Effect of Task oriented training in improving functional independence and quality of life in patients with chronic stroke - A case study

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BACKGROUND: Stroke as a state (condition) is a condition with rapidly developing clinical features of focal loss of cerebral function with symptoms lasting longer than 24 hours or leading to death with no proper cause other than a vascular origin. A number of impairments occur following stroke such as weakness, paralysis, numbness of one side of the body, language, perceptual and cognitive dysfunction, altered consciousness, sensory and motor impairments. **OBJECTIVES:** To evaluate if task oriented training has a positive effect on upper and lower limb extremities function and ADL compared to natural recovery in improving the patient's quality of life. **METHODOLOGY:** Experimental Trail with 10 case studies of the patients affected by stroke with limitations in the basic ADL's and functional task of everyday life. The age 35-85 years old were selected and were divided into 2 groups (i.e. A and B) in which Group A received task oriented training and Group B received the conventional physiotherapeutic training. The outcome measure were Functional Independence Scale (FIM) and Berg Balance Scale employed before and at the end of the training session in both the groups. Training was given 3 times/week, 45 minutes each session and for 3 months. **RESULTS:** The pre and post-test analysis was done in which Group A who received task oriented training showed improvement in both scales of Functional Independence Measurement and Berg Balance Scale. The statistical analysis showed significant improvement in group receiving task oriented training with p value less than 0.05 ($p < 0.05$). **CONCLUSION:** The study concludes that an early rehabilitation in stroke patients using task oriented approach will bring improvement in functional activities and balance. There is a shift from training at impairment level to training on activity level.

Key Words: Stroke, Functional Training, Activities of daily living, Balance, Exercises

MANUSCRIPT

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Introduction:

Stroke is defined as abnormal blood flow (of vascular origin) to the brain arteries resulting in a number of local neurological abnormalities which will last longer than 24 hours. The World Health Organization (WHO) defines stroke as a state with abrupt developing of clinical features of local loss of cerebral function in which symptoms will last longer than 24 hours which might be the cause of death with only vascular origin[1]. According to WHO, it is said to be the 3rd most common cause of death in developed countries. Stroke incidence is the number of acute stroke per year. The subsequent chances of stroke disability will increase as the person age being the greatest risk factor for stroke.

The worldwide incidence can be quoted as 2 over 1000 population per year that is about 4 over 1000 in population of age between 45-84years. The prevalence and incidence of stroke in Zambia is hiking at an alarming rate due to underlying causes such as hypertension and other factors which include alcohol intake, hypercholesterolemia and tobacco smoking or sniffing[3]. Ischemic stroke most commonly affecting more than 80% of population with stroke, occurs when the artery is blocked or the blood flow gets impaired, causing the reduction of essential oxygen and nutrients in the brain. On the other side, Haemorrhagic stroke occurs when blood vessels burst, leading to leakage of blood in or around brain.

A number of impairments occur following stroke such as sudden weakness, paralysis (inability to move) numbness of one side of the body, language dysfunction, perceptual, cognitive, altered consciousness, sensory and motor impairments.

The recovery of stroke is fast within a period of the first 3-6 months[4] after neurological insult to brain. The functional recovery is the recovery in the day to day life functioning with adaptation and training either in the presence or absence of natural neurological recovery which lacks the neurological recovery by approximately 2 weeks and this is most well treated by rehabilitation.

The mechanisms that account for the neurological recovery will include: Early recovery or focal processes, resolution of cerebral oedema, and denervation of super sensitivity mechanisms which account for neurological recovery.

Therefore, the aims for the case study is to identify the effect of task oriented study in order to improve the functional independence and quality of life in patients with chronic stroke.

Methodology:

Study design and Sample size:

The study was performed at University Teaching Hospital (UTH), Chalala, Libala as a Case Study with time duration from August 2019 to October 2019. The total number of sample size incorporated in the study was 10 subjects (outpatients) with dependant variable as Stroke.

