

# Prevalance of Dysphagia Symptoms in Patient with Cerebrovascular Accident

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**Abstract:** *Swallowing difficulties (dysphagia) are common after Cerebrovascular Accidents (CVA) and can severely impact health and quality of life. This study assessed the prevalence of dysphagia symptoms in 67 CVA patients aged 30–80 years using a symptom checklist and Videofluoroscopic evaluation across various food consistencies. Key symptoms included difficulty initiating swallow, coughing, choking, and reduced appetite. Males showed higher rates of dribbling and chest congestion, while older individuals exhibited more severe symptoms such as pneumonia and thickened saliva. Findings highlight the need for early identification and intervention by speech - language pathologists. Further studies with larger, more balanced samples are recommended.*

**Keywords:** Cerebrovascular Accident (CVA), Quality of life, Videofluoroscopic

## 1. Introduction

Swallowing is a fundamental biological activity. Effective swallowing is very critical for maintaining adequate nutrition, hydration etc., which is vital for better quality of living. The simple act of swallowing saliva occurs approximately once in every minute involuntarily.

Swallowing or deglutition is a sequential event of oral, pharyngeal and esophageal phases that transport saliva, ingested solid and fluid from mouth to stomach and protects the airway during swallowing.

Dysphagia or difficulty in swallowing is an impairment of emotional, cognitive, sensory or motor acts involved in transferring a substance from mouth to stomach, resulting in a failure to maintain hydration and nutrition and posing a risk of choking and aspiration Tanner (2006)

Neurological disorder associated with dysphagia are Cerebrovascular Accident (CVA) or stroke, Motor Neuron disease Parkinson's disease, Alzheimer's disease, head trauma, infections - encephalitis, meningitis, neurosyphilis, etc. CVA or stroke is the common cause of dysphagia. A CVA or stroke is a temporary to permanent loss of functioning in brain tissue due to an interruption in the blood supply. Acute stroke is followed by dysphagia in 29% - 64% of all cases.

Flowers, Silver, Fang, Rochon & Martino (2013) Arnold, Loesirova, Broeg - Morvay, Meisterenst, Schlager, Mono, El - Koussy, Kagi, Jung and Sarikaya (2016) assessed the current burden of dysphagia in acute ischemic stroke and concluded that dysphagia still affects a substantial portion of stroke patients and may have a large impact on clinical outcome, mortality and institutionalization.

Wan, Chen, Zhu, Xu, Huang, Li, Ye and Ding (2016) assessed the dysphagia characteristics in patients with subcortical and supratentorial stroke and the result reveals that subcortical and supratentorial stroke may result in pharyngeal dysphagia such as Pyriform sinus residue (PSR) and pharyngeal delay.

Pyriform Sinus residue was mainly caused due to Cricopharyngeal Muscle Achalasia (CMA).

Hassan, Khealani, Shafqat, Aslam, Salahuddin, Syed, Baig and Wasay (2006) assessed the outcome of patients with Stroke Associated Pneumonia (SAP) and the relation of radiological and microbiological data to the outcome and the result reveals that SAP is associated with poor prognosis. It prolongs hospital stay and is also associated with high mortality rate (during initial hospital admission) in stroke patients. They yield from chest radiographs and tracheal aspirate is low; however, these are independent predictors of prolonged hospital stay.

Sundar, Pahuja, Dwivedi and Yeolekar (2008) investigated on morbidity and mortality rate in patients having dysphagia following stroke and the result reveals that (42%) patients had post - stroke dysphagia during their hospital course. Among infarcts, Total Anterior Circulation Infarcts (TACI) had 100% incidence of dysphagia, followed by Partial Anterior Circulation Infarcts (PACI - 36%), Posterior Circulation infarcts (POCI - 33%), and Lacunar infarcts (LACI - 18%). 67% of hemorrhages had livelihood and the quality of life. From the above review of literature, it is evident that difficulty in swallowing is common in patients with CVA. There are very few Indian studies focused on the incidence and prevalence of swallowing difficulty symptoms in CVA patients. Keeping that in mind, the present study throws light on the prevalence of dysphagia symptoms in CVA patients post - stroke dysphagia. Normal swallowing ability is vital for livelihood. Swallowing difficulties are a serious threat for people with Cerebrovascular Accidents which hinder their daily

## 2. Review of Literature

The swallowing center is a complex organization of neural elements in the cortex and brainstem of the central nervous system. The neurons in the brainstem involved in swallowing lies mainly in dorsal region within and adjacent to the nucleus of tractus solitarius and in the ventral region around the

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nucleus ambiguus. Reflexive swallowing is facilitated from sites outside the corticobulbar pathway particularly hypothalamus and midbrain.

There are four pairs of cranial nerves (CN V, VII, IX and X) that convey afferent information on taste and general sensation associated with deglutition. The ix pairs of cranial nerves (CN V, CN VII, CN IX, CN X, and CN XII) are responsible for efferent control of the first two stages of swallowing. Swallowing has five sequential coordinated phases: the pre - oral phase, the oral preparatory phase, the oral propulsive phase, the pharyngeal phase and the esophageal phase.

- **Pre - oral phase:** It involves the visual, visual perceptual and the olfactory awareness of the food and also the intake of food to the mouth. It is a voluntary phase.
- **Oral Preparatory Phase:** During this phase, food in the oral cavity is manipulated and masticated in preparation for swallowing. The back of the tongue controls the position of the food, preventing it from falling into the pharynx. It is a voluntary stage.
- **Oral Propulsive Phase:** During the oral propulsive, the tongue transfers the bolus of food to the pharynx, triggering the pharyngeal swallow. It is voluntary phase of swallowing.
- **Pharyngeal Phase:** During the pharyngeal phase, complex and coordinated movements of the tongue and pharyngeal structures propels the bolus from the pharynx into the esophagus. The closing of the vocal cords and the backward movement of the epiglottis prevents food or liquid from entering into the trachea. It is a semi - voluntary phase of swallowing.
- **Esophageal Phase:** During the esophageal phase of swallowing, coordinated contractions of the esophageal muscle move the bolus through the esophagus towards the stomach. It is an involuntary phase of swallowing.

