

## Effect of Competency-Based Program on Nurses' Performance and Outcomes of Patients with Post-Stroke Dysphagia

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### Abstract

**Background:** Nurses play a crucial role in managing patients who have difficulty swallowing. Managers and nursing researchers should create and provide effective training for nurses to improve their knowledge, attitude, and practice regarding poststroke dysphagia, thereby improving patient outcomes. **The aim of this study** was to evaluate the effect of competency-based program on nurses' performance and outcomes of patients with post-stroke dysphagia. **Design:** A quasi-experimental design was used to achieve the aim of the study using a pre-/post-test approach. **Setting:** This study sample was recruited from the neurological inpatient department and stroke care unit at Ain Shams University Hospital. **Subjects:** A convenient sample included all available nurses (40) working in neurological inpatient units and stroke care units which were affiliated to the Ain Shams University Hospital. A purposive sample of 60 patients from both genders with diagnosis of recent stroke from the previously mentioned setting. **Study Tools:** Data was collected through four tools. (1) Nurses self-administered structured questionnaire; (2) nurses 'observational checklist (3) Nurses' attitudes scale; and (4) Patients' outcomes assessment tool. **Results:** This result revealed that nurses' knowledge, practice, and attitude regarding poststroke dysphagia were statistically significantly improved at post- and follow up implementation phases as compared to pre-implementation phase ( $X^2=24.34$  &  $20.26$  at  $p < 0.001$ ;  $X^2=19.00$  &  $17.00$  at  $p < 0.001$ ; and  $X^2=13.067$  &  $15.017$  at  $p < 0.001$  respectively). Also, there was statistically significant variation between study and control group patients regarding dysphagia severity (0.0072) and total swallowing quality of life composite score ( $p=0.01$ ). **Conclusion:** There was significant improvement in nurses' performance and outcomes of patients with poststroke dysphagia after implementation of nursing competency-based program. **Recommendation:** Continuous in-service competency-based programs for nurses caring for patients with stroke to refresh and update their knowledge and practice on post-stroke dysphagia assessment and management.

**Keywords:** Competency-based program, Nurses' performance, Outcomes, Post-Stroke Dysphagia

### Introduction

Stroke is the most common reason of disability and the second major cause of death worldwide. Based on the 2022 Global Stroke Factsheet, the likelihood of having a stroke has increased by 50% in the last 17 years, meaning that one out of every four people would now be predicted to experience one. It is a quickly growing clinical focal disturbance of brain function. Difficulty swallowing is a typical symptom of stroke known as post-stroke dysphagia (PSD). Previous research found that up to 80% of patients with stroke suffered from swallowing difficulty, with half of them being symptomatic. The prevalence of dysphagia in acute stroke has been estimated to range between 28 to 65% worldwide (Global Stroke Factsheet, 2022; Yang & Pan, 2022).

Dysphagia is the disturbance of bolus flow via the mouth and throat. It refers to the inability to ingest food safely and effectively through the mouth or transport solid or liquid food to the stomach through the esophagus, which often leads to aspiration, undernutrition, and psychological and social interaction disorders and may have adverse consequences, such as death. Post-stroke dysphagia can lead to dehydration, aspiration pneumonia, and malnutrition, resulting in longer hospitalization and higher death rates. One of the primary challenges associated with dysphagia is food entering the airway because the purpose of swallowing is to securely transport a meal bolus into the stomach. Deficits in eating and drinking throughout any or all of the several swallowing phases are known as dysphagia (Oh et al., 2021; Khedr et al., 2021).

Identifying risk factors for post-stroke dysphagia is crucial for its prevention and treatment after a stroke. Previous research indicates that dysphagia in stroke patients is influenced by several variables. Age, history of cerebrovascular illness, infarction location, and other key variables may all influence the development of dysphagia. Dysphagia after a stroke is often caused by pharyngeal muscle dysfunction and incoordination, resulting from a lack of control in the neurological system. Post-stroke dysphagia is manifested by choking, coughing, drooling, cheek pocketing, delayed eating, trouble swallowing medicines, and avoidance of food, fluids, complaining of food sticking in the throat, trouble swallowing, indigestion or heartburn and even difficulty speaking or having a hoarse voice. It is not commonly considered a major cause of mortality, but its complications are the most frequent causes of death (Teasell et al., 2018; Yang & Pan (2022).

