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Effectiveness of Constraint Induced Movement Therapy on Sensory and Motor Functions of Upper Extremity among Patients with Cerebrovascular Accident

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Abstract: ***The present study investigated the effectiveness of constraint induced movement therapy on sensory and motor functions of upper extremity among patients with cerebrovascular accident admitted in a tertiary care hospital, Kottayam. A quantitative approach with quasi experimental pre testpost test control group design was used for the study. The conceptual framework, Betty Neumann's system model theoretically supported the study. Sixty patients with cerebrovascular accident were selected using non probability purposive sampling technique. The data were collected using socio personal and clinical data sheet, action research arm test sensory and motor function scales and constraint induced movement therapy rehabilitation kit.Pre test was conducted on second day of admission. Constraint induced movement therapy is the application of restraint to the unaffected upper extremity of the cerebrovascular accident and providing a group of sensory and motor therapy to the affected upper extremity. Constraint induced movement therapy starts on the 2 nd day of admission and continued for next 4 days. Total of 4 sessions of constraint induced movement therapy was provided in a day, each session was given for 55 min with 1 hour interval in between the sessions. Post test was conducted on the sixth day of admission. The effectiveness of constraint induced movement therapy was computed using Mann Whitney U test. The study result showed that U value obtained for sensory and motor function scores of patients with cerebrovascular accident in the control and experimental group was significant at 0.05 level signifying the effectiveness of constraint induced movement therapy in improving motor functions among patients with cerebrovascular accident. Study revealed that association of sensory and motor functions among patients with cerebrovascular accident with selected variables was not statistically significant.***

1. Significance of study

Cerebrovascular accident rehabilitation may include some or all of the following activities, depending on the part of the body or type of ability affected. The rehabilitation of stroke includes strengthening motor skills, mobility training, constraint induced therapy, range of motion therapy and some technology assisted physical activities like functional electrical stimulation, robotic technology, wireless technology, virtual reality, non-invasive brain stimulation.

Among these, range of motion exercise and constraint induced movement therapy are some of the cost effective measures to implement in clinical setting that will improve the motor functions of the affected patients with CVA. Constraint induced movement therapy describes a package of interventions designed to increase the impact on the upper extremity function of stroke patients. It is the behavioural approach to neuro rehabilitation based on the principle of learned non-use. The major component of the constraint induced movement therapy include repetitive structured practice with intense therapy in more affected arm and restraint given to less affected arm.Cognitive guidelines highly emphasize the importance of patients' participation in constraint induced movement therapy. Constraint induced movement therapy has been identified as measures designed to help the patients in minimizing recovery time following a stroke event and maximizing physical, social and vocational functioning by encouraging physical training. Stroke rehabilitation consists of medical education, supervised exercise training for 2-3 days and may extend to weeks or months in order to produce optimum improvement in patient health related to quality of life. Studies showed that constraint induced movement therapy were effective in improving the motor and sensory functions in the maximum level within a short period of time. There lacks a structured rehabilitation programme for patients with cerebrovascular accident in the medical wards. The researcher ought to design the present study because there is a pressing need to construct a rehabilitation programme and to study its effect on sensory and motor functions of patients with cerebrovascular accident.

1.1 Statement of the problem

Effectiveness of constraint induced movement therapy on sensory and motor functions of upper extremity among patients with cerebrovascular accident admitted in a tertiary care hospital, Kottayam

1.2 Objectives

1) To assess the sensory and motor functions of upper extremity among patients with cerebrovascular accident
2) To determine the effectiveness of constraint induced movement therapy on sensory and motor functions of upper extremity among patients with cerebrovascular accident
3) To find out association of sensory and motor functions of upper extremity among patients with cerebrovascular accident with selected variables

1.3 Hypotheses

H_1: There is a significant difference in the sensory functions of the upper extremity among patients with cerebrovascular accident between control and experimental group.

H_2: There is a significant difference in the motor functions of the upper extremity among patients with

cerebrovascular accident between control and experimental group.

H_3: There is a significant association between sensory functions of the upper extremity among patients with cerebrovascular accident and selected variables.