The term "dysphagia" come from the Greek root word "dys" which means "difficulty or disordered" and "phagia" meaning to 'swallow'. In simpler terms, dysphagia is 'difficulty in swallowing'. The two major types of dysphagia are neurogenic and mechanical dysphagia. Dysphagia can occur as a result of different diseases and conditions. The major types of dysphagia can generally be neurological or structural or mechanical etiology. Mechanical dysphagia is caused due to structural abnormalities within and adjacent to mouth, pharynx or esophagus.

**Table 2.1:** Showing causes of mechanical dysphagia

Within the mouth	Microglossia, temporomandibular dislocation, intra oral tumours
Pharynx	Retropharyngeal tumor or abscess, Zenker's diverticulum, thyroid gland enlargement.
Oesophagus	Benign Esophageal tumours, metastatic carcinoma

Neurogenic dysphagia is caused due to lesion in cerebral cortex, basal ganglia, brainstem, cerebellum or lower cranial nerves.

The two main causes of neurogenic dysphagia are:

- Non degenerative causes
- Degenerative causes

**Table 2.2:** Showing non degenerative causes of dysphagia

Vascular	CVA
Trauma	Traumatic brain injury
Neoplastic	Brain tumor
Congenital	Cerebral palsy
Medicine induced	Tardive dyskinesia
Surgery induced	Carotid endarterectomy cervical spine injury

**Table 2.3:** Showing degenerative causes of dysphagia

Dementia	Alzheimer's disease Frontotemporal dementia Vascular dementia Lewy body dementia
Movement disorders	Parkinson's disease Progressive supranuclear palsy Olivopontocerebellar atrophy Huntington's disease Wilson's disease
Relapsing - remitting course	Multiple sclerosis

The major difference between these two etiologies is that, in neurogenic dysphagic patients, they frequently suffer from cognitive, alertness, language and awareness deficit that can complicate symptoms and outcome. There are mainly three types of CVA: -

**Ischemic stroke:** Ischemic stroke occurs as a result of an obstruction within a blood vessel supplying blood to the brain.

**Haemorrhagic stroke:** Haemorrhage stroke occurs when a weakened blood vessel ruptures. Most common cause of haemorrhagic stroke is uncontrolled hypertension.

**Transient Ischemic Attack (TIA):** Transient Ischemic Attack is caused due to a temporary clot.

**Table 2.4:** Showing symptoms of dysphagia

Drooling	Saliva flowing outside of the mouth unintentionally
Dribbling	Food coming out like drops during the oral preparatory stage.
Pocketing of food	Getting food stuck between teeth and cheek
Sialorrhea	Hyper salivation and drooling
Xerostomia	Dryness in mouth, associated with a change in composition of saliva and, reduced salivary flow.
Nasal regurgitation	Entry of food into the nasal cavity while swallowing
Pneumonia	Inflammatory condition of the lungs affecting microscopic air sac called alveoli
Odynophagia	Pain while swallowing

The other symptoms are difficulty in initiating swallow, difficulty in chewing, thickened saliva, poor bolus formation, multiple attempts to swallow, excessive gag reflex, gurgly voice after intake of food, coughing and choking, increased meal time, heart burn, dehydration, weight loss, GERD (Gastro Esophageal Reflux Disorder), increased pharyngeal transit time, obstruction of food, loss of appetite, chest congestion, mouth odour, change in diet, reduced taste appreciation, less enjoyment in eating, isolation in social situation, poor self - esteem and poor socialization.

Based on the parts that are affected, dysphagia can be classified as oropharyngeal dysphagia and Esophageal dysphagia. Oropharyngeal dysphagia is an inability to initiate swallowing process and involves disorders of striated muscle.

Esophageal dysphagia involves disorders of the smooth muscles of the oesophagus. Dysphagia evaluation tools can be grouped broadly as imaging and non - imaging techniques. Imaging techniques involves Video Fluoroscopic Swallowing Evaluation (VFSE), Ultrasound, Fiberoptic Endoscopic Evaluation of Swallowing (FEES), and Fiberoptic Endoscopic Evaluation of Swallowing with Sensory Testing (FEESST) and non - imaging techniques include bedside assessment tools and pharyngeal manometry. Videofluoroscopic Swallowing Study (VFSS) also referred to as Modified Barium Swallow exam (MBS) is a radiologic examination of swallowing function that uses a special movie - type x - ray called fluoroscopy.

Videofluoroscopic assessment of swallowing is a comprehensive radiological evaluation of the swallowing process, defining transit and motility problems and identifying the timing and degree of aspiration (Logemann, 1983).

The main purpose of VFSS is to: -

- 1) Assess oral/pharyngeal transit times and motility problems.
- 2) Identify anatomical abnormalities in the oral cavity and pharynx.
- 3) Identify presence and etiology of aspiration.
- 4) Implement therapeutic manoeuvres and strategies to address the deficit.

In VFSS, patients are positioned with special seating and the patient is presented with bolus of varying consistencies in a hierarchical manner (e. g., thin liquid, thick liquid, soft solid and hard solid). Imaging in the lateral view is more preferred to detect aspiration and to accomplish a complete image of Oro - pharyngeal swallowing sequence. At the completion of the study the swallowing therapist can identify the consistencies of food the patient can intake orally and the manoeuvres that can aid in swallowing.

