

# Prevalence and Factors Associated with Dysphagia among Stroke Patients in Public and Private Hospitals of Hawassa, Ethiopia

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## Research Article

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## ABSTRACT

**Background:** According to center for disease control and prevention, stroke is one of the top ten causes of death in Ethiopia (CDC report 2013). Despite this fact the attention given to this fatal disorder is inconsiderable. Many complications commonly occur following acute stroke.

**Objectives:** The main purpose of this study is identification of prevalence and major factors associated with dysphagia among stroke patients attending public and private hospitals in Hawassa city.

**Methodology:** Cross-sectional study was conducted. Gugging bed side swallowing screen tool was used to determine dysphagia. For clinical and socio-demographic variables, pretested data collection questioner was employed. Before the data collection, ethical clearance letter was sought from the university ethical board. Pretest of the tool was conducted in Kuyera hospital. The data collection took place from March/10/2017 to August/10/2017. Before actual data analysis the data was entered in to Epi-data then exported to SPSS Version 20 for actual data analysis. Logistic regression was used for analytical analysis. Variables with P value less than 0.25 in univariate analysis were candidates for multivariate data analysis.

**Results:** 209 stroke patients were enrolled in this study. The mean age was  $60.97 \pm 12.14$  years. Male stroke patients account 59.3%. The Prevalence of dysphagia in this study area was 43%. Patients from urban area five times more likely to develop difficulty of swallowing (AOR 5.3, 95% CI 1.228, 12.7) Comorbidity is also one of these factors which have association with dysphagia. Patients without comorbidity were 83.5% less likely to have difficulty of swallowing. (AOR 0.165, 95% CI 0.051, 0.524) cigarette smokers were 9 times more likely have difficulty of swallowing (AOR 9.04, 95% CI 1.419, 57.707).

**Conclusion:** The prevalence of dysphagia was almost similar to other studies which implemented bedside swallowing screening methods. Place of residence, comorbidity and cigarette smoking were factors associated with dysphagia.

## INTRODUCTION

Schistosomiasis Stroke is the primary cerebrovascular disorder in the world. Stroke can be divided into two major categories: Ischemic (85%), in which vascular occlusion and significant hypo-perfusion occur, and hemorrhagic (15%), in which there is extravasation of blood into the brain. Irrespective of its classification, stroke is one of the major causes of disability in adults, causing cognitive, motor, speech, language and swallowing alterations [1,2].

Identifying swallowing difficulties in stroke patients is an important task in health care, as the care needs to be adapted and measures taken to reduce the risk of complications related to dysphasia. For instance, the risks of choking, aspiration and pneumonia are all associated with dysphasia depending on severity, patients with dysphagia may become malnourished or dehydrated and those who aspirate have an increased risk of developing. These factors, including changes in diet or feeding techniques, increase caregiver responsibility, affect the patient's quality of life, increase length of hospitalization and increase the likelihood of discharge to a nursing-care facility rather than home [3,4].

Patient presented with 1 or more of the following features were suggestive of dysphagia: (i) bilateral or brain stem stroke (ii) history of aspiration pneumonia or increased sputum secretion (iii) cough associated with feeding and/or drinking (iv) weight loss, decreased oral intake or prolonged feeding times (v) complaint of difficulty in swallowing (vi) need for a therapeutic diet or non-oral feeding. We excluded patients who could not follow commands, who had a tracheotomy, who had a prior history of oropharyngeal impairments or who had active respiratory infection [5].

Health care provider's highest priorities after a stroke are to prevent complications from the stroke and to prevent another stroke. They must determine that patients are medically stable and able to resume some self-care activities. This means that all complications must be treated and under control. Some things happen as a direct result of injury to the brain due to stroke. Others are because of a change in patients abilities. For eg: Facing difficulty in swallowing due to stroke can result in pneumonia. To reduce this Swallowing and respiratory therapy, and deep breathing exercises are highly recommended to decrease the risk of pneumonia [6].