H_4: There is a significant association between motor functions of the upper extremity among patients with cerebrovascular accident and selected variables.

2. Methodology

Research approach: Quantitative research approach was adopted for the study.
Research design: Quasi experimental research design
Setting: Medical wards (2,3,6 and 9), Govt. Medical College Hospital, Kottayam
Population: The study population comprises the patients with cerebrovascular accident, admitted in Govt. Medical College Hospital, Kottayam.
Sample: Thirty in control group and thirty in experimental group were fixed.
Sampling technique: Non probability purposive sampling technique was used

2.1 Criteria for sample selection

Inclusion criteria
Patients with cerebrovascular accident who

- have diminished upper extremity functional ability
- have 10 degree of flexion and extension possible in upper extremity
- have either ischemic orhaemorrhagic stroke
- are hemodynamically stable(systolic blood pressure>160mm Hg and diastolic blood pressure >60mm Hg and pulse rate above 60 b/m and below 100 b/m)
- are able to do the exercises

Exclusion Criteria
Patients withcerebrovascular accident who are

- Unconscious
- On mechanical ventilator
- Mentally ill

2.2 Tools

Tool 1	:	Sociopersonal and clinical data sheet
1.1	:	Socio personal data sheet
1.2	:	Clinical data sheet
Tool 2	:	Action research arm test sensory function scale
Tool 3	:	Action research arm test motor function scale

3. Data Analysis

Section 1: Sociopersonal data of patients with CVA

Sample characteristics	Control group n=30		Experimental group n=30		df	$\chi 2$
	f	%	f	%		
Age (years)						
35-45	3	10	4	11.3		
46-55	6	20	8	27.7	3	2.07
56-65	13	42.3	10	33.3		
66-75	8	27.7	8	27.7		
Gender						
Male	19	63.3	18	60	1	1.06
Female	11	36.7	12	40		
Education						
Primary	3	10	7	23.3		
Secondary	8	27	5	16.7	3	3.18
Higher secondary	11	36	10	33.3		
Degree or above	8	27	8	26.7		
Marital status						
Married	19	63.3	18	60		
Unmarried	3	10	7	23.3	2	2.53
Widow/ Widower	8	26.7	5	16.7		
Occupation						
Unemployed	3	10	7	23.3		
Manual labourer	8	26.7	8	26.7		
Self- employed	8	26.7	4	13.3	4	2.9
Private	6	20	6	20		
Support system						
Parents	3	10	5	16.7		
Spouse/ children	21	70	18	60	3	2.08
Friends/ Relatives	6	20	7	23.3		
Social groups	0	0	0	0		
Dietary pattern						
Vegetarian	10	33.33	12	40	1	1.6
Non- vegetarian	20	66.67	18	60		
Unhealthy habits						
Nil	11	36.7	12	40		
Smoking	3	10	4	13.3		
Alcoholism	6	20	3	10	3	1.23
Smoking and alcoholism	10	33.3	11	36.7		

3.1 Clinical data of patients with CVA

Sample characteristics	Control group n=30		Experimental group n=30		df	$\chi 2$
	f	%	f	%		
Type of CVA						
Ischemic	24	80	20	66.7	1	1.26
Hemorrhagic	6	20	10	33.3		
Previous history of CVA						
Yes	5	16.7	11	36.7	1	3.06
No	25	83.3	19	63.3		
Comorbidities						
Nil	0	0	0	0		
Hypertension(HTN)	4	13.3	4	13.3		
Diabetes mellitus(DM)	3	10	1	3.3		
Dyslipidemia(DLP)	2	6.7	2	6.7		
HTN+DM	6	20	5	16.7	6	1.62
HTN+DLP	6	20	6	20		
DM+DLP	2	6.7	2	6.7		
HTN+DM+DLP	7	23.3	10	33.3		