The FEES is a procedure to endoscopically examine the pharyngeal stage of swallow using a flexible endoscope. It allows examination of laryngopharyngeal anatomy and physiology during a swallow. FEES are usually performed by a Otolaryngologist along with a swallowing pathologist. A flexible Naso laryngoscope is introduced trans nasally. As the scope is passed, all the structures including the nasopharynx, soft palate, base of the tongue, valleculae, epiglottis, arytenoids, aryepiglottic folds, Pyriform fossae, vocal cords and post cricoid regions are evaluated. A pharyngeal squeeze manoeuvre is performed first. During this, the patient is asked to make high pitched, strained phonation and the patient's pharyngeal squeeze is observed.

The patient is asked to begin oral intake, starting with sips of water, followed by thin liquids, thick liquids, puree, soft solid, solid food and mixture consistencies.

The amount of premature spillage, residue in the valleculae or hypopharynx, laryngeal penetration and laryngeal aspiration are observed.

FEESST is similar to FEES, but includes controlled air pulses to allow objective determination of laryngopharyngeal sensory discrimination thresholds. In order to perform FEESST, an air puff is delivered to the laryngeal mucosa innervated by the superior laryngeal nerve on both the sides, to elicit a laryngeal adductor reflex (LAR). The flexible laryngoscope is placed above the junction of the arytenoids and aryepiglottic fold junction and a graded air puff stimulus is delivered. The normal LAR has been established as less than 4.0 mmHg. The presence of bilateral deficits indicates poor swallowing.

Clinical bedside assessment encompasses clinical history, and thorough examinations of the oral, pharyngeal and laryngeal anatomy. Neurological examination focusing on sensory and motor function, cognitive, behavioural, language abilities and a trial of feeding can also be performed in bedside assessment.

Hamidon, Joseph and Raymon (2007) suggested that advance in age, diabetes mellitus and involvement of Middle Cerebral Artery (MCA) territory infarcts are independent factors for developing dysphagia associated with stroke.

Lan, Xu, Dou, Wan and Yu (2013) studied the effect of balloon dilation intervention on function of Upper Esophageal Sphincter (UES) in brainstem stroke patients with dysphagia before and after treatment by high resolution solid - state manometry and the result showed that post treatment UES residual pressure and relaxation duration both significantly improved for all these materials (water, thick liquid, paste) and also dysphagia therapy with dilation improves relaxation of UES and also helpful for storing UES resting pressure.

Lan, Xu, Dou, Wan, Yu and Lin (2013) investigated the biomechanical changes in the pharynx and the upper Esophageal sphincter after modified balloon dilation in brainstem stroke patients with dysphagia and the result reveals that dysphagia therapy with modified dilatation improved UES relaxation and improved functional oral intake to a greater extent than regular therapy alone.

Crary, Carnaby, Sial, Khanna and Waters (2013) evaluated the potential of spontaneous swallow frequency analysis as a screening protocol for dysphagia in acute stroke. Swallow Frequency Rate (swallow per minute) were compared with stroke and swallow severity indices, age, time from stroke to assessment and consciousness level and the result reveals that SPM correlated significantly with stroke and swallow severity indices but not with age, time from stroke onset or consciousness level. Patients with dysphagia demonstrated significantly lower SPM rates and they concluded that spontaneous swallowing frequency presents high potential to screen for dysphagia in acute stroke without the need for trained available personnel.

Chang, Cheng, Lin, chen, Lin and Kawachi (2013) determined the frequency of reporting aspiration pneumonia or choking as a cause of death with stroke in the United States

and result reveals that the patients died from aspiration pneumonia and choking due to stroke was 5% (~12000 death per year) and 1% (~3700 death per year) according to the information on death certificates.

Al - Khaled, Matthis, Mudter, Schattsschneider, Strhmaier, Niehoff, Zubur, Eggers, Valdueza and Royle (2016) investigated the association of dysphagia and Early Dysphagia Screening (EDS) within 24 hours with stroke related pneumonia and outcomes and the result reveals that dysphagia exposes stroke patients to a higher risk of pneumonia, disability and death. whereas an EDS seems to be associated with reduced risk of stroke related pneumonia and disability.

Cohen, Roffe, Beavan, Blackett, Fairfield, Hamdy and Bath (2016) stated that although multiple advances have been made in the hyperacute treatment of stroke and secondary prevention, the management of dysphagia post - stroke remains a neglected area of research, and its optimal management including diagnosis, investigation and treatment, are still to be defined.

Bahia, Mourao and Chun (2016) investigated the prevalence of dysphagia and communication disorders following stroke and also checked whether communication disorders can predict dysphagia and the result reveals that a comprehensive evaluation of dysphagia, aphasia, and dysarthria are important to improve clinical outcome following stroke. The identification of dysarthria as a predictor of dysphagia can help in identifying risk for dysphagia in stroke and assists in the therapeutic process of swallowing problems.

Schimmel, Vogeli, Duvernay, Leemann and Muller (2017) investigated the sensitivity of oral tissues following stroke and its potential impact on masticatory function and found that stroke may affect the sensitivity of intra - oral tissues contra - lesion ally, thus potentially affecting chewing function. Rehabilitation should therefore not only focus on motor impairment, but equally stimulate the sensitivity of the oral tissues, employing dry ice application or similar specific treatments.