The list of Independent variable include:

• Medication

• Other physiotherapy interventions.

Inclusion Criteria includes the population affected by chronic stroke between age 35-85 years. Both male and female genders were included in the study.

Exclusion Criteria include Brain tumour, Epilepsy, Spinal cord injury, Traumatic brain injury and Cognitive Impairment.

Data collection tools and Outcome Measures were Questionnaire and Assessment by using Functional independence measure (FIM) and Berg balance scale.

Case study:

Case-1 : A patient named MB aged 55years had a history of stroke 2years ago, she is suffering from right side weakness (right side lower limb more affected compared to right upper limb) with difficulties in ambulation with poor balance. History of present illness: patient was apparently fine till august, 2017 when she was giving a lecture then she fell unconscious in the afternoon. She was then rushed to Maina Soko Hospital where she received treatment. On investigations haemorrhagic stroke was found on the left cerebral hemisphere. Past medical history: has a known history of hypertension for 4 years and has been taking medication for the same. On observation: patient was mesomorphic, attitude of limbs: right lower limb flexion of hip, knee is extended and ankle is in plantar flexion. Upper limb: shoulder internal rotation and adducted, elbow was in full flexion, and wrist is in flexion.

The result analysis of the above case study has shown the FIM result as 87/126 and Berg Balance Scale result as 35/56.
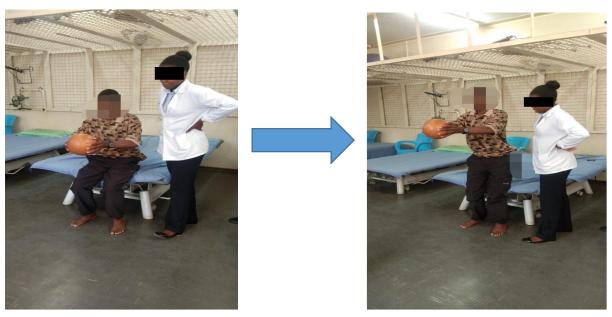

Case- II

A patient named PS aged 60years had a history of stroke 8months ago, he is suffering from left side weakness (left side lower limb more affected compared to left upper limb) with difficulties in ambulation and difficulties in holding, grasping and carrying any object.

History of present illness: patient was apparently fine till March, 2019 early morning at 6am when he fell unconscious. He was then rushed to Chilenje Hospital where he received treatment. On examination haemorrhagic stroke was found on the right cerebral hemisphere. Past medical history: has a known history of hypertension for 8years and has been taking medication for the same. Personal history: history of alcohol intake and cigarette smoking.

On observation: patient was mesomorphic, attitude of limbs: right lower limb flexion of hip, knee is extended and ankle is in plantar flexion. Upper limb: shoulder internal rotation and adducted, elbow was in full flexion, and wrist is in flexion. The result analysis of this subject has shown the score of 104/126 and Berg Balance Scale as 31/56.

The results of the another 8 subjects were calculated the same way with the total on FIM scale as : 110/126, 101/126, 95/126, 95/126, 103/126, 85/126, 75/126, 98/126. And on BBS as : 40/56, 31/56, 31/56, 16/56, 19/56, 14/56, 33/56.

Results:

The study included 10 subjects in which 5 where men and 5 women, with the age group ranging from 35 to 85. They were further divided into group A and group B. Group B consisted of 3 patients in which group task oriented training wasn't performed, they only received general

physiotherapy. And group A which consisted of 7 patients who received the task oriented training intervention for 3 times/week, 45 minutes for 3 months.

Three months following outpatient physical therapy task oriented management, Group A patients demonstrated improvement in the involved extremities compared to their pre-treatment state. This was proved by a comparison of pre-treatment scores of berg balance and functional independence measure (FIM). In FIM a range of improvement was from 3 to 13 scores in different patients, whereas in Berg balance there was an improvement of 5 scores.

In Group B uncoordinated approaches where used and little improvement was observed according to the scores in FIM and Berg balance scales.

