Assiut Scientific Nursing Journal
http://asnj.journals.ekb.eg http://www.arabimpactfactor.com
DOI:10.21608/asnj.2023.202129.1550 http://olddrji.lbp.world/indexedJournals.aspx
https://vlibrary.emro.who.int/journals/assiut-scientific-nursing-journal

Effect of Compensatory Strategies on Severity and Functional Outcome of Oropharyngeal Dysphagia for Stroke Patients

Magda Kamal El Shishtawy[1], Eman Elsayed Hussein[2] & Mona Abdullah Mohamed[3]
[1.] Lecturer of Medical Surgical Nursing, Faculty of Nursing, Zagazig University, Egypt.
[2.] Assistant Professor of Medical Surgical Nursing, Faculty of Nursing, Zagazig University, Egypt.
[3.] Lecturer of Medical Surgical Nursing, Faculty of Nursing, Zagazig University, Egypt.

Abstract
Post-stroke dysphagia is one of the greatest feared consequences of stroke associated with tougher outcome, dependence, and quality of life of stroke survivors. **Aim:** This study aimed to evaluate the effect of compensatory strategies on severity and functional outcome of oropharyngeal dysphagia for stroke patients. **Design:** A pretest and post-test quasi-experimental research design was used. **Setting:** This study was conducted in the intensive care unit, Neurology department in New Surgery Hospital and Outpatient Clinic of Neurology, associated to Zagazig University Hospitals. **Sample:** A Purposive sample of 60 post stroke hospitalized adult patients was conducted. **Tools: Tool I:** A Structured interview questionnaire, **Tool II:** The Gugging Swallowing Screen (GUSS), **Tool III:** Swallow Function Scoring System (SFSS), and **Tool IV:** Swallowing Disturbance Questionnaire. **Results:** Two thirds (66.7%) & the (most 90.0%) of patients in the study group respectively had independent feeding ability through post and follow up phases. highly statistically significant differences were found among the patients in the study group regarding physical, functional, and emotional symptoms of dysphagia through the three phases of the study with $\bar{X}$S. D (161.6 ± 8.2, 82.5 ± 29.2, & 57.8 ± 26.5 respectively) at p=0.000 and F=41.91. **Conclusion:** Rendering to the study results, it can be concluded that use of the compensatory strategies had a statistically significant positive effect on lessening symptoms, severity, and handicap, of dysphagia. **Recommendation:** More study on larger sample sizes is proposed to examine various models of compensatory strategies for post stroke dysphagia.

Keywords: Compensatory Strategies, Dysphagia, Functional Outcome, Severity, & Stroke.

Introduction
Stroke is one of the top five worldwide causes of disability-adjusted life years (DALYs). The prevalence of stroke overall in Egypt is significant (963 per 100,000 people), and there are roughly 150 000 to 210 000 strokes each year **Grotta et al, (2021)**. According to official national data, circulatory diseases like stroke are the leading cause of death in Egypt, accounting for 6.4% of all fatalities and ranking third after cardiovascular and gastrointestinal conditions **Aref et al, (2021).**

Post-stroke dysphagia affects quality of life, may delay reintegration and increase health spending, is linked to diminished oral, pharyngeal, and esophageal functions, causes societal loneliness in addition to thoughtful difficulties that can lead to airway obstacle, aspiration, aspiration pneumonia, dehydration, malnourishment, sepsis, and death **Savci & Acaroğlu (2021).**

Old-style swallowing exercises, behavioural therapy, and pharmaceutical treatments are used to treat dysphagia. These treatments improve sensory response from the oropharynx to the central pattern generator, combine the disused or pharyngeal muscular structure, evading atrophy and decreased mechanical production from the central pattern generator, and reduce symptoms by altering posture in a compensatory manner. (**Alamer et al, 2020)**. **Furthermore, according to Hägglund et al. (2020),** compensatory strategies have been used to control dysphagia, such as postural modifications, swallowing techniques, or altering the thickness of food or liquid.

Compensatory strategies aim to return secure oral feeding to a level as close to usual as is feasible. After a thorough assessment of the swallowing process is finished, compensatory strategies are implemented. All acute stroke patients should have their swallowing ability evaluated. The performance of the guiding strategy depends on the type of swallowing difficulties **(Abo Elfetoh & Karaly, 2018).**

Significance
Post-stroke dysphagia, a swallowing problem caused by a stroke that affects 39–81% of stroke patients, is one of the most dreaded stroke complications. Aspiration pneumonia, malnutrition, dehydration, prolonged hospital stays, and an elevated fatality rate are all frequently caused by post-stroke dysphagia. A timely diagnosis for post-stroke dysphagia decreases

health concerns after stroke and enhances stroke consequence; therefore, prompt identification and suitable action for post-stroke dysphagia could be regarded a vital component of acute management of stroke. The rate of hospital admission for patients with stroke on intensive care units at Zagazig University Hospitals through 2021 were 310 patients **(Statistical Records of stroke intensive care units at Zagazig university Hospitals, 2021).**

Aim of the study: This study aimed to evaluate the effect of compensatory strategies on severity and functional outcome of oropharyngeal dysphagia for stroke patients.

By achieving the following objectives, this aim was achieved:

1. Assess manifestations and complications of dysphagia for post stroke patients.
2. Assess severity of dysphagia for post stroke patients.
3. Assess functional outcome of swallowing for post stroke patients.
4. Develop, and implement the Compensatory Strategies for post stroke patients.

Hypothesis

The following hypotheses were made in order to reach the study's aim:

H 1: Post-stroke patients in the study group who used compensatory strategies will experience fewer manifestations and complications compared to the control group

H2: Patients in the study group will have a statistically significant reduction in dysphagia severity compared to patients in the control group after the application of compensatory strategies.

H3: Functional outcome of swallowing for patients in the study group will demonstrate statistically significant improvements after application of the Compensatory Strategies than control group.

Operational definitions

Compensatory strategies: are environmental and behavioral techniques or modifications designed to bypass functional impairment, as a means to achieve desired rehabilitation goals. In this study, the implementation of Compensatory strategies for post stroke patients with oropharyngeal dysphagia includes postural modifications, swallowing maneuvers, altering the texture of food and fluids, and oropharyngeal exercises.

Dysphagia: Difficulty associated with the act of swallowing of a liquid or solid bolus

Subjects and Methods

Study design

To conduct the study, a quasi-experimental research design was employed. Analyzing the existence of a causal relationship among dependent and independent variables is a function of quasi-experimental research designs. The purpose of this design is to evaluate the impact of one variable on another or examine causal relationships. It is designed around an intervention and the main study goal is to estimate the size of an intervention effect on some outcomes. Since they are more appropriate for use in natural settings found in actual life than true experimental research designs, Quasi-experimental studies are more commonly utilized in nursing **(Davis & Fisher, 2018).**

Setting: The study sample was enrolled from intensive care unit (ICU), Neurology department in New Surgery Hospital, and Outpatient Clinic of Neurology in Outpatients Clinics Hospital, all three institutions were affiliated with Zagazig University Hospitals and were situated in the Egyptian governorate of Sharkia. The intensive care unit and Neurology department are located on the second floor of New Surgery Hospital, ICU include 20 beds. The neurology department includes five rooms each has three beds. On the fourth floor of the Outpatient Clinics Hospital, the Outpatient Clinic of Neurology has five rooms: one for new cases, one for epileptic patients, one for patient follow-up, and two lecture halls.

