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Effect of Chin Tuck Against Resistance Exercise (CTAR) on Swallowing Ability among Post Stroke Patients at Selected Hospital Coimbatore

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ABSTRACT

Dysphagia is an impairment of swallowing involving any structure of the upper gastrointestinal tract, from the mouth to the lower esophageal sphincter. After a stroke, most patients have dysphagia, which can lead to aspiration pneumonia, malnutrition and adverse functional outcomes. An interventional study was conducted to assess the Effect of Chin Tuck Against Resistance (CTAR) Exercise on Swallowing Ability among Post Stroke Patients at Selected Hospital, Coimbatore. Quasi experimental pretest post test control group design was adopted and the convenient sampling technique was used. Among 40 patients, 20 were selected for experimental group and 20 were selected for control group based on the inclusion and exclusion criteria. A pretest was conducted to assess the level of swallowing ability and functional oral intake by using the Gugging Swallowing Screen (GUSS) scale and Functional Oral Intake Scale (FOIS). In the experimental group, the Chin Tuck Against Resistance (CTAR) exercise intervention was given to the patients five times a day for a minimum of five consecutive days. Post-test was conducted to assess the level of swallowing ability and functional oral intake by using the same scale. Paired 't' test was used to evaluate the effect of Chin Tuck Against Resistance exercise (CTAR) on swallowing ability among post-stroke patients in the experimental group. The calculated 't' value 5.871 was greater than the table value of 3.88 at 0.001 level of significance. The effect of Chin Tuck Against Resistance exercise (CTAR) on functional oral intake among post-stroke patients in the experimental group showed that the calculated 't' value 8.143 was greater than the table value of 3.88 at 0.001 level of significance. An independent 't' test was used to evaluate the effect of Chin Tuck Against Resistance exercise (CTAR) on swallowing ability among post stroke patients during the post-test in the experimental group and control group. The calculated value of 2.73 was greater than the table value of 2.09 at 0.05 level of significance. Hence, Chin Tuck Against Resistance (CTAR) exercise is effective in improving swallowing ability among post stroke patients. Chin Tuck Against Resistance (CTAR) exercise is simple, cost-effective, easy-to-administer and effective in improving swallowing ability among post stroke patients.

Keywords: Chin Tuck Against Resistance exercise (CTAR), Swallowing Ability, Cerebro Vascular Accident (CVA), Dysphagia, Gugging Swallowing Screen (GUSS), Functional Oral Intake Scale (FOIS).

INTRODUCTION

Cerebro Vascular Accident (CVA) is defined as the dysfunction of brain due to a disturbance of the cerebral blood flow. It is the second most common cause of death and adult disability around the world. (Jia Hao Sun, 2014) Dysphagia is an impairment of swallowing which involves any structure of the upper gastrointestinal tract, from the mouth to the lower esophageal sphincter. Dysphagia (Difficulty in swallowing) affects more than 50% of stroke survivors. It either presents with difficulty in the initial phases of swallowing (oropharyngeal dysphagia) or as a sensation that food and liquid are being obstructed in their passage from the mouth to the stomach (esophageal dysphagia). (Tuhin mitra 2019)

NEED FOR THE SYUDY

The presence of dysphagia has been associated with an increased risk for pulmonary complications and even mortality. There is emerging evidence that early detection of dysphagia in patients with acute stroke reduces not only these complications but also reduces length of hospital stay and overall healthcare expenditures. CTAR, being a low-cost and easy-to-administer intervention, presents a cost-effective option for both healthcare systems and caregivers. Promoting its usage could help reduce economic strain while improving care outcomes. (Altman et al., 2010).

STATEMENT OF THE PROBLEM

Effect of Chin Tuck Against Resistance (CTAR) Exercise on Swallowing Ability among Post Stroke Patients at selected Hospital, Coimbatore.

OPERATIONAL DEFINITION

Effect:

It refers to the changes in the improvement of swallowing ability after practicing of Chin Tuck Against Resistance (CTAR) exercise. It is measured by using Gugging Swallowing Screening scale (GUSS) and Functional Oral Intake Scale (FOIS).

Chin Tuck Against Resistance (CTAR) exercise:

It is a type of Chin Tuck Against Resistance exercise to improve the swallowing ability. It is a simple exercise used to restore the normal swallowing ability and to strengthen the suprahyoid muscles. A rubber ball of 12 cm in diameter is inserted between the chin and the base of the neck to offer resistance. Patients have to tuck the chin against the ball sustaining for 10 seconds and 10 repetitions, five times a day for minimum five consecutive days.

