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RESEARCH ARTICLE

Chin Tuck Against Resistance Exercise for Dysphagia in Post-CVA Patients

Mr. Ganesh Chokale[1], Dr. Basavant Dhudum[2*], Ms. Jessica Mali[3], Mr. Sachin Sakate[4] and Mr. Yogesh Bhosale[5]

[1]M. Sc. (N) Scholar, Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli
[2]Associate Professor, Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli
[3]Clinical Instructor, Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli
[4]Clinical Instructor, Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli
[5]Clinical Instructor. Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli

*Corresponding Author
Dr. Basavant Dhudum

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Abstract: ***Introduction***: Stroke, also known as cerebrovascular accident (CVA), occurs when blood flow to the brain is interrupted or blocked partially or completely. This will cause the death of brain cells due to a lack of oxygen and nutrients, leading to disability. The main aim of this study was to assess the effectiveness of the Chin Tuck Against Resistance (CTAR) exercise in improving the swallowing ability of cerebrovascular accident patients with dysphagia in the experimental group. A quasi-experimental quantitative research approach was used in the study. The study sample included 52 participants (26 in the experimental group and 26 in the control group), selected through purposive sampling. Data were collected using the Gugging Swallowing Screening Scale (GUSS) to assess dysphagia severity and analyzed using descriptive and inferential statistics. The study demonstrated a significant improvement in swallowing ability among stroke patients following the intervention. In the experimental group, mean GUSS scores increased from 4.65 to 15.61 ($p < 0.00001$), while the control group improved from 5.34 to 11.26 ($p < 0.00001$). Post-test scores were significantly higher in the experimental group compared to the control group ($t = 5.5315$, $p = 0.000005$). Before the intervention, 100% of participants had severe dysphagia; after the intervention, 92% showed improvement, and 19% achieved normal swallowing. Feeding dependency also decreased significantly in the intervention group. These findings confirm the effectiveness of the CTAR exercise in reducing dysphagia severity and enhancing functional performance among stroke patients. The study concludes that the Chin Tuck Against Resistance (CTAR) exercise is an effective intervention for improving swallowing function and reducing dysphagia in patients with stroke.

Keywords: Stroke; Dysphagia; Cerebrovascular Accident; Chin Tuck Against Resistance Exercise; Swallowing Difficulty.

INTRODUCTION

A severe medical illness known as a stroke happens when the blood flow to a portion of the brain is cut off or decreased, which stops oxygen and nutrients from getting to the brain tissue. This can cause brain cell loss and frequently leads to cognitive, linguistic, or physical deficits. A serious global health concern, strokes are more common in elderly persons, especially those over 60. In the world, they are regarded as one of the main causes of death and disability [1]. Post-stroke patients commonly experience medical complications, which contribute to prolonged hospitalization and higher treatment costs. These complications are also a leading cause of mortality during the acute and subacute stages of stroke [2]. Dysphagia is a relatively frequent complication after stroke, and its presence, as assessed clinically, is a significant predictor of death and disability within 90 days [3]. The prevalence of post-stroke dysphagia (PSD) ranges from 8.1% to 80%, according to recent data from surveys. Older age and females have been found to have greater rates of stroke; hence, these factors may be related to a higher PSD prevalence rate. An estimated 42% of patients with acute stroke have a pooled prevalence of PSD, which is linked to a 4.08-fold increased risk of pneumonia and a 4.07-fold increased risk of death. A higher incidence of PSD was linked to severe stroke, past stroke, and hemorrhagic stroke [4]

Dysphagia affects up to 75% of stroke patients, impairing the transport of food, drink, and saliva. It compromises quality of life and leads to serious complications like aspiration pneumonia and malnutrition, increasing mortality and healthcare costs. Early management of post-stroke dysphagia is crucial to reduce mortality and improve quality of life. Rehabilitative interventions, pharmaceutical agents, and neurostimulation techniques aim to enhance swallowing function and promote neuroplasticity.[5].