Sample

A purposeful sample of (60) post stroke hospitalised adults patients were enrolled from the aforementioned setting. The research participants were assigned to two equivalent clusters, study and control (30 patients for each group). Samples size calculation based on year 2021 census report of patients' admission to ICU, The samples were determined by power and sample size calculation software.to give efficacy of 80%. The projected samples size in the aforementioned setting are 60 of the 90 cases **(Thompson, 2012).** The sample size was determined using the following formula:

Sample criteria: Once meeting the following requirements, each participant who entered the study

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

setting throughout the study's run was eligible for inclusion in the sample. Adults over the age of 18, patients of both sexes, who are conscious and able to communicate, stable medical condition, and Positive 5 ml water swallowing test were the inclusion criteria. Patients with history of swallowing difficulties due to previous strokes, patients with sensory discrepancy and receptive aphasia, patients with neurological illnesses other than stroke that could result in dysphagia, and patients who required a change in orally food because of causes other than dysphagia (such as poor nutrition or poor dental health) were

excluded from study. The study group had compensatory strategies beside the routine care of ICU, while control group had only a regular treatment.

Tools of data collection:

Tool I: A Structured interview questionnaire (pre-posttest for both groups):

The researchers constructed it based on a review of the literature and viewpoints of proficiency for validity of content. This must has been changed into Arabic to avert misinterpretation; this was implemented to everyone under study both before (pretest) and after (posttest) the deployment of the compensatory strategies. The questionnaire covered four main parts as the following:

Part I: Demographic Data: It included six items of personal demographic characteristics of the patients such as age, gender, marital status, level of education, living status, and smoking.

Part II: Patients' Clinical Characteristics: it was adapted from **(Yousef et al., 2020, Hägglund et al. 2020, and Diana & Rani 2014).** This addressed 5 questions concerning the clinical characteristics (medical history) of the participants regarding type of stroke, consistency of diet, NG tube insertion, associated disease, and current mental status.

Part III: Nutritional status assessment sheet (pre, Post, follow up): adapted from **(Elsaid et al., 2019)**, consisted of five items: current diet, alternative diet, feeding ability, length of eating (min), and quantity of food consumed (mL). Current diet had three answers; Nothing Per Oss (NPO), liquid, semi liquid rated as 0, 1, and 2 sequentially. Alternative diet had four answers; Naso Gastric Tube (NGT), percutaneous entero, gastrostomy feed, none marked as 0, 1, 2, and 3 sequentially. Feeding ability had three answers; completely dependent, partially dependent, independent self-feeding ranked as 0, 1, and 2 sequentially. Total scores ranged from 0-7 score. Regarding length of eating (min), and quantity of food consumed (mL), the three values during pre, Post, follow up phases were measured then the mean and standard deviation were estimated. These scores converted to percentage and categorized as the following: good nutritional status ≥ 70 %, poor nutritional status < 70 % based on statistical analysis.

Part IV: Dysphagia symptoms and complications assessment sheet ((Dysphagia Handicap Index (DHI)" (pre, Post, follow up): adopted from **(Farahat et al., 2014),** is a personality questionnaire with twenty five items that evaluates the functional, physical, and emotional elements of dysphagia's individuals quality of life (QoL). Nine statements for physical aspect; drooling, coughing, choking, pain on swallowing, weight loss, and history of aspiration. Nine statements for functional aspect; type of food, amount, time to eat, method of feeding, and socialization. Seven statements for emotional aspect; feeling of embarrassment, nervousness, depression, handicapped, angry, and afraid of choking.

Scoring system: four levels of severity were determined; Normal=1 was scored one, Mild= (2-3) was scored two, Moderate= (4-5) was scored three, and sever= (6-7) was scored four. The maximum score was 100 points divided into 36 physical, 36 functional, and 28 emotional.

Tool II: The Gugging Swallowing Screen (GUSS) (pre, Post, follow up): adopted from **Micheala et al., (2007), Rani et al., (2013)**, **Hussein & Mahmoud, (2017),** used to determine the dysphagia severity and the risk of aspiration in acute-stroke patients. The test started with saliva swallowing followed by swallowing of semisolid, fluid and solid textures. It consisted of 4 subtests and was divided into 2 parts: the preliminary assessment or indirect swallowing test (Subtest 1) and the direct swallowing test, which consisted of 3 subtests. These 4 subtests must be performed sequentially. In the indirect swallowing test: 1. vigilance; 2. voluntary cough and/or throat clearing; 3. saliva swallowing (swallowing, drooling, voice change) were assessed. The direct swallowing test assessed the deglutition, involuntary cough, drooling and voice change within the semi-solid swallowing, liquid swallowing and solid swallowing trial. The evaluation is based on a point system, for each subtest a maximum of 5 points can be reached. Thus, 20 points are the highest score that a patient can attain, and it denotes normal swallowing ability without aspiration risk. In total 4 levels of severity can be determined: 0-9 Points: severe dysphagia and high aspiration risk; 10-14 Points: moderate dysphagia and moderate risk of aspiration; 15-19 Points: mild dysphagia with mild aspiration; and 20 Points: normal swallowing ability.

Tool III: Swallow Function Scoring System (SFSS) (pre, Post, follow up): adopted from **(Gupta et al., 2014),** was used to measure the ability of liquid intake. It identified the consistency of liquid that a patient can swallow without aspiration. It is categorized into 7 levels; saliva aspiration, saliva, pudding, honey consistency, nectar consistency, thin liquid, and water (score 0–6; from saliva aspiration to all liquid toleration).

Tool IV: Swallowing Disturbance Questionnaire (pre, Post, follow up): adopted from **(Cohen and Manor, 2011),** was used to measure the common swallowing disturbances that appeared in the oral and pharyngeal phases of swallowing. Five questions (questions 1–5) are related to the oral phase of swallowing and 10 questions (questions 6–15) are related to the pharyngeal phase. Fourteen questions

are rated by a four-point (0–3) scale (0 for no disturbance, 1for **Seldom** (once a month or less), 2 for **Frequently** (1-7 times a week,) and 3 for Very Frequently (> 7 times a week). The total score ranged from (0-45), the fourteen questions were totally scored with 42 points and the fifteen question was answered as a "yes/no" question with 3 points (yes was scored 2.5 and no was scored 0.5).

Content validity and Reliability

Face validity aimed at evaluating the items to determine whether the tools measure what intended to measure. Content validity was conducted to determine whether the content of the tools cover the aim of the study. Tools were reviewed by five experts in each specialty and academic position "three of them professors of medical surgical nursing, professor of neurology, finally Physiotherapy and Rehabilitation Specialist "who reviewed the tool's content for lucidity, significance, inclusiveness, understanding, and ease for application. According to their comments, minimal alterations were made, and the final version was created.

