength of 5 for the unaffected extremity. About 36.7% of patients in the control group and 33.3% of patients in the experimental group had >31 degree angle of flexion of affected extremity and 30% of subjects in both control and experimental group had >31 degree angle of flexion of unaffected extremity. About 63.4% of subjects in the control group and 66.7% of subjects in the experimental group had >31 degree angle of extension of affected extremity and 93.3% of subjects in the control group and 100% of subjects in the experimental group had 0 - 10 degree angle of extension of unaffected extremity.

4.2 Findings related to motor functions and functional ability of upper extremity among patients with stroke

About half of the patients (50%) in both control and experimental group had moderate motor functions. Among the motor function there is fine and gross motor functions. Fine motor function consists of grasp, grip and pinch functions. About 56.7% of patients in control and 53.3% of patients in the experimental group had moderate grasp functions, also 50% of patients in control and 63.3% of patients in the experimental group had moderate grip functions. Almost 43.3% of patients in both control and experimental group had poor pinch functions and 50% of patients in control and 46.7% of patients in the experimental group had no gross motor functions.

Most of the patients in the control (63.3%) and 80% of patients in the experimental group had poor functional ability.

4.3 Findings related to effectiveness of motor rehabilitation bundle among motor functions and functional ability of upper extremity among patients with stroke

Table 1: Mean rank, sum of ranks and U value of post test scores of motor functions of upper extremity among patients with stroke in control and experimental group, (n=60)

Group	Motor Functions		
	Mean rank	Sum of ranks	U
Control (n=30)	22.73	682.00	217*
Experimental (n=30)	38.27	1148.00	

*significant at 0.05 level

Table 2: Mean rank, sum of ranks and U value of post test scores of functional ability of upper extremity among patients with stroke in control and experimental group, (n=60)

Group	Functional ability		
	Mean rank	Sum of ranks	U
Control (n=30)	23.33	700.00	235.00*
Experimental (n=30)	37.67	1130.00	

*significant at 0.05 level

Mann Whitney U test was computed to find out the effectiveness of motor rehabilitation bundle among motor functions and functional ability of upper extremity among patients with stroke. Data depicted that the obtained U value for motor function and functional ability score of patients with stroke in the experimental group was significant at 0.05 level. Hence the motor rehabilitation bundle was effective in improving motor functions and functional ability among patients with stroke.

4.4 Findings related to correlation between motor functions and functional ability of upper extremity among patients with stroke

Table 3: Correlation between motor functions and functional ability of upper extremity among patients with stroke, (n=60)

Variables	ρ
Motor functions	0.61^{**}
Functional ability	

**significant at 0.01 level

The value obtained was statistically significant at 0.01 level. Hence the null hypothesis was rejected. There was a strong positive correlation between motor functions and functional ability. The increased motor function score indicates increase in level of functional ability among patients with stroke

5. Discussion

In the study it was found that 36.7% of patients in the control group and 40% of patients in the experimental group were in the age group of 56 - 65 years. The data showed that half of the patients in the control group (50%) and experimental group (53.3%) were males. Data depicted that 56.7% in the control group and 80% in the experimental group had ischemic stroke. The study findings were consistent with the findings of a randomized control trial

conducted in Rafsanneuro rehabilitation centre, Pakistan. The study was conducted in sixty six patients with stroke. Out of the samples, the majority (69.7%) of patients were males and 60% of the patients belonged to 55 - 65 years.[16]The study findings were also consistent with the findings of another study conducted in Christian medical college, Ludhiana, Punjab. The study was conducted among 174 patients with stroke. Majority of the patients (77.8%) had ischemic type of stroke.[17]The present study also evaluated the effectiveness of motor rehabilitation bundle on motor functions and functional ability of upper extremity among patients with stroke. The effectiveness was computed using Mann Whitney U test. The study result showed that the U value obtained for motor functions and functional ability scores of patients with stroke in the experimental group was significant at 0.05 level signifying the effectiveness of motor rehabilitation bundle in improving motor functions and functional ability among patients with stroke. The findings of the study were parallel with a study which was conducted on 40 patients with stroke to assess the effectiveness of bilateral arm training on upper extremity motor function and activity in patients with stroke. The study result found that there was a significant difference ($p<0.05$) between mean difference of bilateral arm training group and mean difference of conventional training group post treatment scores of motor functions and activity level.[18]The study showed that the obtained ρ value was significant at 0.01 level which was computed by using Spearman rank correlation coefficient. Hence there was a strong positive correlation between motor functions and functional ability of upper extremity among patients with stroke. The findings of the study were congruent with a retrospective cross sectional study was conducted on 58 stroke patients to investigate the relationship between the upper limb motor function and activities of daily living in stroke patients. The results of the study showed that there is a strong positive correlation between motor function and activities of daily living scores.[19]

6. Conclusions

Based on the findings of the study it can be concluded that the motor rehabilitation bundle is effective in improving the motor functions and functional ability of upper extremity among patients with stroke.