Dysphagia is one of the most common and life-threatening complications in patients with stroke; its reported prevalence, as detected radio graphically d clinically ranges from 40% 70% [1,7,8]. Dysphagia has been reported to occur in 42%–60% of acute stroke patients on the basis of standardized clinical bedside swallowing assessments performed within a median of 3 days from stroke diagnosis. Video fluoroscopic swallowing assessments performed within a median of 10 days from stroke diagnosis have been reported to detect swallowing abnormalities in 55%–72% of acute stroke patients [9].

Food aspiration is a frequent consequence of oropharyngeal dysphagia, involving a strong risk of pneumonia and interfering with feeding. Thus, oropharyngeal dysphagia can impair nutrition, hydration, pulmonary status, eating pleasure and the social behavior of an individual, jeopardizing his quality of life and leading to death, especially among elderly patients [10].

During stroke management, one of the most challenging situations to face is the choice of feeding options. About a fifth of patients with acute stroke are malnourished on admission to hospital. Moreover, patients nutritional status often deteriorates thereafter because of increased metabolic demands which cannot be met due to feeding difficulties related to difficulty of swallowing [10,11].

### Conceptual frame work

This conceptual frame work was developed after vigorous revision of literatures. The broken arrows indicate there may be inverse effect of dysphagia but which is not the intension for this research proposal (Figure 1).

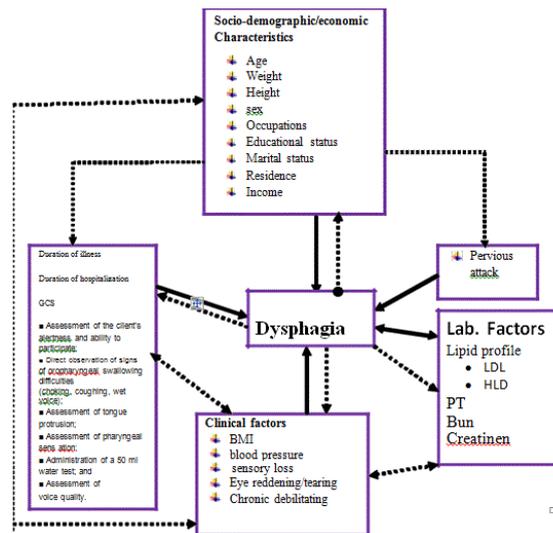


Figure 1. Conceptual frame work showing possible predictors of dysphagia among stroke patients.

## MATERIALS AND METHODS

### Study area and study period

This study was conducted in Hawassa public and private Hospital, Hawassa, Ethiopia. Hawassa is the capital of south region regional states of Ethiopia. The city has four private hospitals, two public hospitals. One of the two public hospitals is under Hawassa University. It is one of the teaching and referral hospitals in Ethiopia and currently the only referral hospital in the city. All those hospitals provides multidimensional aspects of care to clients who need health service. Those hospitals serve people living in the city, in the region and nearby clients form Oromia regional state. The following services are provided by these Hospitals: Internal medicine, surgery, gynecology/obstetrics, pediatrics, dentistry, ophthalmology, dermatology, and psychiatry. The study was undertaken from 10 March, 2017 to 10 August, 2017.

### Study design

An institution based Cross-sectional study with quantitative methods of data collection was employed. We believed that inclusion of secondary data will provide valuable information. Therefore, we did chart review through medical records of patients with an ischemic stroke or transient ischemic attack (TIA) or hemorrhagic stroke in those hospitals.

### Source population

All patients attending Hawassa city public and private hospitals were included who were suspected to have neurologic case.

### Study population

All patients diagnosed with any form of stroke and receiving their treatment and follow up care within these hospitals were involved in this study.

## SAMPLING

### Sampling

All eligible patients who were attending the medical wards in of public and privet hospitals in Hawassa City during the study period were enrolled into the study.

## ELIGIBILITY CRITERIA

### Inclusion criteria

All patients with diagnosis of stroke within the study period irrespective of place of referral were included. Patients who had demonstrated dysphagia after a previous stroke but had documented resolution of the dysphagia were also included in the study.