The internal consistency technique was used to assess the reliability of the tools. It was discovered that Cronbach's alpha reliability coefficient for Tool I: nutritional assessment 0,761, Tool II: dysphagia symptoms and complications 0,846, Tool III: gugging swallowing screen 0,887, Tool IV: swallow function 0,910, and Tool V: swallowing disturbance 0.793.

Ethical considerations

Prior to the primary interview, an oral permit was secured from each subject after being told about the nature, purpose, and profits of the study. Patients were also informed that membership is voluntary and about their right to retire at any time without giving reasons. Confidentiality of any obtained information was ensured through coding of all data. The researchers assured patients that the data would be used for only research purposes.

Pilot study: A pilot study was conducted on patients (10%) of the whole study sample to test the clarity and feasibility of the tools and to estimate the required time to fill in each form. Necessary adjustments were done according to the pilot study results. Pilot subjects were later excluded from the main study sample.

Field work: The field work began at the beginning of May and continued until the end of October 2022 after receiving all necessary official approvals. In order to acquire their agreement and cooperation, the researchers went to the study locations and spoke with the manager and head nurses to clarify the study's purpose as well as methods. The patients who fit the eligibility requirements were then contacted, informed of the study's goals and methods along with their rights, and urged to take part. Participants were randomly assigned to either the control group or the study group. Additionally, The requirements for every patient in the research or control groups to participate were laid out by the authors. The study was carried out through phases: preparatory, assessment, planning, implementation, and evaluation.

Preparatory phase: This phase involved creating the study tools and developing of compensatory strategies by the authors based on a thorough analysis of recent, pertinent articles. **(Konecny et al, 2017, Abo Elfetoh and Karaly, 2018, & Savc & Acaroğlu, 2021).** It was written in simple Arabic language and contained pictures for more illustrations to facilitate patients' understanding.

Assessment phase: The researchers met patients who gave their consents and followed the eligibility criteria, clarified to them the characteristics and purposes of the study. The researchers proposed to patients to create a line of communication. The researchers interviewed patients individually at the Intensive Care Unit using the data collection tools as a pre-test. Tool, I required about 15-20 minutes, tool II took about 20 minutes, and tools III& IV took about 15 minutes to be filled from each patient to collect the necessary data. The gained data served as standard data and directed the researchers in the preparation of compensatory strategies.

Planning phase: Throughout this phase, the researcher designed compensatory strategies centered on patients' demands which were identified in the assessment phase and reviewed of the most recent and relevant literature, and under the direction of the supervisors. A variety of teaching methodologies were chosen to best meet the individual needs of each patient through lectures, demonstration, and re-demonstration to make understanding and incorporation of theory and practice easier. Instructional materials were used as Presentation slides, videos, and coloured printouts. In addition, the authors designed a booklet with practical and theoretical information in simple Arabic to aid patients in understanding the information presented and achieving the study's aim.

Implementation phase: The developed compensatory strategies were fulfilled through the use of sessions applied in the study sites for the study group's patients, for 45 minutes, 3 days per week for 8 weeks in parallel. The caregivers were invited to participate in sessions to help the patients in implementing strategies at home. The contents of the strategies were delivered over 6 sequential sessions including theoretical and practical parts. **The 1st session** was for alignment to clarify aim and matters of the strategies, its broad goals, the teaching approaches, learner's performances, and evaluation methods. **The 2nd session** covered the theoretical part

including the definition of oropharyngeal dysphagia, its' manifestations, causes, risk factors, complications, methods of treatment, information associated to types of exercises, and their importance.

The remaining four practical sessions involved three phases, **Preparatory phase**; covered with the **3rd session**, during this phase any clothing that was compressing the neck, chest, or abdomen was loosened. The patients were supplied with oral care to avoid aspiration pneumonia and to accelerate the flow of saliva and the sense of taste before nutrition. In accordance with the physician's proposal, a diet consisting of sticky liquids and mixed semi-solid food was prepared for bolus control by cooperating with the dietician and the patient's family/caregiver. A proper body and head position was provided for safe swallowing. The head of the patients fed in the sitting position was raised to 90 degrees, and concerning the patients fed in the lie down position it was elevated to 60 degrees. The exhausted parts of the body, the hips, and back were backed by pillows. The chin-to-chest maneuver (the procedure of swallowing with the head leaned forward and the patient's chin leaning on the chest) was used to ensure secure swallowing.

Training of "dry" swallowing phase (without the use of foods); included two sessions; **the 4th session** for demonstration and re-demonstration of facial exercises; tongue, face, lips, and muscles. Exercises were practiced to patients by the researchers then patients were requested to re-demonstrate the exercises by themselves under researchers' observation until the researchers made sure that trainers acquired the expected skills. They received rapid intervention to fix any mistakes they had made.

Started with patient sitting in a good posture. Extend the neck. Touch the chin and pull the chin back and away from your hand. Keep the chin level and parallel with the floor. Perform each exercise slowly and thoughtfully. Rest briefly after each exercise. Facial exercises included 10 consecutive exercises involved: tongue, lips, and muscles exercises.

The 5th session for Pharyngeal training included (supraglottic swallowing, and Mendelsohn maneuver). **Supraglottic swallowing** described to taking food inside the mouth and chewing it, taking a deep breath before swallowing and holding it, passing the bite into the pharynx by pushing the head backwards slightly at the same time, and swallowing the bite while keeping the breath. The patient coughs as soon as after swallowing and before breathing again. So, the bite passed through the pharynx without any problem. Willingly increasing the time to keep the airway closed before and during swallowing is a technique to protect the airway and prevent aspiration. **Mendelsohn maneuver** is a swallowing method used to improve the cricopharyngeal opening width and opening time during swallowing. The patient was asked to swallow and hold on the larynx for 2–3 seconds after swallowing and then swallow again.

Targeted physiotherapy of swallowing phase; covered by the sixth sessions for demonstration and re-demonstration for practice of trying to swallow with the assistance of meals and beverages of various solidity, stimulation of the impulsion push (pressure of the tongue with the bite on the palate), coaching of the supraglottic swallowing and ultimately practice of the recompense swallowing strategies with the aid of dominated head posture (turning, bending forward). Additionally, each patient in the research study group received a copy of the guideline's booklet from the researchers. The researchers phoned the patients for follow-up and urged them to apply compensatory strategies completely and regularly at home.

During the research group's adoption of the strategies, the patients in the control group continued to receive their regular nursing care from the intensive care unit's nursing staff (e.g., monitoring vital signs, drug administration, hygienic care, suctioning, and feeding) .The researchers made no more interactions with them.

Evaluation phase:

It is the final phase conducted twice to together groups at the Outpatient Clinic of Neurology. The first evaluation was conducted two months after the compensatory strategies were implemented to evaluate their effectiveness utilizing the identical pre-test tools then, the second time after one month as a follow up. The researchers evaluated the control group first and then the study group to accomplish justice of the results.