Lindner - Pflgar, Neugebauer, Stosser, Kassubek, Ludolph, Dziewas, Prosiel and Riecker (2017) validated the recommendations for management of dysphagia in acute stroke patients and found that clinical screening alone is not sufficient to identify patients at risk for aspiration pneumonia. The FEES should be used at allow threshold in cases of severe stroke and minor clinical abnormalities. especially concerning isolated dysarthria and cough after swallowing water; therefore, current recommendations should be correspondingly modified

Jani and Gore (2014) studied the occurrence of communication and swallowing problems in neurological disorders and concluded that speech, language and swallowing problems are frequent in individuals with neurological conditions.

Speech language pathologist plays an important role as a member of the rehabilitation team in a neurological setup with respect to identifying these problems and initiating

intervention at the earliest. Hence, it is necessary for speech language pathologist to be well versed with the features as each disorder may present with in terms of communication and swallowing.

Radhakrishnan, Menon and Anandakuttan (2013) assessed the utility of FEES in decision making with respect to resumption of oral intake in stroke patients and also to document the findings of FEES in stroke patients, and to look for correlation between these and the site of stroke and the study revealed that FEES is an easy, efficient and reliable method to evaluate the swallowing status in stroke patients. In combination with good bedside clinical examination and swallow exercises, it can be a good tool in assessing patients with post - stroke dysphagia. Post - stroke rehabilitation and prevention of aspiration pneumonia can be effectively done with the help FEES.

Gupta and Bamerjee 2014) investigated the severity and management approach for dysphagia in brainstem stroke, with traditional dysphagia therapy and Vital Stimulation therapy and the result reveals that the patients showed a complete recovery even though the treatment was given late.

Arya and Kumaraswamy (2016) investigated swallowing changes in geriatric population and the result showed that the normal geriatrics within the age range of 60 - 70 years does not show any difference in their swallowing patters.

Neethu and Kumaraswamy (2016) investigated swallowing changes in angioplasty patients and the result reveals that there are no significant changes in the swallowing patter of angioplasty patients.

### 3. Need of the Study

Normal swallowing ability is vital for livelihood. Swallowing difficulties are a serious threat for people with Cerebrovascular Accidents which hinder their daily livelihood and the quality of life. From the above review of literature, it is evident that difficulty in swallowing is common in patients with CVA. There are very few Indian studies focused on the incidence prevalence of swallowing difficulty symptoms in CVA patients. Keeping that in mind, the present study throws light on the prevalence of dysphagia symptoms in CVA patients.

### 4. Aim of the Study

The aim of the present study was to understand the prevalence of dysphagia symptoms in CVA patients.

### 5. Methodology

The aim of the present study was to report the prevalence of dysphagia symptoms in CVA patients. The data for the current study was collected using a questionnaire on dysphagia symptoms.

#### Subjects

Sixty - seven subjects admitted with Cerebrovascular Accident who were further divided into 36 males and 31 females in the age group 30 - 80 years participated in the



present study. The age range was categorized from 30 - 50 years and 60 - 80 years.

#### Inclusion criteria

- 1) CVA patients
- 2) Age range 30 - 80 years
- 3) Patients with near normal cognition were included in the study.

#### Exclusion criteria

Patients with reduced consciousness and disorientation were excluded from the study.

#### Procedure

The dysphagia symptoms were observed through videofluoroscopy and informal swallowing assessments. Assessment was carried out for different consistencies thin liquid, thick liquid, soft solid and hard solid. Thin liquid was in the form of pure barium and water mixture. Thick liquid was given in the form of pure barium. Soft solid was given in the form of barium and biscuit mixture. Hard solid was given by sandwiching barium between biscuits.

A questionnaire was developed with thirty - two symptoms of dysphagia that are evident in CVA patients. The questionnaire was validated by ten qualified speech language pathologists before it was administered in patients

The questionnaire is given below:

	Symptoms	Yes	No
1	Drooling		
2	Dribbling		
3	Difficulty in initiating swallow		
4	Difficulty in chewing		
5	Pocketing of food		
6	Sialorrhea (excessive saliva)		
7	Xerostomia (dryness in mouth)		

8	Thickened saliva		
9	Poor bolus formation		
10	Multiple attempts to swallow		
11	Excessive gag reflex		
12	Nasal regurgitation		
13	Gurgly voice after intake of food		
14	Coughing and choking		
15	Increased pharyngeal transit time		
16	Obstruction of food		
17	GERD		
18	Weight loss		
19	Dehydration		
20	Heart burn		
21	Increased meal time		
22	Loss of appetite		
23	Pneumonia		
24	Chest congestion		
25	Mouth order		
26	Odynophagia (pain while swallowing)		
27	Change in diet		
28	Reduced taste appreciation		
29	Less enjoyment in eating		
30	Isolation in social situation		
31	Poor self esteem		
32	Poor socialization		

#### Analysis

Scoring of the questionnaire was done as following: -

0 - If the symptom is absent

1 - If the symptom is present

## 6. Results and Discussion

The aim of the present study was to report the prevalence of dysphagia in CVA patients. Swallowing difficulties were observed using a symptoms item in 67 subjects who had CVA. The data was statistically questionnaire 32 analysed and obtained are discussed below: -