Swallowing ability:

It is the ability of the patient to swallow food or fluid without any complication. It is measured by Gugging Swallowing Screen scale (GUSS) and Functional Oral Intake Scale (FOIS).

Post stroke patients:

In this study, it refers to clinically diagnosed stroke patients with dysphagia admitted at selected Hospital, Coimbatore.

Dysphagia:

It refers to difficulty in swallowing and it is measured by using Gugging Swallowing Screen scale (GUSS) and Functional Oral Intake Scale (FOIS).

Hypotheses

H_1 – There is a significant difference in the level of swallowing ability before and after CTAR exercise am-

ong post stroke patients in experimental and
Control group.

H_2 – There is a significant difference in the level of functional oral intake before and after CTAR exercise among post stroke patients in experimental and Control group.

H_3 – There is a significant difference in the level of swallowing ability after the implementation of Chin Tuck Against Resistance (CTAR) exercise training among experimental group.

H_4 – There is a significant difference in the level of functional oral intake after the implementation of Chin Tuck Against Resistance (CTAR) exercise training among experimental group.

H_5 - There is a significant association between the level of swallowing ability and selected clinical variables among post stroke patients with dysphagia.

METHODOLOGY

RESEARCH APPROACH: Quantitative approach

RESEARCH DESIGN: Quasi- Experimental, Pre-test Post -test control group design.

SETTING: Sri Ramakrishna hospital, Coimbatore.

TARGET POPULATION: Post stroke patients with dysphagia

ACCESSIBLE POPULATION: Post stroke patients with dysphagia admitted in Selected Hospital

SAMPLING TECHNIQUE: Convenient sampling technique

SAMPLE SIZE: 40 samples were taken.

CRITERIA FOR SAMPLE SELECTION

Samples were selected based on the following inclusion and exclusion criteria.

Inclusion Criteria

- Post stroke patients with dysphagia.
- Post stroke patients who are alert, cooperative and obey commands.
- Post stroke patients who are willing to participate.

Exclusion Criteria

- Post stroke patients who are critically ill.
- Post stroke patients with other neurological disorders.
- Post stroke patients with history of neck surgery.

Data Collection Procedure

Following expert advice and approval from the pilot study, the main study was conducted. The validated tool was used to collect data and the main study was conducted over one-month period. The research was carried out in neuro and special wards of selected Hospital, Coimbatore. Quasi experimental pretest and post-test control group design was adopted. Using the convenient sampling technique, 40 study participants were chosen based on inclusion and exclusion criteria so that 20 were in the experimental group from special ward and 20 were in the control group from neuro ward. Pretest data was collected using Gugging Swallowing Screen scale (GUSS) and Functional Oral Intake Scale (FOIS). Observational and interview method was used to collect data from both experimental and control group. The Chin Tuck Against Resistance (CTAR) exercise was given to the experimental group 5 times a day for a period of minimum 5 consecutive days. The control group received normal routine treatment. Post test was conducted at the end of 5 days of intervention by using the same scale.

DATA ANALYSIS AND INTERPRETATION

SECTION - I

Demographic variables of post stroke patients

n = 40

S. No.	Demographic variables	Experimental group		Control group	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	**Age in years**				
	a) 31-40	0	0	0	0
	b) 41-50	7	35	5	25
	c) 51-60	7	35	7	35
	d) 61-70	6	30	8	40
2	**Gender**				
	a) Male	16	80	15	75
	b) Female	4	20	5	25
3	**Education**				
	a) No formal education	7	35	5	25
	b) Primary education	4	20	6	30
	c) Secondary education	3	15	4	20
	d) Higher secondary education	2	10	2	10
	e) Graduate	4	20	2	10
4	**Marital status**				
	a) Single	0	0	0	0
	b) Married	14	70	15	75
	c) Divorced	0	0	0	0
	d) Widow/widower	6	30	5	25
5	**Occupation**				
	a) Private	10	50	9	45
	b) Government	1	5	5	5
	c) Self-employed	4	20	1	25
	d) Unemployed	5	25	1	25
6	**Monthly family income**				
	a) ₹ 20,000- 30,000	4	20	7	35
	b) ₹ 31,000- 40,000	4	20	2	10
	c) ₹ 41,000- 50,000	6	30	5	25
	d) ₹ 51,000- 60,000	6	30	6	30
7	**Dietary pattern**				

	a) Vegetarian b) Non vegetarian	0 20	0 100	0 20	0 100
8	**Personal habits** a) Alcohol b) Smoking c) Both alcohol and smoking d) Betel leaf e) No personal habits	 4 4 5 2 5	 20 20 25 10 25	 3 0 6 1 10	 15 0 30 5 50