Therefore, one of the most important aspects of post-stroke care is looking into efficient dysphagia rehabilitation techniques. For the rehabilitation of dysphagia, therapeutic exercises that target and strengthen the muscles involved in swallowing are strongly encouraged. CTAR (Chin tuck against resistance) exercise is a successful therapeutic approach for the rehabilitation of dysphagia following a stroke [6]-[8].

Therefore, the objective of this study was to evaluate the effect of CTAR exercise on dysphagia among stroke patients.

MATERIALS & METHODS:

The study aimed to evaluate the effect of CTAR exercise on dysphagia among CVA patients. In this study, a quantitative research approach was adopted, as it focused on evaluating the impact of chin tucks against resistance exercises in patients with cerebrovascular accidents experiencing dysphagia. This approach enabled the researcher to select suitable methodologies and effectively interpret the findings. To examine the effectiveness of chin tucks against resistance in individuals with cerebrovascular accidents and dysphagia, the study employed a Pre-Test–Post-Test Control Group Design. The population is composed of Cerebrovascular Accident patients with dysphagia. The participants in this research study were patients diagnosed with cerebrovascular accident and dysphagia, who were admitted to tertiary care hospitals.

The inclusion criteria for the study were as follows: Patients admitted with either right or left-sided hemiplegia or hemiparesis were considered eligible. Participants needed to be alert, cooperative, and capable of following instructions. Only those who were willing to participate and provided written consent were included. Additionally, patients had to be physically able to sit and should not be at risk for aspiration. The exclusion criteria included patients who were on NBM/NPO, those receiving tube feeding, and individuals with other neurological disorders. Patients with chronic neck pain, a history of neck surgery, or those with a tracheostomy were also excluded from the study to avoid complications and ensure accurate assessment. These criteria were set to maintain the homogeneity of the study sample and to eliminate factors that could interfere with the study outcomes or participant safety. Non-probability purposive sampling technique was adopted in this study.

The selection and development of the research tool were carried out thorough review of relevant literature, textbooks, and journal articles, along with consultations with the research guide and subject experts. The tool was divided into three sections: demographic data, Clinical Profile, and Gugging Swallowing Screen Scale (GUSS). The demographic data included age, gender, and level of education; the clinical profile included the duration of the stroke, family history of stroke, and the patient's level of dependency for feeding. The GUSS assesses the level of swallowing ability, and it consists of the parameters such as Vigilance, Coughing or Throat clearance, Deglutition, Swallowing, Drooling, Voice Change, and the total score is 20. The score is interpreted as 20 is Normal Dysphagia, 15 to 19 is Mild Dysphagia, 10 to 14 is Moderate Dysphagia, and 0 to 9 is Severe Dysphagia. In collaboration with the Department of Clinical Neurosciences and Preventive Medicine, the neurological department of the "Landesklinikum Donauregion Gugging" created the Gugging Swallowing Screen (GUSS) in 2006. It assesses acute stroke patients' risk of aspiration and the degree of dysphagia [7].

After obtaining ethical approval from the Institutional Ethics Committee (Ref: BVDU/CON/SAN/594/2024-25), permission to conduct the study was granted by the relevant authorities of the hospital. Following this, informed consent was obtained from the study participants, and the required data collection process began. The data collection occurred in three distinct phases: **Phase I**: Participants were selected based on the inclusion criteria and were assigned to either the experimental or control group. Demographic information was collected, and the severity of swallowing difficulties was assessed using the tool employed in the study. **Phase II**: After evaluating the level of dysphagia using the GUSS Scale, the experimental group performed the Chin Tuck exercise by positioning the chin against a ball and holding the position for 10 seconds (isometric), repeating this for 10 repetitions (isokinetic), three times daily for 8 consecutive days. This exercise was conducted alongside routine nursing care. In contrast, the control group received only the routine nursing care without the Chin Tuck intervention. **Phase III**: Swallowing difficulty was reassessed daily for both the experimental and control groups, and any changes in the participants' conditions were systematically recorded.