Dysphagia in stroke patients causes significant emotional, medical, and economic concerns, including increased hospital stay. Medical consequences associated with dysphagia include aspiration pneumonia, dehydration, starvation, and weight loss. As a result, early diagnosis of dysphagia is critical to avoiding future health problems and should be addressed in healthcare activities. Dysphagia estimates that around 56% of cerebrovascular stroke (CVS) patients may develop major and life-threatening consequences such as nutritional insufficiency, aspiration pneumonia, and immune-compromised health problems (Yousef et al., 2020).

There is growing evidence that identifying dysphagia in stroke patients at an early stage lowers the risk of these problems, as well as shortening hospital stays and lowers total healthcare costs. Early detection of post-stroke dysphagia improves the prognosis for stroke patients and lowers aspiration pneumonia. Thus, it may be argued that prompt identification and treatment of poststroke dysphagia are crucial components of acute stroke care. (Green et al., 2021; Khedr et al., 2021).

The management of dysphagia involves several medical specialties. It is vital to coordinate management among various experts, including dietitians, nurses, physicians, occupational

therapists, speech, and language pathologists. Lastly, there is very little integration of dysphagia management into medical education. Nurses have a crucial role in the dysphagia multidisciplinary team since they are the first healthcare professionals to notice the symptoms and indicators of the condition and interact with patients most of time (Khoja, 2018).

Dysphagia management goals are addressing underlying physiological deficiencies, maximizing nutrition and hydration, and correcting nutritional deficiencies recommending dysphagia screening within 24 hours of presentation. Speech and language therapists frequently provide initial management for dysphagia, which includes adjusting fluid and food consistency, postural strategies, swallowing exercises, and stimulating oral and pharyngeal layers (Fairfield & Smithard, 2020).

Nurses have an important role in the care of patients with dysphagia after stroke. They are the primary health care providers for stroke patients with dysphagia; nevertheless, nurses must be trained to recognize and manage dysphagia to improve stroke patient outcomes. Nurses with competency in dysphagia management are more capable of recognizing symptoms early and refer stroke patients to specialized medical professionals for diagnosis and treatment. If early screening for dysphagia was done by qualified nurses within twenty-four hours of admission, it might reduce the time that patients waste without nutrition and hydration and improve clinical outcomes for stroke patients. Nurses, particularly those who have received training in dysphagia screening, play an essential role in lowering dysphagia-related unfavorable outcomes (Abu-Snieneh & Saleh, 2018).

Furthermore, nursing competence is defined as a collection of knowledge, psychomotor skills, attitudes, and abilities that enable successful performance in professional nursing responsibilities. Competency improves the quality of patient care and promotes patient safety. There is an urgent necessity for having a greater number of highly competent nurses because of the rising number of stroke patients with its subsequent dysphagia to reduce complications and improve outcomes of such group of patients (Heydari et al., 2016; Naga et al., 2021).

### Significance of the study

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Stroke is the world's largest cause of mortality, a clinical illness marked by a rapidly progressive functional impairment. The incidence of stroke yearly is estimated to be between 150,000 and 210,000, accounting for 6.4% of all fatalities in Egypt, where the crude prevalence rate of stroke is high overall. Post-stroke dysphagia is the term for swallowing disorders after stroke, which affects 39–71% of stroke patients. It is one of the most terrible stroke complications. Dysphagia following a stroke is among the most common causes of morbidity, including dehydration, aspiration pneumonia, and malnutrition, as well as prolonging hospitalization and increasing death rates. Nursing professionals can diagnose and treat stroke patients more quickly when they have knowledge and skills about dysphagia disorder and can refer patients to specialized healthcare providers for diagnosis and treatment (Aref et al., 2021; Fang et al., 2022).