Statistical Analysis:

Statistical Package for Social Science (SPSS) version 25 for Windows was used to arrange, tabulate, and statistically analyse the acquired data on an IBM compatible computer. The use of descriptive statistics was used. (e.g., frequency, percentages, mean and standard deviation). During the two visits, qualitative characteristics were compared between the group using the chi square test (X2), and the three visits were evaluated using the Friedman test. Differences between the group during the two visits were assessed by paired t test and different between the group during the three visits were assessed by repeated measures ANCOVA. Correlation coefficient test (r) was used to test the correlation between studied variables. Reliability of the study tools was done using Cronbach's Alpha. A significant level value was considered when $p < 0.05$ and a highly significant level value was considered when $p < 0.01$. No statistical significance difference was considered when $p > 0.05$.

Results

Table (1): Percentage and Frequency Distribution of Demographic Characteristics of the Studied Groups (n=60)

Socio-demographic data	Study group (n=30)		Control group(n=30)		X^2	P-Value
	No.	%	No.	%		
Age (Year)						
40-<50	10	33.3	4	10.0	**5.448**	**0.064**
50-<60	5	16.7	12	62.5		
≥ 60	15	50.0	14	27.5		
X¯ S.D	**58.71 ± 4.91**		**60.27 ± 6.03**		**t=4.500**	**0.083**
Gender						
Male	22	73.3	18	60.0	**1.200**	**0.273**
Female	8	26.7	12	40.0		
Marital Status						
Married	28	93.3	26	86.7	**0.671**	**0.335**
Not married	2	6.7	4	13.3		
Educational level						
Educated	24	80.0	27	90.0	**1.176**	**0.278**
Not educated	6	20.0	3	10.0		
Living status						
With family	28	93.3	30	100.0	**0.492**	**0.246**
Without family	2	6.7	0	0.0		
Smoking						
Yes	14	46.7	11	36.7	**0.617**	**0.432**
No	16	53.3	19	63.3		

X^2: Chi-square *No statistically significant at p > 0.05.*

Table (2): Percentage and Frequency Distribution of the Studied Patients According to Their Medical History (n=60)

Items	Study group (n=30)		Control group (n=30)		X2	P-Value
	No.	%	No.	%		
Type of stroke						
Ischemic	30	100.0	30	100.0	**0**	**0**
Hemorrhagic	0	0.0	0	0.0		
Consistency of diet						
Liquid	20	66.7	16	53.3	**1.111**	**0.292**
Semisolid	10	33.3	14	46.7		
NG tube insertion						
Yes	10	33.3	14	46.7	**1.111**	**0.292**
No	20	66.7	16	53.3		
Associated disease.						
No associated illness	0	0.0	0	0.0		
Hypertension	20	66.7	18	60.0		
Diabetes	0	0.0	1	3.3	**0.809**	**0.319**
Ischemic heart Hypertension and diabetes	2	6.7	4	13.3		
Ischemic heart conditions with high blood pressure	8	26.7	7	23.3		
Current mental status						
Alert	28	93.3	26	86.7	**0.671**	**0.335**
Confused	2	6.7	4	13.3		
Drowsy	0	0.0	0	0.0		

(*)** select more answer* ***X^2: Chi-square *No statistically significant at p > 0.05.*

Table (3): Comparison Between the Studied Patients (Study and Control Groups) Regarding Nutritional Assessment Through Pre, Post and Follow-Up Phases (n=60).

Items	Study group (n=30)						Control group (n=30)						p_1	p_2	p_3	p_4	P_5
	Pre		Post		Follow-up		Pre		Post		Follow-up						
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%					
Feeding ability																	
Independent self-feeding	10	33.3	20	66.7	27	90.0	12	40.0	13	43.3	14	46.7	**Fr=18.55**	**Fr=2.500**	**X^2=1.002**	**X^2=13.27**	**X^2=15.80**
Partially dependent	14	46.7	8	26.7	3	10.0	10	33.3	11	36.7	11	36.7	**P=0.000****	**p=0.260**	**p=0.299**	**p=0.000****	**p=0.000****
Completely dependent	6	20.0	2	6.6	0	0.0	8	26.7	6	20.0	5	16.7					
Duration of Eating (Min)	18.36 ± 6.37		14.29±5.22		13.88±5.60		17.88±5.93		16.54±5.27		16.22±4.92		**P=0.00****	**P=0.410**	**P=0.397**	**P=0.01***	**P=0.01***
Amount of Food Consumed (mL)	231.15±41.16		273.28±59.33		271.48±58.73		229.71±40.08		240.07±41.82		241.33±41.97		**P=0.00****	**P=0.236**	**P=0.261**	**P=0.02***	**P=0.01***
Total score																	
Good nutritional status	13	43.3	26	86.7	27	90.0	14	46.7	16	53.3	18	60.0	**Fr=26.90**	**Fr=4.608**	**X^2=0.076**	**X^2=7.937**	**X^2=7.200**
Poor nutritional status	17	56.7	4	13.3	3	10.0	16	53.3	14	46.7	12	40.0	**P=0.000****	**p=0.137**	**p=0.795**	**p=0.005****	**p=0.008****
$\bar{X}$ S. D	**4.53±0.73**		**5.43±0.97**		**5.66±0.99**		**4.46±0.50**		**4.66±0.66**		**4.73±0.63**		**F=13.07 p=0.000****	**F=1.571 p=0.214**	**t=0.571 p=0.573**	**t=5.600 p=0.000****	**t=5.413 p=0.000****

X^2: Chi-square. T= paired t.test. Fr= Friedman test. F= One Way Anova. p= p-value. No statistically significant at p > 0.05.
: Highly statistically significant at p ≤ 0.01. **P^1: p value for comparing between study group pre, post and follow-up intervention**.**
P^2: p value for comparing between control group pre, post and follow-up intervention**.** **P^3:** p value for comparing between two groups at **pre-intervention.**
P^4: p value for comparing between two groups at **post intervention.** **P^5:** p value for comparing between two group **follow-up intervention.**

Table (4): Comparison Between the Studied Patients (Study and Control Groups) Regarding Dysphagia Symptoms and Complications (Dysphagia Handicap Index (DHI) Through Pre, Post and Follow-Up Phases (n=60).