**Exclusion criteria**

Patients with a history of head and neck structural damage, upper respiratory tract infection, esophageal disorders, neurological disease other than stroke, and a current history due to these mentioned disorders which were supposed to cause dysphasia were excluded from the study.

**DATA COLLECTION PROCEDURES****Variables**

*Dependent variables:* Dysphagia

*Independent variables:*

Socio-economic characteristics: Age, Sex, Marital status, Residence, Income, Educational status, Occupation.

Clinical factors: History of smoking, Duration of illness, GCS (Glasgow coma scale), Previous History of attack, Eye reddening /tearing, Blood glucose level, Chronic debilitating illness or co-morbidity (hypertension, myocardial infarction, neuropathy, retinopathy), Signs of oropharyngeal swallowing difficulties (choking, coughing, wet voice), tongue protrusion, Body weight, Abnormal volitional cough, Height, Voice Change after Swallow.

**Data collection Instrument**

For data collection Structured medical record review guide, Gugging swallow screen check list and structured patient questionnaire, which were adopted after reviewing different studies (gug, tor, mass) were used. Gugging swallow screen tool has reassessment criterion. It uses three consistencies liquid, semisolid and solid food. This tool was developed for nurses and therapists. The Sensitivity and Specificity of this tool was 100% and 69% respectively. The GUSS offers a quick and reliable method to identify stroke patients with dysphagia and aspiration risk. This assessment tool considers the Pathophysiology of voluntary swallowing in a more differentiated fashion and provides less discomfort for those patients who can continue with their oral feeding routine for semisolid food while refraining from drinking fluids. Next to interview questionnaire, patient's medical record review guide was used.

**Data collection personnel**

In order to collect data, along the researchers, five BSc. nurses with data collection experience were recruited considering their previous data collection experience, communication skill and commitment. One researcher was recruited as supervisor. Before the actual data collection, those selected nurses were given basic training for two days on data collection tool and collection procedures. Selection of nurse for participation was negotiated with hospital administrators to ensure availability of at least 1 trained GUSS dysphasia screener across all shifts in each ward.

**Data collection procedure**

As soon as possible after hospital admission, patients were identified, consented, and enrolled by a research assistant. The presence of aphasia did not rule out or exclude patients from participation. If the patient is unconscious the date was postponed till patient becomes conscious or patients with GCS is less than 13, the observation was postponed till they were conscious. For those patients with communication impairment, we obtained consent either; directly from the patient using the methods of Supported Conversation for Adults with Aphasia; or from the substitute decision maker. All patients who were eligible and fulfill the criterion were checked for clinical swallowing evaluation.

**Data collection quality control**

For the management of data quality, data cross check up between interview result and patient's medical record review was used. Besides training was given for data collectors before data collection. Furthermore the principal investigators did regular cross check up for the completeness of the tool. Pre testing the tools was done among stroke patients attending Shashamene referral hospital.

**Data analysis procedures**

The collected data was checked manually for its completeness. After this the data was coded and entered to Epidata version 3.1 and then it was exported to SPSS version 20. Before the actual data analysis the data was explored for its completeness, outliers and missing values. Following data exploration descriptive statistics was used for variables such as socio-demographic characteristics of the study participants in relation to the dependent variable. For identification of independent variables which were associated with the dependent variable, dysphagia, chi-square test and student t-test was used. All factors with  $p < 0.25$  of the univariate analysis were considered as candidates for the multivariate regression

model. The 95% confidence interval (CI) was calculated wherever found appropriate. P-value less than 0.05 of the multivariate analysis was considered significant at two tailed tests. Finally results were presented in tables, graphs frequency and percentage.