Statistical Analysis: Demographic variables were analyzed using frequency distributions and percentages to provide a clear overview of the participants' characteristics. A comparison between the pre-test and post-test scores within both the experimental and control groups was conducted using a paired t-test. This statistical method allowed for the assessment of any significant changes within each group for the study. To compare the post-test results between the experimental and control groups, an unpaired t-test was utilized. This test helped determine if there were any statistically significant differences in the outcomes between the two groups after the intervention.

RESULTS:

Table No 1: Frequency and Percentage Distribution of Demographic Variables. N= 52

Variables	Category	Intervention Group		Control group	
		frequency	%	frequency	%
Age	30-40	2	8%	1	4%
	41-60	10	38%	8	31%

	61 - 85	14	54%	17	65%
Sex	Male	17	65%	19	73%
	Female	9	35%	7	27%
Education	No Formal Education	8	31%	13	50%
	Primary	5	19%	2	8%
	SSC & HSC	7	27%	5	19%
	Graduated	6	23%	6	23%

Both groups are predominantly older adults (61–85 years), with few young participants. This suggests the study population is mostly elderly, which is common in stroke research. There are more male participants in both groups, especially in the control group. The control group has a higher proportion of participants with no formal education. Graduation rates are identical in both groups.

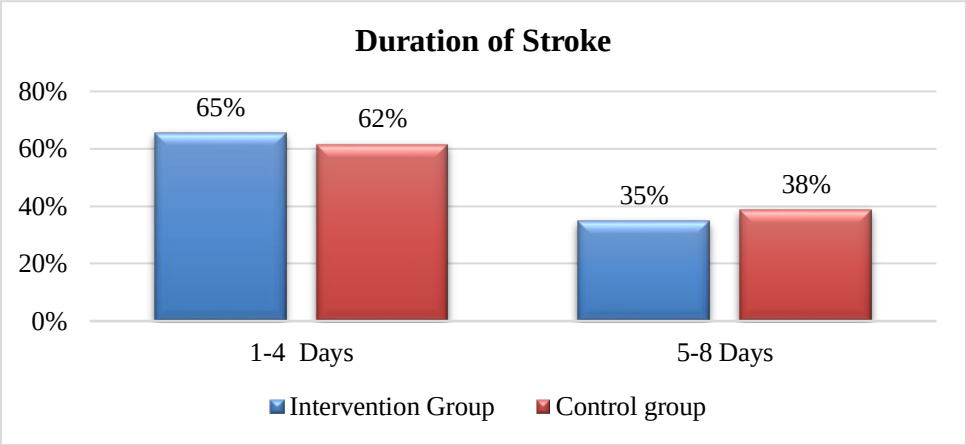

Figure No. 1: Duration of Stroke.

Figure No.1 illustrates the distribution of stroke duration (in days) among participants in both the intervention group and control group. Most participants experienced strokes lasting 1–4 days**:** 65% of the intervention group and 62% of the control group had stroke episodes that lasted 1–4 days.

Table No. 2: Comparison Between Pre and Post Test in Experimental Group N= 52

Experimental Group	Mean	Variance	df	t-value	P-value
Before Intervention	4.65	0.6353	25	-18.4692	<0.00001
After Intervention	15.61	11.1261			

Table no. 2 represents the effect of the intervention within the experimental group. The experimental group showed a significant improvement in the measured variable after the intervention, as indicated by the large increase in mean score and a highly significant t-test result ($p < 0.00001$).

Table No. 3: Comparison of Post-Test Scores Between Experimental and Control Groups N= 52

After Intervention	Mean	Variance	df	t-value	P-value
Experimental Group	15.61	11.1261	50	5.5315	0.000005
Control Group	11.26	4.9246			

Table No. 3 illustrates that after the intervention, the experimental group demonstrated significantly higher outcome scores compared to the control group. The statistical test ($t = 5.5315$, $p = 0.000005$) strongly supports the conclusion that the intervention applied to the experimental group was more effective than the treatment in the control group.