Items	Study group (n=30)						Control group (n=30)						p_1	p_2	p_3	p_4	P_5
	Pre		Post		Follow-up		Pre		Post		Follow-up						
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%					
Physical	**56.6 ± 3.05**		**27.6 ± 8.06**		**17.3 ±5.22**		**55.9 ± 3.19**		**54.7 ± 4.15**		**53.9 ± 4.21**		**F=33.99 p=0.000****	**F=1.557 p=0.290**	**t=0.993 p=0.302**	**t=31.50 p=0.000****	**t=26.79 p=0.000****
Functional	**59.1 ± 1.15**		**30.4 ± 11.1**		**21.3 ± 9.55**		**59.9 ± 1.29**		**58.3 ± 1.45**		**57.5 ± 1.61**		**F=30.41 p=0.000****	**F=1.641 p=0.275**	**t=0.400 p=0.601**	**t=27.50 p=0.000****	**t=21.66 p=0.000****
Emotional	**45.9 ± 2.11**		**24.5 ± 10.0**		**19.2 ± 11.7**		**44.8 ± 1.97**		**44.1 ± 2.0**		**43.7 ± 2.10**		**F=26.40 p=0.000****	**F=0.941 p=0.415**	**t=0.714 p=0.481**	**t=20.59 p=0.000****	**t=23.60 p=0.000****
Total score																	
Normal	1	3.3	16	53.3	22	73.3	1	3.3	1	3.3	2	6.6					
Moderate	4	13.3	8	26.7	6	20.0	5	16.7	4	13.3	5	16.7	**Fr=29.88**	**Fr=1.090**	**X2=0.107**	**X2=24.05**	**X2=30.07**
Severe	25	83.4	6	20.0	2	6.7	24	80.0	25	83.4	23	76.7	**P=0.000****	**p=0.299**	**p=0.666**	**p=0.000****	**p=0.000****
$\bar{X}$ S. D	**161.6 ± 8.2**		**82.5 ± 29.2**		**57.8 ± 26.5**		**160.6±6.5**		**157.1 ± 7.6**		**155.1 ± 7.9**		**F=41.91 p=0.000****	**F=2.317 p=0.110**	**t=1.001 p=0.293**	**t=34.91 p=0.000****	**t=39.70 p=0.000****

X^2: Chi-square. T= paired t.test. Fr= Friedman test. F= One Way Anova. p= p-value. No statistically significant at p > 0.05.
: Highly statistically significant at p ≤ 0.01. **P^1: p value for comparing between study group pre, post and follow-up intervention**.** **P^2:** p value for comparing between control group pre, post and follow-up intervention**.** **P^3:** p value for comparing between two groups at **pre-intervention.**
P^4: p value for comparing between two groups at **post intervention.** **P^5:** p value for comparing between two group **follow-up interventions.**

Table (5): Comparison Between the Studied patients (Study and Control groups) Regarding Gugging Swallowing Screen Through Pre, Post and Follow-Up Phases (n=60).

Items	Study group (n=30)						Control group (n=30)						p_1	p_2	p_3	p_4	P_5
	Pre		Post		Follow-up		Pre		Post		Follow-up						
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%					
Normal swallowing ability	0	0.0	6	20.0	15	50.0	0	0.0	0	0.0	0	0.0					
Mild dysphagia with mild aspiration	0	0.0	20	66.7	13	43.3	0	0.0	0	0.0	1	3.3					
Moderate dysphagia and moderate risk of aspiration	16	53.3	4	13.3	2	6.7	12	40.0	14	46.7	15	50.0	**Fr=53.47 P=0.000****	**Fr=2.527 p=0.097**	**X2=0.933 p=0.295**	**X2=14.30 p=0.000****	**X2=18.27 p=0.008****
Severe dysphagia and high aspiration risk	14	46.7	0	0.0	0	0.0	18	60.0	16	53.3	14	46.7					
$\bar{X}$ S. D	**8.73 ±2.11**		**16.1 ± 2.44**		**17.93±2.09**		**8.60±2.28**		**8.83±1.62**		**9.73±1.70**		**F=147.69 p=0.000****	**F=3.003 p=0.055**	**t=0.363 p=0.720**	**t=12.293 p=0.000****	**t=10.862 p=0.000****

X^2: Chi-square. **T= paired t.test.** **Fr= Friedman test.** **F= One Way Anova.** **p= p-value.** No statistically significant at $p > 0.05$.
******: Highly statistically significant at $p \leq 0.01$.
P^1: p value for comparing between study group pre, post and follow-up intervention**.**
P^2: p value for comparing between control group pre, post and follow-up intervention**.**
P^3: p value for comparing between two groups at **pre-intervention.**
P^4: p value for comparing between two groups at **post intervention.**
P^5: p value for comparing between two group **follow-up intervention.**

Table (6): Comparison Between the Studied Patients (Study and Control Groups) Regarding Swallow Function Through Pre, Post and Follow-Up Phases (n=60).

Items	No.	Study group (n=30)			Control group (n=30)			p_1	p_2	p_3	p_4	P_5
		Pre	Post	Follow-up	Pre	Post	Follow-up					
		$\bar{X}$ S. D	$\bar{X}$ S. D	$\bar{X}$ S. D	$\bar{X}$ S. D	$\bar{X}$ S. D	$\bar{X}$ S. D					
Total swallow function	7	**0.86 ±0.62**	**4.16 ± 0.64**	**5.70±0.46**	**0.80±0.76**	**1.06±0.78**	**1.26±0.58**	**F=531.91 p=0.000****	**F=3.213 p=0.051**	**t=1.608 p=0.119**	**t=31.285 p=0.000****	**t=28.404 p=0.000****

T= paired t.test. **F= One Way Anova.** **p= p-value.** No statistically significant at $p > 0.05$. ******: Highly statistically significant at $p \leq 0.01$.
P^1: p value for comparing between study group pre, post and follow-up intervention**.**
P^2: p value for comparing between control group pre, post and follow-up intervention**.**
P^3: p value for comparing between two groups at **pre-intervention.**
P^4: p value for comparing between two groups at **post intervention.**
P^5: p value for comparing between two group **follow-up intervention.**

Table (7): Comparison Between the Studied Patients (Study and Control Group) Regarding Swallowing Disturbance Through pre, post and follow-up phases (n=60).

Items	No.	Study group (n=30)			Control group (n=30)			p_1	p_2	p_3	p_4	P_5
		Pre	Post	Follow-up	Pre	Post	Follow-up					
		$\bar{X}$ S. D	$\bar{X}$ S. D	$\bar{X}$ S. D	$\bar{X}$ S. D	$\bar{X}$ S. D	$\bar{X}$ S. D					
Oral phase	**5**	12.47 ± 1.11	4.55 ± 0.91	2.85 ± 0.89	12.83 ± 1.0	12.65 ± 1.2	12.01±0.99	**F=193.74 p=0.000****	**F=0.876 p=0.588**	**t=0.855 p=0.591**	**t=23.74 p=0.000****	**t=31.77 p=0.000****
Laryngopharyngeal phase	**10**	24.64±2.09	10.25±3.03	7.85±1.97	25.27±1.85	24.95±1.79	24.69±2.02	**F=203.68 p=0.000****	**F=1.054 p=0.457**	**t=1.412 p=0.290**	**t=36.30 p=0.000****	**t=35.01 p=0.000****
Total oral and laryngopharyngeal	**15**	**37.11 ± 3.08**	**14.8 ± 3.94**	**10.7 ± 2.86**	**38.1 ± 2.83**	**37.6 ± 2.99**	**36.7 ± 3.01**	**F=299.38 p=0.000****	**F=2.955 p=0.087**	**t=1.414 p=0.131**	**t=29.742 p=0.000****	**t=25.509 p=0.000****

T= paired t.test. F= One Way Anova. p= p-value. No statistically significant at $p > 0.05$.
******: Highly statistically significant at $p \leq 0.01$.
P^1: p value for comparing between study group pre, post and follow-up intervention**.**
P^2: p value for comparing between control group pre, post and follow-up intervention**.**
P^3: p value for comparing between two groups at **pre-intervention.**
P^4: p value for comparing between two groups at **post intervention.**
P^5: p value for comparing between two group **follow-up intervention.**

Table (8): Correlation Between Nutritional Status, Dysphagia Symptoms and Complications, Gugging Swallowing Screen, Swallow Function and Swallowing Disturbance Among the Patients in the Study Group During Pre, Post and Follow-Up Phases.