Discussion:

Task oriented training is a contemporary intervention; it focuses on the relearning of daily activities. It is based on theories in kinesiology which emphasize on a distributed motor control rather than hierarchal motor control model. The person is an active participant whose goal is to relearn effective functions to aid with daily activities. A successful task relearning occurs when performance is automatically and efficiently practiced or performed.

This project was focused on four steps of task oriented training to rehabilitate patients with stroke. These steps were followed after observing and identifying deficits in generating appropriate models of action, which are the primary problems following stroke, and not spasticity or pathologic movement synergies. However there is a need to distinguish normal movements from stereotypic movement patterns which are compensatory strategies that result when movement is attempted.

The four steps includes analysis of task which has three sub component and these are observation of task, comparison of task and analysis of task. The second steps is practise of missing components which involves three subcomponents, explanation and identification of goal, instruction to the patients, practice plus verbal and visual feedback plus manual guidance. The third step is just the progression of second step, which is the practise of task and involves all the components in second step and an addition of increased complexity, adding variety, decrease feedback and guidance, more re-evaluation and encourage flexibility.

The final and last step is the transference where the patient gets an opportunity to practice in context, the therapist also ensures the consistency of practice and positive reinforcement is achieved, organization of self-monitored practice in this the patient is encouraged to perform

the tasks on their own without supervision. Some patients perform better than other patients and others perform well in a group where they get motivated upon seeing other conditions and draw motivation from. This was the reason why a structured and stimulating learning environment is put in place and there is also involvement of relatives in order to help with achieving the functional goal[10].

For this study, collected data using Berg balance scale and functional independence measure (FIM) which is an 18 item measure or tool which explores an individual's physical, psychological and social function. The measure uses a level of assistance and individual needs to grade functional status from total independence to total assistance. Berg balance scale is an objective measure of static and dynamic balance abilities, it consists of 14 functional tasks commonly performed in everyday life. The items range from sitting to standing unsupported, variations in standing position to placing the foot on a stool. The study included 10 subjects in which 5 where men and 5 where women, with the age group ranging from 35 to 85, they were further divided into experimental group A and control group B. In the experimental group A which consisted of 7 patients who received the task oriented training intervention for 3 times/week 45 minutes for 3 months. In control group B, which consisted of 3 patients who were treated randomly not following task oriented training.

According to the assessment carried out, patients in the experimental group received treatment based on the scores of the FIM and Berg balance in order to rehabilitate them in the area they lack functional independence. In the control group assessment was done but they only received general physiotherapy and not the specific approach. For example one patient in experimental group was assessed and had difficulties in performing ADL's and balance by using the approach was trained the patient for sitting to stand balance progressively. For improving the hand movement weight bearing while sitting so as to improve the proprioception of joints and non-equilibrium exercises where done, once the patient was capable of this, he started with hand function activities such as grasping different shapes using objects such as bottle, ball and pen. On another patient task oriented training was applied on the patient's hand to improve hand function. Initially the patient was trained for forward and sideways reach with assistance given to keep the arm straight once the patient was able to do that, she was taught on how to improve fine motor functions such as picking and placing the key in the lock, using a peg board with different shapes.

Limitations of study:

• The study includes a small sample size

• The study was limited within defined areas

• Duration of the study was less

• Time constrains hence more subjects were not included

• Accessibility to subjects and accessibility of tools

• There was lack of literature

• Approval from Research ethical committee in Zambia

Future scope of the study: Studies with larger participants needs to be conducted to find

actual difference among the population

 A long term follow up of the study

 Adequate duration should be there to make the results more reliable

 This study can be done in different age groups (example 35-60, 50-70)

Conclusion: The study concludes that an early rehabilitation in stroke patients using task oriented approach will bring improvement in functional activities. Task oriented approach after stroke has been proved to be relevant in improvement of impairments as well as functional movements. There is a shift from training at impairment level to training on activity level.

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