Previous research investigations have demonstrated that the incidence of dysphagia-related problems can be decreased with prompt and efficient nursing care. Thus, in clinical nursing, the recognition, evaluation, and management of dysphagia should be highly regarded (Luo et al., 2022). However, there is a lack of a greater focus on this issue in nursing courses and programs, which has an impact on patient outcomes. Consequently, in order to deliver competent care, the nurses who serve stroke patients must possess noteworthy education and training. Therefore, it is necessary to establish a competency-based educational program for nursing staff to keep up with current information and help them in building skills and delivering competent care for that group of patients to raise their competence, as a result, improve the outcomes of the patients they are caring for. That's why this study was undertaken.

### Aim of the Study

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This study aimed to evaluate the effect of competency-based program on nurses' performance and outcomes of patients with post-stroke dysphagia through the following:

1. Assess nurses' performance regarding care of patient with post-stroke dysphagia.
2. Develop and implement nursing competency-based program regarding care of patient with post-stroke dysphagia.
3. Evaluate the effect of nursing competency-based program on nurses' performance regarding care of patient with post-stroke dysphagia.
4. Evaluate the effect of nursing competency-based program on outcomes of patients with post-stroke dysphagia.

### Operational Definitions

**Nurses' performance:** It included nurses' knowledge, practice and attitude regarding care of patients with post-stroke dysphagia.

**Nursing competency-based program:** it means educational delivery option that includes core abilities in term of knowledge, psychomotor skills and attitudes-directions to meet nursing essential competencies for approaching nursing practice.

**Post-stroke dysphagia:** a difficulty in swallowing after a recent stroke.

**Patients 'outcomes:** they are referred in the current study as two dysphagia-related outcomes including dysphagia severity and swallowing quality of life.

### Research hypothesis:

The following research hypotheses were developed to accomplish the present study's aims.

H1: Nurses who received nursing competency-based program regarding post stroke dysphagia will demonstrate better performance after program implementation.

H2: Patients who received care by nurses who participated in the program will have decreased dysphagia severity and better scores of swallowing quality of life.

### Subjects and Method

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#### Research design:

The aim of this study was accomplished through the use of a quasi-experimental design, which involved the use of pre- and post-tests for nurses in addition to control and study groups approaches for patients. According to Harris et al. (2006), quasi-experimental studies may have

both pre- and post-intervention evaluations, as well as nonrandomly selected control groups. This type of study design attempts to evaluate interventions but does not rely on randomization to prove that one intervention causes an outcome.

#### Setting:

The current study sample was recruited from the neurological inpatient department and stroke care unit, which were affiliated to the Ain Shams university hospitals. The department includes six rooms with 25 beds and one stroke care unit. This setting was selected because the high flow rate of patients with cerebrovascular stroke which was sufficient for meeting the study aim. It is one of Cairo Governorate's main medical sectors, servicing numerous people in both urban and rural locations.

#### Subjects:

A convenient sample included all available nurses (40) working in the previously mentioned settings. They were from both genders, with different age, educational levels, and years of experience, and willing to participate in the study.

A purposive sample of 60 patients from both genders with diagnosis of recent stroke from the previously mentioned setting. The sample size was determined using the Epi Info 7 statistical software based on patients' hospital admissions (last six months prior to study conduction) at 95% confidence power and 5% acceptable error. It was decided that 60 patients would be the bare minimum needed, they were distributed equally to control and study groups (30 for each).

**Inclusion criteria** for the studied patients included adult (20-65years) patients who were first admitted with a diagnosis of stroke and were hospitalized 24 hours after the stroke onset, conscious and alert.

#### Tools for data collection:

Four tools were used to collect data pertinent for this study. They included the following:

##### 1- A nurses self-administered structured questionnaire.

It was created by researchers in Arabic based on an analysis of current and relevant literature, and it was translated and back translated into Arabic. It was split into two parts:

**Part one:** It was focused on demographic characteristics of nurses participants including age, gender, marital status, qualifications, working hours, experience, previous training courses, and presence of nursing procedure manual guide.