Variables		Total dysphagia symptoms and complications			Total gugging swallowing screen			Total swallow function		
		Pre	Post	Follow-up	Pre	Post	Follow-up	Pre	Post	Follow-up
Total nutritional status	**R**	-0.615	-0.721	-0.727						
	P	.000**	.000**	.000**						
Total gugging swallowing screen	**R**	-0.505	-0.619	-0.625						
	P	.000**	.000**	.000**						
Total swallow function	**R**	-0.484	-0.537	-0.546	0.525	0.600	0.608			
	P	.000**	.000**	.000**	.000**	.000**	.000**			
Total swallowing disturbance	**R**	0.525	0.603	0.611	-0.489	-0.533	-0.540	-0.499	-0.659	-0.673
	P	.000**	.000**	.000**	.000**	.000**	.000**	.000**	.000**	.000**

r= correlation coefficient test. **p= p-value.** ****highly significant at p ‹ 0.01.**

Table (1): Showed that the age of exactly half (50.0 %) of patients in the study group was ≥ 60 while, nearly two thirds (62.5%) of patients in the control group ranged between 50-<60 years with $\bar{X}$ S.D (58.71 ± 4.91 & 6.03 ± 60.27respectively). 73.3 % & 60.0% of patients in the study and control groups respectively were males. The highest percentages of patients in the study and control groups (80.0% & 90.0%) respectively were educated. Finally, there was no statistically significant differences between both groups (p value > 0.05).

Table (2): Indicated that all (100.0%) of patients in the study and control groups were diagnosed with ischemic stroke. Two thirds of patients in the study group and over half of them in the control group 66.7%& 53.3% respectively received liquid consistency diet and corresponding without nasogastric tube.

Table (3): Explored that approximately half (46.7%) of patients in the study group were partially dependent according feeding ability in pre intervention phase while two thirds (66.7%) & the most (90.0%) of them respectively became independent in post and follow up phase. Also, there were statistically significant differences between patients in the study and control groups regarding the length of eating and the quantity of food consumed at post and follow up phase with p=0. 000. There were highly statistically significant differences between patients in the study and control groups regarding nutritional status at post and follow up phase with p=0.000 .

Table (4): Showed that there were highly statistically significant differences among the patients in the study group regarding physical, functional, and emotional symptoms of dysphagia through the three phases of the study with $\bar{X}$ S. D (161.6 ± 8.2, 82.5 ± 29.2, & 57.8 ± 26.5 respectively) at p=0.000and F=41.91. As well, there were highly statistically significant differences between patients in the study and control groups concerning dysphagia symptoms and complications with p=0.000

Table (5): Indicated that about half (46.7%) of patients in the study group had severe dysphagia and high aspiration risk in pre intervention, in post phase two thirds (66.7%) of them had mild dysphagia with mild aspiration, while in follow up phase immediately half (50.0%) became normal and less than half (43.3%) had mild degree of dysphagia with $\bar{X}$ S. D (8.73 ±2.11, 16.1 ± 2.44& 17.93±2.09) respectively. 60.0%, 53.3%, & 46.7% of patients in the control group had severe dysphagia and high aspiration risk during pre, post, and follow up phase respectively. There were highly statistically significant differences between patients in the study and control groups regarding the gugging swallowing screen at post and follow up phase with p=0.000.

Table (6): Revealed that there was a highly statistically significant difference among the patients in the study group regarding the swallow function at pre, post, and follow up phase with p=0.000 and $\bar{X}$S. D (0.86 ±0.62 0.64 ± 4.16 (0.46±5.70 correspondingly. There were highly statistically significant differences between patients in the study and control groups regarding swallow function at post and follow up phase with p=0.000 .

Table (7): Explored that there was a highly statistically significant difference among the patients in the study group regarding SDQ at pre, post, and follow up phase and between patients in the study and control groups with p=0.000 and $\bar{X}$S. D (37.11 ± 3.08, 14.8 ± 3.94, &10.7 ± 2.86) correspondingly.

Table (8): Pointed to that there were highly statistically significant negative correlations coefficients among the patients in the study group between total dysphagia symptoms and complications and (total nutritional status, total gugging swallowing screen, &total swallow function) with p=0.000 throughout pre, post, & follow up phases. Moreover, there was highly statistically significant positive correlation coefficient between total dysphagia symptoms and complications and total swallowing disturbance over the three phases of the study r= 0.525, 0.603, &0.611 correspondingly with p=0.000. In addition, there was a highly statistically significant positive correlation coefficient between total gugging swallowing screen, &total swallow function r= 0.525, 0.600, &0.608 in that order with p=0.000. Finally, there were highly statistically significant negative correlations coefficients between total swallowing disturbance and both (total gugging swallowing screen, and total swallow function) with p=0.000.

Discussion

The underdiagnosed yet significant complication of post-stroke dysphagia is linked to a worse outcome, dependency, and quality of life for stroke survivors. Treatment approaches include oral care, behavioural therapies, pharmacological- and neuro-stimulation, as well as dietary and nutritional interferences **Balcerak et al, (2022).**

Related to the nutritional assessment, the recent study proved that there was a highly statistically significant difference among the patients in the study group concerning the duration of eating and the amount of food consumed at pre, post, and follow up phase. Also, there were statistically significant differences between patients in the study and control groups regarding the duration of eating and the amount of food consumed at post and follow up phase. Moreover, there was significant improvement

in nutritional status among the patients in the study group throughout pre, post, and follow up phase. **According to the researchers' opinions,** these findings reflect the effective influence of the compensatory strategies on swallowing ability for the patients and their successful participation through the study phases.

These findings were steady with the results of **Savci & Acaroğlu, (2021)** who monitored that the mean extent of eating dropped by 4.78 minutes, and the mean sum of food eaten risen by 56.87 mL in the second follow-up matched with the first one. This differentiation was statistically significant. As well, **Krajczy et al. (2019)** had applied inclusive swallowing remedy including exercise to the patient and family about harmless food and fluid intake in the primary period in patients with stroke and dysphagia, and they exposed that there was a significant drop-in swallowing time after treatment in the experimental group. In the even study, it was highlighted that widespread therapy could lower the complications that may develop due to dysphagia.

According to dysphagia symptoms and complications (Dysphagia Handicap Index (DHI), the present study indicated that there were highly statistically significant differences among the patients in the study group regarding physical, functional, and emotional symptoms of dysphagia through the three phases of the study. As well, there were highly statistically significant differences between patients in the study and control groups concerning dysphagia symptoms and complications.