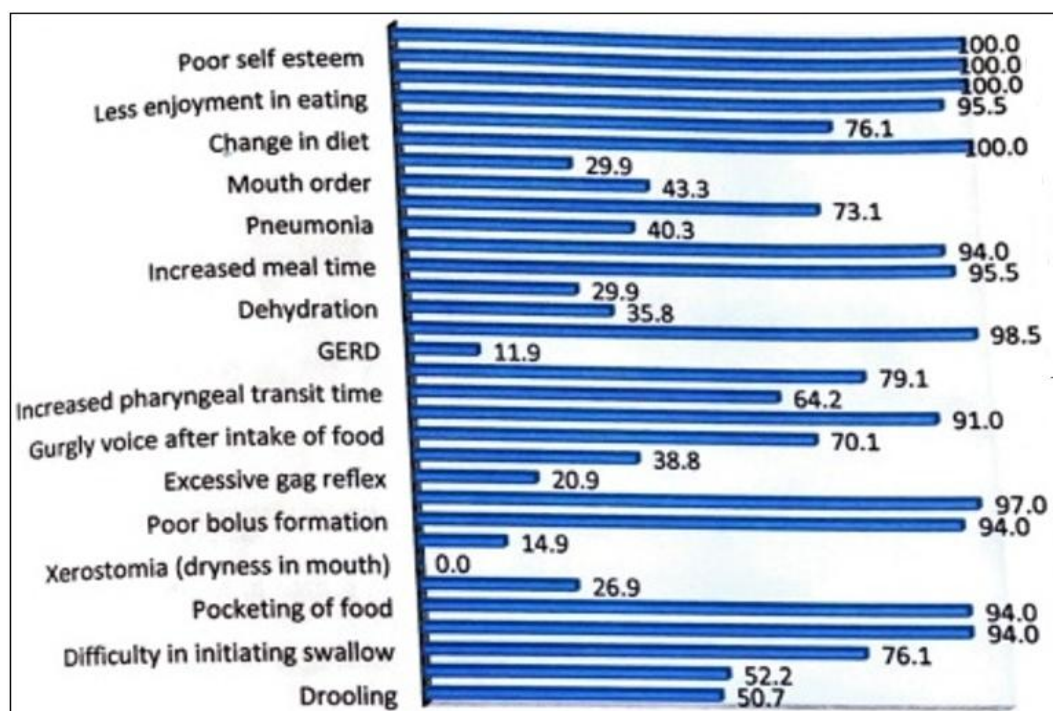


Figure 4.1: Showing the prevalence of each symptom of dysphagia in CVA patient

From the above figure it is evident that the following symptoms are most commonly seen in CVA patients

- 1) Difficulty in initiating swallow
- 2) Difficulty in chewing
- 3) Pocketing of food
- 4) Poor bolus formation
- 5) Multiple attempts to swallow
- 6) Gurgly voice after food intake
- 7) Coughing and choking
- 8) Obstruction of food
- 9) Weight loss
- 10) Increased meal time

- 11) Loss of appetite
- 12) Chest congestion
- 13) Change in diet
- 14) Reduced taste appreciation
- 15) Less enjoyment in eating
- 16) Isolation in social situations
- 17) Poor self esteem
- 18) Poor socialization

Comparison of dysphagia symptoms **among males** and females who had CVA 8) within the age range 30 - 80years

**Table 4.1:** Showing the comparison of dysphagic symptoms among males and females

	Females		Males		Z test for proportions	
	Freq	%	Freq	%	p value	
Drooling	11	35.50%	23	63.90%	0.01	Sig
Dribbling	11	35.50%	24	66.70%	0.005	HS
Difficulty in initiating swallow	21	67.70%	30	83.30%	0.068	
Difficulty in chewing	29	93.50%	34	94.40%	0.439	
Pocketing of food	29	93.50%	34	94.40%	0.439	
Sialorrhea (excessive saliva)	9	29.00%	9	25.00%	0.355	
Xerostomia (dryness in mouth)	0	0.00%	0	0.00%		
Thickened saliva	5	16.10%	5	13.90%	0.399	
Poor bolus formation	29	93.50%	34	94.40%	0.439	
Multiple attempts to swallow	29	93.50%	36	100.00%	0.061	
Excessive gag reflex	7	22.60%	7	19.40%	0.376	
Nasal regurgitation	13	41.90%	13	36.10%	0.313	
Gurgly voice after intake of food	17	54.80%	30	83.30%	0.006	HS
Coughing and choking	27	87.10%	34	94.40%	0.147	
Increased pharyngeal transit time	19	61.30%	24	66.70%	0.324	
Obstruction of food	23	74.20%	30	83.30%	0.179	
GERD	4	12.90%	4	11.10%	0.411	
Weight loss	31	100.00%	35	97.20%	0.175	
Dehydration	12	38.70%	12	33.30%	0.324	
Heart burn	11	35.50%	9	25.00%	0.175	
Increased meal time	30	96.80%	34	94.40%	0.323	
Loss of appetite	31	100.00%	32	88.90%	0.028	Sig
Pneumonia	8	25.80%	19	52.80%	0.012	Sig
Chest congestion	18	58.10%	31	86.10%	0.005	HS
Mouth order	8	25.80%	21	58.30%	0.004	HS
Odynophagia (pain while swallowing)	12	38.70%	8	22.20%	0.071	
Change in diet	31	100.00%	36	100.00%		
Reduced taste appreciation	21	67.70%	30	83.30%	0.068	
Less enjoyment in eating	31	100.00%	33	91.70%	0.05	
Isolation in social situation	31	100.00%	36	100.00%		
Poor self esteem	31	100.00%	36	100.00%		
Poor socialization	31	100.00%	36	100.00%		

Table 4.1 gives information on the presence of swallowing difficulty among males and females. It is evident that there is a significant swallowing difficulty in both the gender.

The highly significant dysphagia symptoms were:

- 1) Dribbling
- 2) Gurgly voice after food intake
- 3) Chest congestion
- 4) Mouth odour

The symptoms drooling, loss of appetite and pneumonia were significant dysphagia symptoms. The result also shows the most prevalent symptoms in each group.