### ETHICAL CONSIDERATIONS

Data First ethical approval and clearance letter was obtained from Hawassa university ethical review board and an official permission was sought from hospitals administration and ethical issue board. In addition to this, to have rapport between the data collectors and study participants, informed consent was secured from the participants. Indeed participants were informed that they have full-right to participate or not to participate in the study as well as to withdraw at any time during the time of data collection if they felt uncomfortable. Confidentiality of the data was ensured. The study has no any negative impact on any one rather the finding of the study will help stoke patients and educators as well as care givers particularly nurses in identifying modifiable factors favoring the development of swallowing difficulty.

#### Plan for dissemination of the study findings

The final report was presented to the Hawassa University College of health science and medicine research and publication office and the result was submitted to hospital medical and surgical department and nursing service director.

#### Glossary

**Limb apraxia:** Inability to perform complex movements with own limb.

**Abnormal gag reflex:** Absent or weakened velar or pharyngeal wall contraction, unilaterally or bilaterally, in response to tactile stimulation of posterior pharyngeal wall.

**Abnormal volitional cough:** Weak, verbalized, or absent response upon command to cough.

**Cough after swallow:** Cough immediately after or within 1 min of ingestion of calibrated volumes of water (5, 10, and 20 ml in duplicate).

**Voice change after swallow:** Alteration in vocal quality after ingestion of calibrated volumes of Water.

**Dysphasia:** Difficulty of swallowing with gugging swallowing screen score less than 14.

### RESULTS

**Table 1.** Socio demographic characteristics of respondents who were admitted at Hawassa public and privet Hospital, Hawassa, 2017 (n=209).

Variables (n=209)		No.	%
Sex	Male	124	59.3
	Female	84	40.7
Residence	Urban	145	69.4
	Rural	64	30.6
Marital status	Married	177	84.7
	Widow	13	6.2
	Divorces	19	9.1
Occupation	Professional worker	65	31.1
	Farmer/house wives	54	25.8
	Merchants	85	40.7
	Daily labor	3	1.4
	Unemployed	2	1
Educational status	No formal education	16	7.7

	Primary education	67	32.1
	Secondary education	74	35.4
	College and above	52	24.9
Age category	Age less than 45	27	12.9
	Age greater than 45	182	87.1

Two hundred nine patients with diagnosis of stroke were involved in the study of prevalence and factors associated with dysphagia among stroke patients. The mean age of the study population was  $60.97 \pm 12.14$  years. 'Stroke in the young' defined as stroke in the age less than 45 years, accounted for 27 (12.9%) patients. With regard to sex distribution 124 (59.3%) were male. Considering place of residence 64 (30.6%) was from rural area. One hundred seventy seven (84.7%) were married. Corresponding to educational status 74 (35.4%) have secondary education. Regarding age classification 38% were 48-57 years. Almost forty percent of study populations were merchants. For details of Socio demographic variables see **Table 1**.

**Description of same clinical factors observed in patients with stroke**

**Table 2.** Same clinical factors observed during swallowing among stroke patients attending Hawassa public and privet Hospital in Hawassa city, Hawassa, 2017 (n=209).

Variables (n=209)	No.	%
History of stroke attack	50	23.9
	159	76.1
History of swallowing problem	115	55
	94	45
Sense of food stuck in throat	82	39.2
	127	60.8
Elevation of Adams apple during swallowing	163	78
	46	22
Excessive tongue movement	151	72.2
	58	27.8
Regurgitation of food	41	19.6
	168	80.4
Reluctance to eat same food items	78	37.3
	131	62.7
Slurred speech	107	51.2
	102	48.8
Tearing /redness of eye during swallowing	24	11.5
	185	88.5

Among observed for swallowing 23.9% have history of previous stroke attack. Almost 39% of patients have sense of food stuck in the throat after swallowing.

Regarding elevation of Addams apple during swallowing 22% of patients has minor or no elevation observed. For details of same clinical factors see **Table 2**.