References

[1] https: //www.webmd. com/brain/picture - of - the - brain
[2] Skilbeck CE, Wade DT, Hewer RL, Wood VA. Recovery after stroke. Journal of Neurology, Neurosurgery & Psychiatry.1983 Jan 1; 46 (1): 5 - 8.
[3] Heller A, Wade DT, Wood VA, Sunderland A, Hewer RL, Ward E. Arm function after stroke: measurement and recovery over the first three months. Journal of Neurology, Neurosurgery & Psychiatry.1987 Jun 1; 50 (6): 714 - 9.
[4] Yekutiel M, Guttman E. A controlled trial of the retraining of the sensory function of the hand in stroke patients. Journal of Neurology, Neurosurgery & Psychiatry.1993 Mar 1; 56 (3): 241 - 4.
[5] Aho K, Harmsen P, Hatano S, Marquardsen J, Smirnov VE, Strasser T. Cerebrovascular disease in the community: results of a WHO collaborative study. Bulletin of the World Health Organization.1980; 58 (1): 113.
[6] Brunner &Suddarth's. Textbook of medical surgical nursing.12th edition. New Delhi: Wolter Kluwer; 2019, p.1712, 1895 - 1900
[7] Santisteban L, Térémetz M, Bleton JP, Baron JC, Maier MA, Lindberg PG. Upper limb outcome measures used in stroke rehabilitation studies: a systematic literature review. PloS one.2016 May 6; 11 (5): e0154792.
[8] Yang GY. Advancement in stroke research.
[9] Sullivan OS. Physical rehabilitation: 5th ed.2007: 705 - 775.
[10] Chitrambalam P, Baskar D, Revathy S. A study on stroke in young and elderly in Rajiv Gandhi government general hospital, Chennai.
[11] Black M Joyce, Jane Hokanson Hawks. Medical surgical nursing: Clinical management for the outcome.8th edition. New Delhi: Elsevier; 2012, p.1140 - 45.
[12] Lewis S l, Heitkember M C, Drikson S R, O Brien P G, Butcher L. Textbook of medical surgical nursing.7th edition. New Delhi: Elsevier; 2007, p.1466 - 1471.
[13] Huliyappa D, Kotrabasappa K. Risk factors and outcome of stroke in young in a tertiary care hospital. Int J Community Med Public Heal.2016 Jan; 3 (1): 323 - 7.
[14] Nakayama H, Jorgensen HS, RaaschouHparkerO, Olsen TS. Recovery of Upper Extremity Function in Stroke Patients: The Copenhagen Study. Archives of Physical Medicine and Rehabilitation 1994; 75: 852–857. [PubMed: 8053790]
[15] https: //www.mayoclinic. org/diseases - conditions/stroke/in - depth/stroke - rehabilitation/art - 20045172 Stroke rehabilitation, what to expect as you recover
[16] Jan S, Arsh A, Darain H, Gul S. A randomized control trial comparing the effects of motor relearning programme and mirror therapy for improving upper limb motor functions in stroke patients. JPMA.2019 Sep; 69 (1242).
[17] Stroke surveillance and establishment of acute stroke care pathway in rural northwest India using CHWs; Data from Ludhanapopulation based stroke registry.
[18] Dhakate D, Bhattad R. Study the Effectiveness of Bilateral Arm Training on Upper Extremity Motor Function and Activity Level in Patients with Sub - Acute Stroke. Int J Cur Res Rev| Vol.2020 Oct; 12 (20): 31.
[19] Yamamoto H, Takeda K, Koyama S, Morishima K, Hirakawa Y, Motoya I, Sakurai H, Kanada Y, Kawamura N, Kawamura M, Tanabe S. Relationship between upper limb motor function and activities of daily living after removing the influence of lower limb motor function in subacute patients with stroke: A cross sectional study. Hong Kong Journal of Occupational Therapy.2020 Jun 22: 1569186120926609