These results were confirmed by **KANG et al, (2017)** who proved that the treatment group's patients experienced lesser adverse events (aspiration, choking, aspiration pneumonia) incidence rate than that of the control group, and the difference was statistically significant. Moreover, **Eldsoky & Ismaiel, (2021)** stated the same outcomes as there were statistically significant differences between both groups according DHI. Additionally, **Ren et al, (2022)** found that systematic voice training mutual with swallowing function exercises enhanced the psychological and physiological proportions of patients with stroke swallowing dysfunction.

The results of the present study, however, did not agree with those of **Hägglund et al. (2020),** who came to the conclusion that there was no significant difference between the intervention and control groups despite significant improvements in the swallowing proportion within each group following the 5-week training period. The nonsignificant difference was influenced by a number of variables. One shows that both interventions had an immediate impact on swallowing in that groups as a whole had effective recovery during the management period and with positive results. Yet only the neuromuscular exercise was found to have a lasting impact. The limited sample size was another concern, suggesting that there might not be enough statistical power to draw general implications from the results.

As regard Gugging Swallowing Screen the current study revealed that two thirds of patients in the study group had mild dysphagia with mild aspiration in post intervention phase, while in follow up phase immediately half of them had no dysphagia and nearly half had mild degree of dysphagia. There was a highly statistically significant difference among the patients in the study group regarding the gugging swallowing screen at pre, post, and follow up phase with p=0.000**. There were highly statistically significant differences between patients in the study and control groups regarding the gugging swallowing screen at post and follow up phase.

According to the researchers' points of view, theses statistically significant differences among the patient in the study group and others between study and control groups indicated the effect of the compensatory strategies on worsening the severity of dysphagia for patients. These results were consistent with **Bassiouny et al, (2017)** who stated that two fifths of patients had no dysphagia so normal diet is advised, one fifth had slight dysphagia, and one quarter had moderate dysphagia. Also, they were in harmony with **Ren et al, (2022)** who explored that the incidence of swallowing dysfunction, malnutrition, and aspiration pneumonia was significantly lower post-intervention in the collective voice training group than in the single swallowing exercise group, and the differences were statistically significant.

These results were in contrast with **Abd El-Hamid et al, (2021)** who mentioned that more than two thirds of the study and control groups of patients had severe dysphagia with no significant difference between both groups. These findings were related to the heightened severity of stroke among acute stroke patients involved in the study which is correlated with increased dysphagia severity in addition omission of patients with mild dysphagia.

With regard to the swallow function Scoring System (SFSS) during the pre-post and follow-up phases, the current study found that there was a highly statistically significant difference between the patients in the study group and other significant differences between the study and control groups, with p=0.000. These results may be attributed to the study group's successful patient engagement, which showed the beneficial impact of compensatory strategies on reducing dysphagia.

These findings agreed with **Jongprasitkul & Kitisomprayoonkul, (2020)** who proved that the mean score of functional oral intake scale (FOIS) and

SFSS after swallowing therapy increased and nearly half of patients with tube dependent change to total oral intake after therapy. As well, **Konecny et al, (2017)** mentioned that after eight weeks of new orofacial physiotherapy performance there was significant development of food intake between patients in intervention and control groups.

According to the swallowing disturbance questionnaire SDQ the present study explored that there was a highly statistically significant difference among the patients in the study group regarding SDQ at pre, post, and follow up phase and between patients in the study and control groups. These results can be interpreted as, the vital functional role of the tongue in bolus chewing, manipulation, formation, and movement of its base. So, increased the intensity of the tongue through oropharyngeal exercises has a direct effect on the oral phase and therefore improved oropharyngeal swallowing. **park et al, (2019)**. Tongue strength was a part of the compensatory strategies followed in the current study.

These findings agreed with **Park et al, (2019)** who found that the experimental group showed larger improvements in swallow function during both the oral and pharyngeal phases than did the control group. Additionally, these results are largely consistent with **Mohseni et al, (2023)** who concluded that the combination therapy group had a greater significant effect on the SDQ score compared to the speech therapy groups.

The current study showed that there were highly statistically significant negative correlations coefficients among the patients in the study group between total dysphagia symptoms and complications and (total nutritional status, total gugging swallowing screen, &total swallow function) throughout pre, post, & follow up phases. Moreover, there was highly statistically significant positive correlation coefficient between total dysphagia symptoms and complications and total swallowing disturbance over the three phases of the study. Also, there was a highly statistically significant positive correlation coefficient between total gugging swallowing screen, &total swallow function. Finally, there were highly statistically significant negative correlations coefficients between total swallowing disturbance and both (total gugging swallowing screen, and total swallow function).

These results were supported by the findings of **Savci & Acaroğlu, (2021)** who detected that swallowing function could be reinforced in patients who had assessed and were supported with swallowing exercise. The accomplishment time of portion at meals was reduced, the sum of food eaten during meals increased, and the enhancement of problems due to dysphagia could be thwarted. On the other hand, **Abd El-Hamid et al, (2021), Ebrahim et al, (2018) & Teuschl et al, (2018)** stated that there was a statistically significant relation between dysphagia severity, stroke severity and incidence of stroke associated pneumonia. According to the results of **Cohen and Manor, (2011)** in his study titled as Swallowing Disturbance Questionnaire for Identifying dysphagia, the score of SDQs correlated significantly with fiberoptic endoscopic evaluation of swallowing (FEES) results.

Conclusion

Comparable to the study findings, it can be concluded that application of the compensatory strategies for post stroke patients with oropharyngeal dysphagia had a statistically significant positive effect on lessening symptoms, complications, severity of dysphagia, as well as functional outcome, There were highly statistically significant negative correlations coefficients among the patients in the study group between total dysphagia symptoms & complications and (total nutritional status, total gugging swallowing screen, &total swallow function).

Recommendation

Centered on the findings of the current research, it may be suggested that:

1. More study on larger sample sizes is proposed to examine various models of compensatory strategies for post stroke dysphagia.
2. Continuous education sessions are recommended for nurses working in the neurological units on dysphagic patient assessment, the compensatory & feeding strategies, and oropharyngeal exercises for dysphagic patients.
3. A brief Arabic pamphlet with many straightforward images should be available and distributed for high-probability groups.