**C) Comparison of dysphagia symptoms in the ages 30 - 50 years and 60 - 80 years**

**Table 4.2:** Showing the comparison of dysphagia symptoms among 30 - 50years and 60 - 80 years

	30 - 50 years		60 - 80 years		Z test for proportions	
	Count	%	Count	%	p value	
Drooling	5	20.00%	29	69.00%	0	HS
Dribbling	4	16.00%	31	73.80%	0	HS
Difficulty in initiating swallow	17	68.00%	34	81.00%	0.115	
Difficulty in chewing	25	100%	38	90.50%	0.056	
Pocketing of food	23	92.00%	40	95.20%	0.294	
Sialorrhea (excessive saliva)	3	12.00%	15	35.70%	0.017	Sig
Xerostomia (dryness in mouth)	0	0%	0	0%		
Thickened saliva	0	0%	10	23.80%	0.004	HS
poor bolus formation	23	92.00%	40	95.20%	0.294	
Multiple attempts to swallow	24	96.00%	41	97.60%	0.353	
Excessive gag reflex	0	0%	14	33.30%	0.001	HS
Nasal regurgitation	8	32.00%	18	42.90%	0.189	
Gurgly voice after intake of food	13	52.00%	34	81.00%	0.006	HS
Coughing and choking	20	80.00%	41	97.60%	0.007	HS
Increased pharyngeal transit time	19	76.00%	24	57.10%	0.06	
Obstruction of food	17	68.00%	36	85.70%	0.042	sig
GERD	0	0%	8	19.00%	0.01	sig
Weight loss	25	100%	41	97.60%	0.218	
Dehydration	7	28.00%	17	40.50%	0.151	
Heart burn	4	16.00%	16	38.10%	0.028	Sig
Increased meal time	25	100.00%	39	92.90%	0.086	
Loss of appetite	25	100.00%	38	90.50%	0.056	
Pneumonia	4	16.00%	23	54.80%	0.001	HS
Chest congestion	12	48.00%	37	88.10%	0	HS
Mouth order	2	8.00%	27	64.30%	0	HS
Odynophagia (pain while swallowing)	8	32.00%	12	28.60%	0.0383	
Change in diet	25	100.00%	42	100.00%		
Reduced taste appreciation	14	56.00%	37	88.10%	0.001	HS
Less enjoyment in	25	100.00%	39	92.90%	0.086	
Isolation in social situation	25	100.00%	42	100.00%		
Poor self esteem	25	100.00%	42	100.00%		
poor socialization	25	100.00%	42	100.00%		

Table 4.2 gives information on the presence of swallowing difficulties among ages 30-50 years and 60-80 years. The highly significant dysphagia symptoms were:

- 1) Drooling
- 2) Dribbling
- 3) Thickened saliva
- 4) Excessive gag reflex
- 5) Gurgly voice after food intake
- 6) Coughing and choking
- 7) Pneumonia
- 8) Chest congestion
- 9) Mouth odour
- 10) Reduced taste appreciation

The significant dysphagia symptoms were sialorrhea, obstruction of food, GERD and heartburn. The result also shows the prevalent dysphagia symptoms in ages 30 - 50 years and 60 - 80 years.

## 7. Discussion

The aim of the present study was to report the prevalence of dysphagic symptoms in CVA patients. Swallowing difficulties are obvious in patients with CVA. Normal swallowing is vital for livelihood and hence the difficulty in swallowing affects the quality of life.

From the above results it is evident that dysphagia symptoms are present in patients with VA. The highly significant dysphagic symptoms in CV A patients are:

- 1) Difficulty in initiating swallow
- 2) Difficulty in chewing
- 3) Pocketing of food
- 4) Poor bolus formation
- 5) Multiple attempts to swallow
- 6) Gurgly voice after food intake
- 7) Coughing and choking
- 8) Obstruction of food
- 9) Weight loss
- 10) Increased meal time
- 11) Loss of appetite
- 12) Chest congestion
- 13) Change in diet
- 14) Reduced taste appreciation
- 15) Less enjoyment in eating
- 16) Isolation in social situations
- 17) Poor self esteem
- 18) Poor socialization

The result of the present study is in accordance with Jani and Gore (2014) where they have said that swallowing problems are frequent in individuals with neurological conditions.

Speech language pathologist plays a crucial role as a member of the rehabilitation team in a neurological setup with respect to identifying problems and initiating intervention at the

earliest. Hence, it is necessary for speech language pathologist to be well versed with the features each disorder may present with in terms of communication and swallowing

## 8. Summary and Conclusion

Swallowing is a fundamental biological activity. Effective swallowing is very crucial for maintaining adequate nutrition and hydration. Swallowing difficulties are a serious threat for people with Cerebrovascular Accidents which hinder their daily livelihood and the quality of life. From the above review of literature, it is evident that difficulty in swallowing is common in patients with CVA. There are very few Indian studies focused on the incidence and prevalence of swallowing difficulty symptoms:

CVA patients. Keeping that in mind, the present study throws light on the prevalence of dysphagia symptoms in CVA patients.

The current study was conducted in 67 CVA subjects within the age range of 30 - 80 years. Thirty - two dysphagic symptoms were noticed using a questionnaire.

Assessment was carried out through observation and Videofluoroscopic swallowing studies. The consistencies checked on were thin liquid, thick liquid, soft solid and hard solid.