**Common Co-morbidities among stroke patients**

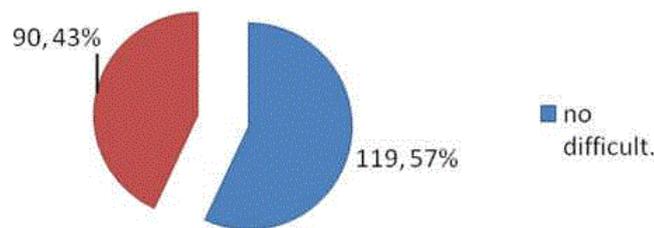
**Table 3.** Distribution of co-morbidities among stroke patients attending public and private hospitals in Hawassa city, Hawassa, 2017.

Variables (n=209)	No.	%
No comorbidity		
dm		
Heart disease		
Hypertension		
Total		

Hypertension was the most common co-morbidity followed by Diabetes mellitus. Hypertension was seen in 109 (52.1%) of patients (Table 3).

**PREVALENCE OF DYSPHAGIA**

Among 209 patients admitted and clinically evaluated for presence of difficulty of swallowing, 90 patients have GUSS score less than 14. This makes the prevalence of dysphagia in Hawassa public and private hospitals 43% (Figure 2).



**Figure 2.** Prevalence of difficulty of swallowing among stroke patients in public and private hospitals in Hawassa city, Hawassa, 2017.

**FACTORS ASSOCIATED WITH DYSPHAGIA**

Difficulty of swallowing is more common among Stroke in young age. Patients under 45 were almost 23 times more likely to develop difficulty of swallowing is all other factors or confounders were kept constant (COR 22.5; 95% CI 5.16; 98.03).

If all other factors were kept constant of the same, Male patients with stroke were 2.64 times more likely to have difficulty of swallowing (COR 2.64; 95%CI 1.47; 4.74).

Merchants were almost 4 times more likely to develop difficulty of swallowing as compared to those patients working as professionals either in public or non-government organizations (COR 3.56; 95%CI 1.795; 7.07). If we kept all other factors constant cigarette smokers either current or previous were almost 2 times more likely to have difficulty of swallowing as compared to non-smokers (COR 2.17; 95%CI 1.21; 3.894).

Assuming all other factors constant, One day increment in hospital admission increases the risk of difficulty of swallowing by 1.75 (COR 1.75; 0.55; 95% CI 1.43; 2.123). Stroke patients without other illness or comorbidity were almost 62% less likely to develop difficulty of swallowing (COR 0.379; 95% CI 0.179; 0.801).

Independent factors associated with dysphagia among stroke patients were place of residence, comorbidity and cigarette smoking. Stroke patients from urban area were almost five times more likely to develop difficulty of swallowing (AOR 5.3; 95%CI 1.228; 12.7).

Presence of comorbidity is also one of these factors which have association with difficulty of swallowing. Patients without comorbidity 83.5% less likely to have difficulty of swallowing (AOR 0.165; 95%CI 0.051; 0.524) cigarette smokers were 9 times more likely have difficulty of swallowing (AOR 9.04; 95%CI1.419; 57.707). For details see Table 4 below

**Table 4.** Factors associated with difficulty of swallowing among stroke patients attending public and private hospitals in Hawassa city, Hawassa, 2017.

Variables (n=209)		Dysphagia (Difficulty of swallowing)		COR (95%CI)	AOR (95%CI)
		Dysphagia	No Dysphagia		
Comorbidity	yes	79	87	0.379 (0.179,0.801)	0.165 (0.052,0.524)
	No	32	11	1	
Sex	Male	59	65	2.64 (1.47, 4.74)	
	Female	25	60	1	
Occupation	Professional workers	28	37	1	
	Farmers/H wives	1	53		
	Merchants	62	23	3.56 (1.79,7.07)	
	Daily labors	0	3		
	Unemployed	0	2		
Young stroke (stroke in under 45 years)	<45 yrs	25	2	22.5 (5.15, 98.03)	
	>45 yrs	117	65	1	
Smoking	Smokers	39	31	2.17 (1.21,3.89)	9.04 (1.41,57.71)
	Non smokers	51	88	1	
Occupation	Professional workers	28	37	1	
	Farmers/house wives	1	53		
	Merchants	62	23	3.56 (1.76,7.07)	
	Daily labors	0	3		
	Unemployed	0	2		
Duration of hospital stay in days				1.742 (1.43;2.213)	
BMI				1.36 (1.212,1.53)	
Residence	Rural	8	63	1	1
	Urban	82	56	11.5 (5.01,25.99)	5.3 (1.228,12.7)