Pupillary reaction	Control group n=30		Experimental group n=30		df	$\chi 2$
	f	%	f	%		
Right eye						
Reactive	26	86.7	28	93.3		
Slightly reactive	4	13.3	2	6.7	1	1.10
Non-reactive	0	0	0	0		
Left eye						
Reactive	27	90	28	93.3		
Slightly reactive	3	10	2	6.7	1	1.02`
Non-reactive	0	0	0	0		
Affected extremity						
1	22	73.4	21	70		
2	6	20	5	16.7		

3	1	3.3	4	13.3	3	2.41
4	1	3.3	0	0		
5	0	0	0	0		
Unaffected extremity						
1	0	0	0	0		
2	0	0	0	0		
3	0	0	0	0	1	3.27
4	18	60	11	36.7		
5	12	40	19	63.3		
Affected extremity						
10-20	22	73.3	24	80		
21-30	8	26.7	6	20	1	1.23
>31	0	0	0	0		
Unaffected extremity						
10-20	18	60	8	26.7		
21-30	12	40	22	73.3	1	4.05
>31	0	0	0	0		
Affected extremity						
10-20	25	83.3	22	73.3		
21-30	5	16.7	8	26.7	1	1.21
>31	0	0	0	0		
Unaffected extremity						
10-20	16	53.3	17	56.7		
21-30	14	46.7	13	43.3	1	2.65

Section 2: Sensory functions and motor functions among patients with CVA

3.2 Sensory functions among patients with CVA in control and experimental group

Sensory functions	Control group n=30		Experimental group n=30		df	$\chi 2$
	f	%	f	%		
Normal (>6)	0	0	0	0		
Delayed(3-5)	3	10	6	20	1	0.13
No response(0-2)	27	90	24	80		

3.3 Motor functions among patients with CVA in control and experimental group

Motor functions	Control group n=30		Experimental group n=30		df	$\chi 2$
	f	%	f	%		
Normal (40-57)	0	0	0	0		
Delayed(20-39)	5	16.7	13	43.3	1	0.67
No response(0-19)	25	83.3	17	56.7		

Section 3: Effectiveness of constraint induced movement therapy on sensory and motor functions among patients with cerebrovascular accident

Section 3.1: Effectiveness of constraint induced movement therapy on sensory functions among patients with cerebrovascular accident, n=60

Sensory functions			
Group	Mean rank	Sum of ranks	U value
Control (n=30)	19.57	587	4.25 *
Experimental (n=30)	41.43	1243	

*significant at 0.05 level

Section 3.2: Effectiveness of constraint induced movement therapy on motor functions among patients with cerebrovascular accident, n=60

Motor functions			
Group	Mean rank	Sum of ranks	U value
Control (n=30)	15.58	467	2.15 *
Experimental (n=30)	45.42	1362	

*significant at 0.05 level

Section 4: Association between sensory functions among patients with cerebrovascular accident and selected variables

S. No	Variables	df	$\chi 2$
1	Age (years)	3	1.84
2	Gender	1	0.69
3	Dietary pattern	1	0.39
4	Unhealthy habits	3	4.69
5	Type of CVA	1	0.41
6	Muscle strength of affected extremity	3	1.93
7	Angle of flexion of affected extremity (degree)	1	2.57
8	Angle of extension of affected extremity (degree)	1	0.09

Section 5: Association between motor functions among patients with cerebrovascular accident and selected variables

S.No	Variables	df	$\chi 2$
1	Age (years)	3	3.47
2	Gender	1	1.56
3	Dietary pattern	1	0.05
4	Unhealthy habits	3	2.18
5	Type of CVA	1	0.58
6	Muscle strength of affected extremity	3	0.88
7	Angle of flexion of affected extremity (degree)	1	0.01
8	Angle of extension of affected extremity (degree)	1	0.38

4. Implication

Nurses should incorporate CIMT in their clinical practice for improving the sensory and motor functions of upper extremity among patients with CVA. Nurses working in the medical wards should use CIMT to achieve maximum functional ability of the patients. CIMT could be used in various settings like medical wards, rehabilitation centres and home care settings.