The assessment mainly focused on three aspects: -

- 1) Comparison of prevalence of each symptom of dysphagia
- 2) Comparison of dysphagia symptoms among males and females
- 3) Comparison of dysphagia symptoms in the ages 30 - 50 years and 60 - 80 years

### 1) Comparison of prevalence of each symptom of dysphagia

On comparison of prevalence of each symptom of dysphagia, the result reveals that the symptoms like difficulty in initiating swallow, difficulty in chewing, pocketing of food, poor bolus formation, multiple attempts to swallow, gurgly voice meal time, loss of appetite, chest after food intake, coughing and choking, obstruction of food, weight loss, increased congestion, change in diet, reduced taste appreciation, less enjoyment in eating, isolation in social situations and poor self - esteem poor socialization were most significant among CV A patient

### 2) Comparison of dysphagia symptoms among males and females

On comparison of dysphagia symptoms among males and females, the highly significant dysphagic symptoms were:

- Dribbling
- Gurgly voice after food intake
- Chest congestion
- Mouth odour

The symptoms drooling, loss of appetite and pneumonia were significant dysphagia symptoms.

### 3) Comparison of dysphagia symptoms in the ages 30 - 50 years and 60 - 80 years

On comparison of dysphagia symptoms in the ages 30 - 50 years and 60 - 80 years, the highly significant dysphagic symptoms were:

- Drooling
- Dribbling
- Thickened saliva
- Excessive gag reflex
- Gurgly voice after food intake
- Coughing and choking
- Pneumonia
- Chest congestion
- Mouth odour
- Reduced taste appreciation

The significant dysphagic symptoms were sialorrhea, obstruction of food, GERD and heartburn.

The result of the present study is in accordance with Jani and Gore (2014) where they have said that swallowing problems are frequent in individuals with neurological conditions.

Speech language pathologist plays a crucial role as a member of the rehabilitation team in a neurological setup with respect to identifying problems and initiating intervention at the earliest. Hence, it is necessary for speech language pathologist to be well versed with the features each disorder may present with in terms of communication and swallowing.

## 9. Limitations of the Study

- 1) Onset of CVA was not considered in the subject selection criteria
- 2) The number of participants taken for the study was less
- 3) The study was not conducted with equal gender division
- 4) Severity of dysphagic symptoms were not rated on a scale

## 10. Future Directions

- 1) Dysphagic symptoms can be assessed and compared in different types of CVA.
- 2) Equal number of males and females can be considered for future studies
- 3) Study can be done in a large population
- 4) Severity of each dysphagia symptoms can be rated

## References

- [1] Al - Khaled, M., Matthis, C., Binder, A., Mudter, J., Schattschneider, J., Pulkowski, U., & Royl, G. (2016). Dysphagia in Patients with Acute Ischemic Stroke: Early Dysphagia screening may Reduce Stroke - Related Pneumonia and Improve Stroke Outcomes. *Cerebrovascular diseases*, 42 (1 - 2), 81 - 89. doi: 10.1159/000445299
- [2] Aminoff, M. J., Boller, F., & Swab, D. F. (2013). Handbook of *clinical neurology*. In G. Malandraki & J. Robbins (Eds.), *Neurological rehabilitation*. New York, NY: Elsevier Inc
- [3] Arnold, M., Liesirova, K., Brocg - Morvay, A., Meisterernst, J., Schlager, M., Mono, M. - L, Sarikaya, H1. (2016). Dysphagia in Acute Stroke: Incidence, Burden and Impact on Clinical Outcome. *PLoS ONE*,