SECTION – II
Clinical variables of post stroke patients
n = 40

S. No.	Clinical variables	Experimental group		Control group	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	**Type of stroke** a) Ischemic stroke b) Haemorrhagic stroke	 12 8	 60 40	 12 8	 60 40
2	**Day of stroke** a) 0 to 5 b) 6 to 10 c) 11 to 15 d) 16 to 20	 12 7 1 0	 60 35 5 0	 10 9 1 0	 50 45 5 0
3	**Family history of stroke** a) Yes b) No	 0 20	 0 100	 0 20	 0 100
4	**Comorbid illness** a) Hypertension b) Diabetes mellitus c) Both HT and DM d) No comorbid illness	 8 4 8 0	 40 20 40 0	 9 3 6 2	 45 15 30 10
5	**Duration of sleep (In hours)** a) <5 b) 6 to 8 c) >8	 5 8 7	 25 40 35	 3 6 11	 15 30 55
6	**Activity of daily living** a) Partially dependent				

	b) Dependent Independent	8 12 0	40 60 0	8 12 0	40 60 0
7	**CT scan findings** a) Right Middle Cerebral Artery infarct Left Middle Cerebral Artery infarct	11 9	55 45	9 11	45 55

SECTION - III

Level of swallowing ability among post stroke patients of experimental and control group n=40

S. No	Level of swallowing ability (GUSS scale)	Experimental group (n= 20)		Control group (n= 20)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	No dysphagia (20)	-	-	-	-
2	Mild dysphagia (15-19)	-	-	-	-
3	Moderate dysphagia (10-14)	2	10	2	10
4	Severe dysphagia (0-9)	18	90	18	90

SECTION -IV

Level of functional oral intake among post stroke patients of experimental and control group n=40

S.NO	Level of functional oral intake (FOIS scale)	Experimental group (n= 20)		Control group (n= 20)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Grade 1	16	80	14	70
2	Grade 2	3	15	4	20
3	Grade 3	1	5	1	5
4	Grade 4	-	-	1	5
5	Grade 5	-	-	-	-
6	Grade 6	-	-	-	-

7	Grade 7	-	-	-	-

SECTION - V

Level of swallowing ability among post stroke patients in pre and post-test of experimental group by using GUSS scale

n=20

S. No	Level of swallowing ability (GUSS scale)	Pre test		Post test	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	No dysphagia (20)	-	-	-	-
2	Mild dysphagia (15-19)	-	-	-	-
3	Moderate dysphagia (10-14)	2	10	9	45
4	Severe dysphagia (0-9)	18	90	11	55

Effect of CTAR exercise on swallowing ability before and after the intervention among post stroke patients in experimental group

Group	Mean	SD	Mean difference	't' value	Table value
Pretest Post test	6.3 9.5	3.018 2.598	0.42	5.871***	3.88

***Significant at 0.001 level**

Level of functional oral intake before and after the intervention among post stroke patients in experimental group

n=20

S.NO	Level of functional oral intake (FOIS scale)	Pre test		Post test	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Grade 1	16	80	4	20
2	Grade 2	3	15	1	5
3	Grade 3	1	5	5	25
4	Grade 4	-	-	6	30

5	Grade 5	-	-	4	20
6	Grade 6	-	-	-	-
7	Grade 7	-	-	-	-

Effect of CTAR exercise on functional oral intake before and after the intervention among post stroke patients in experimental group

Group	Mean	SD	Mean difference	't' value	Table value
Pretest	1.25	0.536	0.744	8.143***	3.88
Post test	3.4	1.280			

***Significant at 0.001 level**

Level of swallowing ability before and after the intervention among post stroke patients in control group

n=20

S. No	Level of swallowing ability (GUSS scale)	Pre test		Post test	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	No dysphagia (20)	-	-	-	-
2	Mild dysphagia (15-19)	-	-	-	-
3	Moderate dysphagia (10-14)	2	10	4	20
4	Severe dysphagia (0-9)	18	90	16	80

Pre and post test level of swallowing ability among post stroke in control group.