**Part two:** The researchers developed this part based on the relevant literature (Rhoda & Pickel-Voight, 2015; Zhou et al., 2019; Pierpoint & Pillay, 2020) to assess nurse's knowledge competencies regarding care of patient with post-stroke dysphagia. The core knowledge competencies include knowledge regarding anatomy and physiology of swallowing, post-stroke dysphagia definition, etiology and risk factors, clinical manifestations, complications, screening and nursing care regarding care of patient with post-stroke dysphagia. It includes 30 multiple choice questions (MCQ questions and 16 true and false questions).

#### Scoring system:

Regarding the knowledge items, a correct answer received a score of one while an incorrect answer received a score of zero. For every part of knowledge, the scores for each item were added together and the overall score was divided by the number of items. These scores have been converted into a percentage score, with a total of 46 grades. The sum of the total knowledge score (46) was classified as competent knowledge if score was equal or more than 85% of the total score ( $\geq 39.1$ ) and incompetent if score was less than 85% of the total score ( $< 39.1$ ).

#### II-Nurses' Observational checklist:

This tool was adapted from **Sant Mary's medical center (2007); Seedat and Penn (2016); Clare (2018)** and modified by the researchers after analysis of the relevant and recent literature to assess nurses' skills competency level regarding post-stroke dysphagia. The modification was done by adding and omitting steps to be integrated and meet study purposes. It consisted of main nursing competencies as regards care of patients with post-stroke dysphagia. It included the following checklists: bedside dysphagia screening using Gugging Swallowing Screening tool (GUSS) that consists of preliminary investigation/ indirect swallowing test (5 steps) and direct swallowing test (15 steps),

nasogastric tube feeding (18 steps), oral feeding with diet modification (12 steps), swallowing posture and maneuvers (10 steps), oral care (6 steps), swallowing exercise training (20 steps), and discharge instructions (6 steps).

### Scoring system

The observational checklists had 92 steps, each step was evaluated and given one grade for done steps and zero for not done. The total score for each checklist and the total score for all checklists were added together, and the percentage score was determined. The total skills competency score equal 92 grades and it was scaled as competent if the percentage score was  $\geq 85\%$  ( $\geq 78$  grades) and incompetent if the percentage score  $< 85\%$  ( $< 78$  grades).

### III-Nurses' Attitudes Scale

It is focused on the assessment of self-reported attitudes of participated nurses regarding the care of patients with post-stroke dysphagia, it is structured with guidance of **Odgaard and Kothari (2019); Zhang et al. (2019)**. It includes 20 questions to assess the self-reported attitude of nurses toward the care of patients with post-stroke dysphagia. It was rated with 3-point Likert scale with agree, disagree, and neutral options.

### Scoring system:

Concerning the attitude scale, each answer was scored against three points Likert scale, as one for disagree response, two for neutral response and three grades for agree response. The total score of attitudes was 60 grades. The items' scores were added together, and the total score was then divided by the total number of items to be converted to percentage score. The total attitude level score ranged between 20 to 60 points, and it was classified as follows: a total grade of greater than 70% (42 grades) indicated a good attitude, while a grade of less than 70% (42 grades) indicated a negative attitude.

### IV- Patients' outcomes assessment tool

This tool was focused on assessment of outcomes of studied patients with post-stroke dysphagia. It consisted of three parts. **Part one** covered demographic characteristics of the participating patients, including age, gender, education, occupation status, and residence in addition to clinical data including type of stroke and history of chronic illness.

**Part two** involved assessment of severity level of dysphagia using Gugging Swallowing Screening (GUSS) tool. It was a standardized tool adapted from **Trapl et al. (2007)**, then it was translated and retranslated into Arabic. The GUSS is divided into two parts: the preliminary assessment (part 1, indirect swallowing test) and the direct swallowing test (part 2), which included three subtests. A point system was established with higher scores denoting greater performance and a maximum score of 5 points in each subtest. This maximum must be achieved before proceeding to the next subtest. Patients should complete all repeated subtests successfully to get the full score of 5 points.