DISCUSSION:

Based on the demographic data, the majority of participants were aged between 61 and 85 years, comprising 54% in the intervention group and 65% in the control group. The second largest age group was 41–60 years, with 38% in the intervention group and 31% in the control group, while the youngest age group (30–40 years) had the fewest participants. In terms of gender, men were more prevalent than women in both groups, accounting for 65% of the intervention group and 73% of the control group. Regarding education, 50% of the control group and 31% of the intervention group had no formal education, while graduates represented 23% of both groups, indicating an equal proportion of participants with higher education.

The clinical profile data revealed that the majority of patients had experienced strokes lasting between one and four days, with 65% in the intervention group and 62% in the control group. A smaller proportion of participants had strokes that lasted five to eight days. Additionally, a family history of stroke was significantly more common in the control group (85%) compared to the intervention group (19%), indicating a higher genetic predisposition to stroke among the control participants.

The intervention had a strong positive effect on dysphagia levels. Initially, 100% of participants had severe dysphagia, but after the intervention, 92% showed improvement and 19% achieved full recovery (GUSS score of 20). There was a noticeable transition from severe to mild or no dysphagia among participants, confirming the intervention's effectiveness. In terms of feeding dependency, the intervention group showed reduced need for assistance compared to the control group.

Performance scores improved significantly after the intervention. In the experimental group, the mean score rose from 4.65 to 15.61, while in the control group, it increased from 5.34 to 11.26. The changes were statistically significant, with p-values less than 0.00001. Post-test comparisons also showed that the experimental group outperformed the control group, with higher mean scores and greater variance, indicating stronger improvement after the intervention.

Overall, the findings suggest that the intervention successfully improved swallowing ability, reduced dysphagia severity, and enhanced performance among patients with cerebrovascular accidents.

Additionally, the study, supported by Abisha L (2023), involved an experimental investigation to assess the effectiveness of Chin Tuck Against Resistance (CTAR) exercise in enhancing dysphagic swallowing in patients with cerebrovascular accident (CVA). The purposive sampling method was used to select a total of 30 participants. The Gugging Swallowing Screen Scale (GUSS) was employed to assess the swallowing abilities of the patients, while a self-administered questionnaire was used to gather clinical and demographic information. Before the intervention, all 30 participants (100%) had severe dysphagia, with 14 patients (46.67%) exhibiting mild dysphagia, 9 patients (30%) showing moderate dysphagia, and 7 patients (23.33%) demonstrating no dysphagia. After the intervention, a statistically significant improvement was found, with the pre-test score of 4.23 increasing to a post-test score of 16.63. The standard deviations were 2.94 and 0.43, respectively, and the difference was statistically significant with a t-value of 24.48 and a p-value less than 0.05. These results indicate that CTAR exercise significantly improved swallowing abilities in CVA patients with dysphagia, suggesting its potential as an effective intervention for enhancing swallowing function in this patient group [7].

CONCLUSION:

The demographic data revealed that the majority of participants were aged between 61 and 85 years, with men outnumbering women in both groups. A higher percentage of participants in the control group had no formal education compared to the intervention group. Clinically, most stroke patients experienced strokes lasting 1 to 4 days, and a family history of stroke was significantly more prevalent in the control group (85%) compared to the intervention group (19%). The intervention had a significant positive effect on dysphagia levels: before the intervention, 100% of participants had severe dysphagia, whereas after the intervention, 92% showed improvement, and 19% achieved normal swallowing (GUSS score of 20). Additionally, feeding dependency decreased more in the intervention group compared to the control group. Statistically, the mean score in the experimental group increased from 4.65 to 15.61 ($p < 0.00001$), while the control group's score increased from 5.34 to 11.26 ($p < 0.00001$). The post-test scores were significantly higher in the experimental group compared to the control group ($t = 5.5315$, $p = 0.000005$). Overall, the findings indicate that the intervention was effective in improving swallowing ability, reducing dysphagia severity, and enhancing overall performance in stroke patients.

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