The present study emphasis the need for rehabilitation for patients with CVA. Nursing curricula for various levels of preparation should include different types of rehabilitations for patients with CVA. The nursing students should be taught and practiced to perform CIMT session for patients with CVA. The techniques and the skills for CIMT should be given as an in-service education for the staff nurses. The main focus of nursing care in clinical setting is to provide comprehensive and competent nursing care for patients with CVA. The nurse administrators play a key role in organizing the staff development programmes related to the CVA rehabilitation and CIMT.

Nurse administrators should use the findings of the study and should extend in the form of evidence based practice. Administrative support should be given to the staff to plan, organize and conduct rehabilitation technique for improving the physical abilities of patients with CVA. The findings of the study should be published in national and international journals. Dissemination of findings of the study should be done through national and international conferences.

5. Conclusion

The study on effectiveness of constraint induced movement therapy on sensory and motor functions of upper extremity among patients with CVA was a success research work by the investigator. Based on the finding of the study the following conclusion can be made. There was a significant improvement in the sensory and motor functions of upper extremity among patients with CVA. The present study grasped the need for providing rehabilitation therapy like CIMT for the patients with CVA. So more research should be conducted on CIMT and other CVA rehabilitation techniques.

6. Recommendations

- A follow up study need to be conducted to assess the sensory and motor functions of upper extremity among patients with CVA in 2-4 weeks after CIMT sessions.
- The study can be replicated in various settings with larger sample to facilitate generalization of results.
- A comparative study can be conducted to determine the effectiveness of CIMT and modified CIMT on sensory and motor functions of upper extremity among patients with CVA.
- The CIMT guidelines and procedure can be developed and propagated in all medical wards.
- The study can be modified on the basis of other neuro rehabilitation techniques for CVA like kinetic movement therapy, electrical stimulation therapy, random movement therapy, positive stretching, high frequency muscle vibration and positioning therapy.

References

[1] Mayfield Brain & Spine [Internet]. Ohio; Tonya Hines; 2015[updated 2017 Dec 23; cited 2018 Jan 2] Available from: https://www.mayfieldclinic.com/pe-anatbrain.htm.
[2] 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.
[3] Brunner & Suddarth's. Textbook of medical surgical nursing. 12th edition. New Delhi: Wolter Kluwer; 2011, p.1895-1900.
[4] Stroke [Internet]. Wikipedia; 2017[updated 2017 Dec 10; cited 2018 Mar 15]. Available from: https://en.wikipedia.org/wiki/Stroke.
[5] Hickey V Joanne. The clinical practice of neurological and neurosurgical nursing. 4th edition. East Washington: Lippincott Williams & Wilkins; 2014, p543-50.
[6] Black M Joyce, Jane Hokanson Hawks. Medical surgical nursing: Clinical management for the outcome. 8th edition. New Delhi: Elsevier; 2012, p.1140-45.
[7] Mrabet A, Attia-Romdhane N, Ben MH, Gharbi N, Le HN, Hentati R, Ben JM, Srairi I. Epidemiologic aspects of cerebrovascular accidents . Revue neurologique. 2016; 146(4):297-301. Available from:http://europepmc.org/abstract/med/2359902
[8] Kasitha TO, Livin W. Stroke prevalence rate over date. Stroke medical journal. 2017 Jul; 67(7):482-6.
[9] Bhise MD, Patra S, Chaudhary M. Geographical variation in prevalence of non-communicable diseases (NCDs) and its correlates in India: evidence from recent NSSO survey. Journal of Public Health. 2018:1-9.
[10] Koul R, Motta A, Razdan S. Epidemiology of young strokes in Spirion , India. Act Neurological association. 2010 Jul 1; 82(1):1-3.
[11] Sridharan SE1, Unnikrishnan JP, Sukumaran S, Sylaja PN, Nayak SD, Sarma PS, Radhakrishnan K. Incidence, types, risk factors, and outcome of stroke in kerala: the Trivandrum Stroke Registry. Journal of stroke. 2015 Sep; 15(3):128. Available from: https://www.ncbi.nlm.nih.gov/pubmed/19228849.
[12] Pandian JD, Sudhan P. AVA center for stroke and stroke care services in India. Journal of stroke. 2013 Sep; 15(3):128.