References

- **Abd El-Hamid SHM, Ahmed NT, Ahmed IM, & Abd El-Fattah FR. (2021):** Effect of Early Dysphagia screening, Feeding Strategies and Oral Care on Occurrence of Stroke Associated Pneumonia among Critically Ill Patients with Acute Stroke. ASNJ; Vol.23 No.2.52-64
- **Abo Elfetoh EE, & Karaly FS. (2018):** Effect of swallowing training program on dysphagia following cerebrovascular stroke. Egyptian Nursing Journal; 15:125–134
- **Alamer A, Melese H, & Nigussie F. (2020):** Effectiveness of Neuromuscular Electrical Stimulation on Post-Stroke Dysphagia: A Systematic Review of Randomized Controlled Trials. Clinical Interventions in Aging; 15 1521–1531

- **Aref H, Zakaria M, Shokri H, Roushdy T, El Basiouny A, & El Nahas N. (2021):** Changing the landscape of stroke in Egypt. Cerebrovascular Diseases Extra; 11:155–159.
- **Balcerak ph, Corbiere S, Zubal R, & Kägi HG. (2022):** Post-stroke Dysphagia: Prognosis and Treatment–A Systematic Review of RCT on Interventional Treatments for Dysphagia Following Subacute Stroke. Front. Front. Neurol. 13:823189. doi: 10.3389/fneur.2022.823189.
- **Bassiouny SE, Azab SN, Soliman RH, & saleh SHA. (2017):** Assessment of Dysphagia in Acute Stroke Patients by the Gugging Swallowing screen. Glob J Otolaryngol; 9(3): 80-87. 555766. DOI: 10.19080/GJO.2017.09.555766.
- **Cohen JT, & Manor Y. (2011):** Swallowing Disturbance Questionnaire for Detecting Dysphagia. Laryngoscope; 121. 1383-1387. DOI: 10.1002/lary.21839 · Source: PubMed.
- **Davies C & Fisher M. (2018):** Understanding research paradigms. Journal of the Australasian Rehabilitation Nurses Association; 21(3), Pp.21:25.
- **Diana DM. & Rani SJ. (2014):** A study to assess the Effectiveness of Swallowing exercises on Swallowing Ability among Patients with Cerebrovascular Accident in selected Hospitals. Asian J. Nur. Edu. and Research 4(4): Oct.- Dec.; PP. 429-435.
- **EBRAHIM A, MOHAMED WY, ABD ALLAH F, & ABD AL-SALAM Y. (2018):** Dysphagia Related Health Consequences among Patients with Acute Stroke in Cairo, Egypt. Med. J. Cairo Univ., Vol.86, No. 7: 4159-4167
- **Eldsoky I, & Ismaiel WF. (2021):** Incidence of Dysphagia in Patients with Unilateral Vocal Cord Paralysis. International Journal of Medical Arts; 3 [1]: 1039-1045. DOI: 10.21608/IJMA.2020.45632.1190
- **Elsaid R.AA. & Shabaan A.EA. (2019):** Effectiveness of Exercises Based Dysphagia Therapy on Swallowing Ability for Patients with Cerebrovascular Accident. IOSR Journal of Nursing and Health Science (IOSR-JNHS); 8(6)), PP 27-34.
- **Farahat M, Malki KHH, Mesallam TA, Bukhari M, & Alharethy S. (2014):** Development of the Arabic Version of Dysphagia Handicap Index (DHI). Dysphagia; 29:459–467. DOI 10.1007/s00455-014.
- **Grotta JC, Albers WG, & Wong KSL. (2021)**: Stroke: Pathophysiology, Diagnosis, and Managemet.7th Ed. Elsevier, Philadelphia
- **Gupta H., Banerjee A., Rai VK, & Gambhir PK.(2014):** RESTORATION OF FUNCTIONAL SWALLOW USING COMBINATION OF NMES AND TDT DURING HOSPITAL STAY IN ACUTE CEREBRAL STROKE PATIENTS. International Journal of Latest Research in Science and Technology ISSN (Online); 3(6).Pp89-94**.**
- **Hägglund P, Hägg M, Jäghagen EL, Larsson B, & Wester P. (2020)**: Oral neuromuscular training in patients with dysphagia after stroke: a prospective, randomized, open-label study with blinded evaluators. BMC Neurology; 20:405 p 1-10
- **Hussein AH. & Mahmoud MA. (2017):** Effect of Nursing Intervention Program on Minimizing Dysphagia for Post Stroke Patients. Egyptian Journal of Health Care; 8(4). PP. 13-21.
- **Jongprasitkul H, & Kitisomprayoonkul W. (2020):** Effectiveness of Conventional Swallowing Therapy in Acute Stroke Patients with Dysphagia. Rehabilitation Research and Practice; 5.ID 2907293, https://doi.org/10.1155/2020/2907293
- **KANG WL, REN JL, LAI XZ, & TAI LW. (2017):** Effects of extended in-patient treatment training on outcome of post-stroke dysphagia. European Review for Medical and Pharmacological Sciences; 21: 5711-5716.
- **Konecny P, Elfmark M, Bastlova P, & Gaul-Alacova P. (2017):** New Orofacial Physiotherapy of Dysphagia after Stroke. Int J Phys Med Rehabil; 5:3, 2-4. DOI: 10.4172/2329-9096.1000406.
- **Krajczy E, Krajczy M, Luniewski J, Bogacz K, & Szczegielniak J. (2019):** Assessment of the effects of dysphagia therapy in patients in the early post-stroke period: A randomised controlled trial. Neurologia i Neurochirurgia Polska; 53(6), 428-434.
- **Micheala, T., Enderle, P., Nowotny, M., Teuschl, Y. & Matz, K. (2007):** Dysphagia bedside screening for acute stroke acute stroke patients: The Gugging Swallowing Screen. Stroke; 38: 2948-2952.
- **Mohseni Z, Saffarian A, Mohamadi R, Abolghasemi J, & Habibi SA (2023):** Effect of Conventional Speech Therapy Combined with Music Therapy on Swallowing in Patients with Parkinson's Disease (Telerehabilitation): A Randomized-Controlled Trial. Middle East J Rehabil Health Stud; 10(1): e131572.
- **Park HS, Oh DH, Yoon T, & Park JS. (2019):** Effect of effortful swallowing training on tongue strength and oropharyngeal swallowing function in stroke patients with dysphagia: a double-blind, randomized controlled trial. INT J LANG COMMUN DISORD; VOL. 54, NO. 3, 479–484.
- **Rani JS., Porkodi A., & Seethalakshmi A.(2013):** EFFECTIVENESS OF DYSPHAGIA EXERCISES ON SWALLOWING ABILITY AMONG PATIENTS WITH CVA . Journal of Science; 3 (2). Pp. 76-81.

- **Ren X, Huang L, Wang J, He J, Bai X, & He Y. (2022):** Efficacy of systematic voice training combined with swallowing function exercises for the prevention of swallowing dysfunction in stroke patients: a retrospective study. Ann Transl Med;10(4):195.1-7 https://dx.doi.org/10.21037/atm-22-101
- **Savcı C, & Acaroğlu R. (2021):** Effects of Swallowing Training and Follow-up on the Problems Associated with Dysphagia in Patients with Stroke. Florence Nightingale J Nurs;29(2), 137-149
- **Statistical Records of stroke intensive care units at Zagazig university Hospitals, 2021).**
- **Teuschl Y, Trapl M, Ratajczak P, Matz K, Dachenhausen A, & Brainin M. (2018):** Systematic dysphagia screening and dietary modifications to reduce stroke-associated pneumonia rates in a stroke-unit. PLoS ONE; 13(2): e0192142. https:// doi.org/10.1371/journal.pone.0192142
- **Thompson S.K. (2012):** Sampling 3rd ed., John Wiley &Sons, P.59-60.
- **Yousef SHG, El-Deeb HAA, & Rady SE. (2020):** Effect of Swallowing Training Rehabilitation Program on Severity of Dysphagia and Swallowing Trial among Patients with Cerebrovascular Stroke. Egyptian Journal of Health Care. EJHC; Vol. 11 No.3