- 11 (2), e0148424. <http://doi.org/10.1371/journal.pone.0148424>
- [4] Bahia, M. M., Mourao, L.F., & Chun, R. Y. (2016). Dysarthria as a predictor of dysphagia following stroke. *Neurorehabilitation*, 38 (2), 155 - 162. doi: 10.3233/NRE - 161305
- [5] Bradley, W. G., Daroff, R. B., Fenichel, G. M., & Jankovic, J. (2004). *Neurology in clinical practice: Principles of diagnosis and management* (4th ed.). United States of America, U. S. A: Taylor & Francis
- [6] Sial, L, Khanna, A., & Waters, M. F. (2013). Crary, M. A., Carnaby, G. D., Spontaneous Swallowing Frequency has Potential to Identify Dysphagia in Acute Doi: Stroke. *Stroke*, 44 (12), 3452 - 3457. doi: 10.1161/STROKEAHA.113.003048
- [7] Chang C. Y., Cheng, T.J, Lin, C. Y., Chen, J. Y, Lu, T. H., & Kawachi, L. (2013). Reporting of Aspiration Pneumonia or Choking as a Cause of Death in Patients who Died with Stroke. *Stroke*, 44 (4), 1182 - 1185. doi: 10.1161/STROKEAHA.111.000663
- [8] Cohen, D. L., Reoffence., Beavan, J., Blackett, B., Fairfield, C. A., Hamdy, S., & Bath, P. M. (2016). Post - Stroke Dysphagia: A Review and Design Considerations of Future Trials. *International Journal of Stroke*, 11 (4), 399 - 411. doi: 10.1177/1747493016639057
- [9] Dikeman, K. J., & Kazandjian, M. S. (1995). *Communication and swallowing management of tracheostomized and ventilator dependent adults*. San Diego: singular publishing Group Inc.
- [10] Gonzalez - Fernandez, M., Ottenstein, L., Atanelov, L, & Christian, A. B. (2013). Dysphagia after Stroke: an Overview. *Current Physical Medicine and Rehabilitation Reports*, 1 (3), 187 - 196. <http://doi.org/10.1007/s40141-013-0017-y>
- [11] Gupta, H., & Bamerjee, A. (2014). Recovery of Dysphagia in Lateral Medullary Stroke. *Case Reports in Neurological Medicine*, vol.2014, Article ID 404871, 4 pages, 2014doi: 10.1155/2014/404871
- [12] Hamidon, B. B, Joseph, & Raymond, A. A. (2007). The predictors of subclinical cerebral infarcts in ischemic stroke patients. *The Medical Journal of Malaysia*, 6 (2), 114 - 116. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/1870541>
- [13] Hassan, A., Khealani, B. A., Shafqat, S., Aslam, M., Salahuddin, N., Syed, N. A., & Wasay, M. (2006). Stroke - associated pneumonia: microbiological data and outcome. *Singapore medical journal*, 47 (3), 204 - 207. Retrieved from [https://www.researchgate.net/profile/Bhojo\\_Khealani/publication/7258640\\_Stroke\\_associated\\_pneumonia\\_Microbiological\\_data\\_and\\_outcome/links/0c960526693995d225000000.Pdf](https://www.researchgate.net/profile/Bhojo_Khealani/publication/7258640_Stroke_associated_pneumonia_Microbiological_data_and_outcome/links/0c960526693995d225000000.Pdf)
- [14] Jani, M. P., & Gore, G. B. (2014). Occurrence Of Communication and Swallowing Problem in Neurological Disorders: Analysis of Forty Patients. *Neuro Rehabilitation*, 35 (4), 719 - 727. doi: 10.3233/NRE - 141165
- [15] Kumar, A.J, & Kumaraswamy, S. (2016). Swallowing patterns in Geriatrics. *Unpublished Master's Dissertation, University of Mangalore*.
- [16] Lan, Y., Xu, G, Q., Dou, Z. L., Wan, G. F., & Yu, F. (2013). Effect of Balloon
- [17] Dilatation on Upper Esophageal Sphincter in Brainstem Stroke Patients with Dysphagia: An Investigation using High - Resolution Solid - State Manometry 2031 - 208
- [18] Zhonhua Yi Zhi.93 (33), Xue Za <https://www.ncbi.nlm.nih.gov/pubmed/24360042>
- [19] Lan, Y, Xu, G, Dou, Z, Wan, O, Yu, F, & Lin, T. (2013). Biomechanical Changes in the Pharynx and Upper Esophageal Dilatation Sphincter after Modified Balloon 10.1111/mmo.12209
- [20] Lindner - Pleghar, B, Neugebauer H., Stsner, S, KassubekJ, Ludolph, A, Dziewas, R., Prosiège, M., Riecker, A (2017) Management of Dysphagia in Acute Stroke: A prospective Study for Validation of Current Recommendations. *Nervenarzt*, 88 (2), 173 - 179. doi: 10.1007/s00115 - 016 - 0271 - 1
- [21] Loue, S., & Sajatovic, M. (2008). *Encyclopaedia of aging and public health*. New York: Springer science and Business media
- [22] Ortiz, Karin Zazo, & Marinelli, Milena Ribeiro. (2013). Investigation on the complaint of dysphagia in aphasic patients, *Revista CEFAC*, 15 (6), 1503 - 1511. Epub August 06, 2013. Retrieved February 20, 2017, from [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S151618462013000600013&lng=en&tlng=en](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S151618462013000600013&lng=en&tlng=en).
- [23] Perlman, A. L, & Schulze - Delirien, K. (1997). *Deglutition and its disorders: Anatomy, physiology, clinical diagnosis and management*. San Diego: singular publishing group Inc.
- [24] Radhakrishnan, S., Menon, U. K., & Anandakuttan, A. (2013). A Combined Approach of Bedside Clinical Examination and flexible Evaluation of Swallowing in Post Stroke Dysphagia: A pilot study. *Annals of Indian Academy of Neurology*, 16 (3), 388 - 393. doi: 10.4103/0972 - 2327.116953
- [25] Rajeev, N. S., & Kumaraswamy, S. (2016). Swallowing patterns in Angioplasty patients. *Unpublished Master's dissertation. University of Mangalore*.
- [26] Schimmel, M., Voegeli, G., Duvernay, E., Leemann, B., & Muller, F. (2017). Oral Tactile Sensitivity and Masticatory Performance are Impaired in Stroke Patients. *Journal of Oral Rehabilitation*, 44 (3), 163 - 171. doi: 10.1111/joor.12482
- [27] Shaker, R., & Geenen, J. E. (2011). Management of Dysphagia in Stroke Patients. *Gastroenterology & Hepatology*, 7 (5), 308 - 332.
- [28] Singh, S., & Hamdy, S. (2006). Dysphagia in stroke patients. *Postgraduate Medical Journal*, 82 (968), 383 - 391. <http://doi.org/10.1136/pgmj.2005.043281>
- [29] Sundar, U., Pahuja, V., Dwivedi, N., & Yoelekar, M. E. (2008). Dysphagia in Acute stroke: correlation with stroke subtype, vascular territory and in hospital respiratory morbidity and mortality. *Neurology India*, 56 (4), 463 - 470. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/19127043>
- [30] Wan, P., Chen, X, Zhu, L, Xu, S., Huang, L, Li, X, Ye, Q., & Ding. R. (2015). Dysphagia Post Subcortical and Supratentorial Stroke. *Journal of stroke and*

**Retrieved from:**[31] <http://www.stroke-rehab.com/dysphagia.html>[32] <http://www.asha.org/uploadedFiles/FAQs-on-Swallowing-Screening.pdf>

- [33] <http://www.aafp.org/afp/2000/0415/p2453.html>
- [34] <https://www.csuchico.edu/~pmccaffrey/syllabi/SPPA342/342unit5.html>
- [35] <https://www.csuchico.edu/~pmccaffrey/syllabi/SPPA342/342unit1.html>
- [36] <http://thickit.com/9-facts-about-stroke-patients-and-dysphagia/>