## DISCUSSION

Farmers Given that dysphagia or difficulty of swallowing can affect quality of life and prolong hospitalization, identification of factors that may predict which stroke patients are at risk for dysphagia is important. The present study identified difficulty of swallowing among 43% of patients with stroke. The finding of this present study implies that the need to screen stroke patients with much more specific tools. The finding of this study is in line with that of done in different countries using standardized clinical bedside swallowing assessments performed within a median of 3 days from stroke diagnosis. But much lower from studies supported by Video fluoroscopic swallowing assessments method [12].

Comorbidity like hypertension and DM are disorders associated with dysphagia among stroke patients. This may be due to combined pathophysiologic effect of cerebrovascular accident (the stroke and other co morbidities. Another study done in Sao-polo found statistically significant association between stroke and other complications. Even statistical association was not done, study done in St. Poule hospital in Ethiopia found hypertension and dm as the most common commodities among stroke patients.

Place of residence was also one of the factors associated with difficulty of swallowing. According to the present study stroke patients from urban area were more prone for difficulty of swallowing this may be due to the fact that urban areas were more polluted than rural areas thus patients from urban area were more likely exposed for polluted air. Besides, peoples living in most rural area have good physical activities as compared to those living in urban areas. Other factor that may attribute to development of dysphagia among patients from urban area is unclear.

The present study found that longer hospital stay has significant effect on presence of dysphagia or difficulty of swallowing. It was probably because of all the disabilities that were part of the problem, of which swallowing difficulties was one, that dysphagia patients had significantly longer stays in hospital. This study was in agreement with other studies [13,14].

The present study found Smoking as one of influential factor associated with difficulty of swallowing. This may be due to the fact that cigarette smoking has different health and health related problems. Therefore patients with stroke who were smokers were more likely to develop difficulty of swallowing are dysphagia [15,16].

As strength this study is the first to use clinical bed side swallowing screening method to see its prevalence and associated factors among stroke patients. Besides, the present study tried to integrate patients medical records with interview results.

The limitation of this study is that, the study design did not include a prospective study of dysphagia screening methods, but instead involved a cross-sectional study design [17-19]. In an ideal evaluation it is good to apply gold standard diagnostic test like video fluoroscopic methods. Because of this it is difficult to see cause effect relationship. Besides, screening is to see sign and symptoms present in patients therefore it suggests patients at risk rather than confirming the presence dysphagia. Because of absence of consistencies in finding all Laboratory results for all patients, these factories were not included in the analysis.

## **CONCLUSION**

The prevalence of dysphagia or difficulty of swallowing is similar to other studies which implemented bedside swallowing screening methods. Independent factors associated with dysphagia among stroke patients were place of residence, comorbidity and cigarette smoking. Presence of comorbidity is also one of these factors which have association with difficulty of swallowing. Patients without comorbidity were 83.5% less likely to have difficulty of swallowing. (AOR 0.165; 95%CI 0.051; 0.524) cigarette smokers were 9 times more likely have difficulty of swallowing (AOR9.04; 95% CI1.419; 57.707).

## **RECOMMENDATIONS**

Based on the finding of this study the following recommendations were forwarded:

- Nurses taking care of stroke patients should evaluate stroke patients for swallowing difficulties before discharge and after they become conscious.
- Nurses taking care of those patients should provide health education or self-learning materials for patients after discharge. Besides special attention should be given for patients with co-morbidity.
- All health care providers involved in the care of stroke patients should practice documentation of laboratory findings.
- Health care providers working in hospitals and taking care of stroke patients should strengthen health education for stroke regarding the effect of smoking on health and health related problems.
- Stroke patients with comorbidity should receive due attention since they were more at risk for dysphagia associated complications.

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