Group	Mean	SD	Mean difference	't' value	Table value
Pretest	5.5	2.439	0.921	2.839*	2.09
Post test	6.9	3.360			

***Significant at 0.05 level**

Level of functional oral intake before and after the intervention among post stroke patients in control group

n=20

S. No.	Level of functional oral intake (FOIS scale)	Pre test		Post test	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Grade 1	14	20	6	30

2	Grade 2	4	5	2	10
3	Grade 3	1	5	4	20
4	Grade 4	1	-	7	35
5	Grade 5	-	-	1	-
6	Grade 6	-	-	-	-
7	Grade 7	-	-	-	-

Pre and post test level of functional oral intake among post stroke patients in control group

Group	Mean	SD	Mean difference	't' value	Table value
Pretest	1.7	1.144	0.193	3.818**	2.86
Post test	2.75	1.337			

****Significant at 0.01 level**

The level of swallowing ability after the intervention among post stroke patients in experimental and control group.

Group	Mean	SD	Mean difference	't' value	Table value
Experimental group	9.5	2.598	0.762	2.73*	2.09
Control group	6.9	3.360			

***Significant at 0.05 level**

The level of functional oral intake after the intervention among post stroke patients in experimental and control group.

Group	Mean	SD	Mean difference	't' value	Table value
Experimental group	3.4	1.280	0.057	1.67	2.09
Control group	2.75	1.337			

Association between the level of swallowing ability and selected variables among post stroke patients.

n=40

S. No	Variables	Level of ADL				χ^2 Chi-square	Degree of freedom	χ^2 table value
		Moderate (10-14)		Sever (0-9)				
		N	%	N	%			

1.	**Age in years** a) 31-50 b) 51-70	 1 3	 2.5% 7.5%	 10 26	 25% 65%	0.01	1	3.84
2.	**Gender** a) Male b) Female	 2 2	 5% 5%	 29 7	 72.5% 17.5%	1.91	1	3.84
3.	**Personal habits** a) Alcohol, smoking, both alcohol and smoking betel leaf b) No personal habit	3 1	7.5% 2.5%	22 14	55% 35%	0.28	1	3.84
4.	**Type of stroke** a) Ischemic stroke b) Hemorrhagic stroke	 3 1	 7.5% 2.5%	 21 15	 52.5% 37.5%	0.4	1	3.84
5.	**Day of post stroke** a) 0-10 b) 11-20	 4 0	 10% 0%	 34 2	 85% 5%	0.23	1	3.84
6.	**Comorbid illness** a) Yes b) No	 4 0	 10% 0%	 34 2	 85% 5%	0.23	1	3.84

RESULT AND DISCUSSION

The present study revealed that mean level of swallowing ability among post stroke patients during post-test in the experimental group and control group were 9.5 and 6.5 respectively, with a mean difference of 0.762. The calculated value 2.73 was greater than the table value of 2.09 at 0.5 level of significance. Hence the stated hypothesis. Hence the stated hypothesis H_3: "There is a significance difference in the level of swallowing ability after the implementation of Chin Tuck Against Resistance (CTAR) exercise training among post stroke patients in experimental and control group was accepted. It was inferred that there was a significant improvement in the level of swallowing ability among post stroke patients in the experimental group and control group.

The study conducted by Santhosh Priya 2017 the findings revealed that CTAR exercise significantly improves the swallowing ability of CVA patients with dysphagia in the intervention group than who received the routine care in the comparison group. In the intervention group, at the end of 8 days of CTAR exercise most of the progressed to mild dysphagia with a mean post test score of 16.3688 where as in comparison group, even at the end of 8 days of routine care they remained in severe dysphagia state with a mean post test score of 7.75 ± 4.0389. Thus, it is statistically significant with 't' value 6.5009 at the level of $p<0.001$. Hence it can be concluded that CTAR is effective in improving the swallowing ability as compared to routine care among CVA patients.

CONCLUSION

Dysphagia is an impairment of swallowing involving any structure of the upper gastrointestinal tract, from the mouth to the lower esophageal sphincter. The Chin Tuck Against Resistance (CTAR) exercise help to improve the level of swallowing ability, promote swallowing function and reduce aspiration risk. It also helps to improve the functional oral intake among post stoke patients. The Chin Tuck Against Resistance exercise is simple, cost effective and easy-to-administer intervention. The present study result shows that patients in experimental group who practiced the CTAR exercise had better outcome than the control group. Therefore, CTAR exercise is effective in improving swallowing ability among post stroke patients.

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