### Scoring system (part two):

The maximum score a patient can receive is twenty, which indicates normal swallowing skills without aspiration risk. There are four severity categories based on the GUSS scores. A score of 0–9 denotes severe dysphagia, 10–14 denotes moderate dysphagia, 15–19 denotes mild dysphagia, and 20 denotes no dysphagia.

**Part three** was focused on interviewing assessment of the swallowing quality of life utilizing Swallowing Quality-of-Life Questionnaire (SWAL-QOL), it was a standard tool adapted from **McHorney et al. (2002)**. It was translated and retranslated into Arabic. The SWAL-QOL (44 items) covers ten subscales. SWAL-QOL includes 44 items that evaluate ten QOL swallowing-related features, including general burden, food selection, eating duration, eating desire, fear of eating, sleep, fatigue, communication, mental health, and social functioning, for a total of 30 items, as well as 14 items known as the dysphagia symptom battery (DSB) for assessing the severity of dysphagia symptoms. Patients' participants were asked to respond for each item based on their experience during the previous month.

### Scoring system

Each item was evaluated on a 5-point Likert scale with options for "always" (0 points), "many times" (25 points), "sometimes" (50 points), "seldom" (75 points), and "never" (100 points). The score for each subscale was estimated by adding up the points from the answers to the subscale's questions and dividing them by the

total number of questions. All scales are converted into a range of 0 to 100, with "0" representing the poorest score and "100" representing the best score.

### **Competency based nursing program.**

It was developed by the researchers in accordance with the literature review, objectives of the study and assessment of the baseline competencies and the determined needs of the studied nurses. It involves theoretical and practical content based on nurses' needs to overcome the deficient knowledge practice competencies. Various teaching approaches, including video, group discussion, demonstration, and redemonstration, were employed in conjunction with an illustrated structured booklet in easy Arabic language, accompanied by explanatory photos, to serve as a guide for the nurses. The program's content combine's theoretical knowledge with practical skill competencies to help studied nurses meet the aim of the study.

Theoretical part involves knowledge regarding anatomy and physiology of swallowing, post-stroke dysphagia definition, etiology and risk factors, clinical manifestations, complications, screening, and nursing care regarding care of patient with post-stroke dysphagia. Practical content covers the main skill competencies regarding bedside dysphagia screening using Gugging Swallowing Screening tool (GUSS), nasogastric tube feeding, oral feeding with diet modification, swallowing posture and maneuvers, oral care, swallowing training, and discharge instructions.

The program booklet was prepared with guidance from scientific relative resources and was translated and back translated into Arabic language to be accessible and feasible to read among studied nurses (Rhoda & Pickel-Voight, 2015; McCoy & Wallace, 2019; Nazarko, 2020), The booklet content was validated by panel of five academic nursing professors from faculty of nursing, Ain Shams university).

### **Validity and Reliability**

#### **Validity**

Face and content validity are used in the assessment of the study tools' validity. Testing for content validity was done to make sure the tools'

content addressed the goal of the study. A panel of five specialists in medical surgical nursing from Ain Shams University's Faculty of Nursing and two specialists in neuro medicine from the Faculty of Medicine at the same university assessed it. The tools were evaluated by the experts for language clarity, relevance, accuracy, thoroughness, ease of use, and simplicity. Their opinions on the format, organization, coherence, and scoring system of the tool were addressed. The correctness, relevance, and efficiency of the contents of the tools were assessed.

#### **Reliability**

The Cronbach's alpha coefficient test was used to confirm the test-retest reliability of the study tools. The test values for Tools I, II, III, and IV were 0.85, 0.88, 0.883, and 0.796, respectively, indicating a high level of tool reliability.

#### **Ethical consideration:**

The scientific ethical research committee of the Ain Shams University faculty of nursing accepted the study on April 10, 2023, with code number 23.04.56. The participants received an explanation of the research's purpose. Following a clarification of the study aim and methodology, each nurse and patient gave their verbal agreement to participate. Participants received information about their rights to withdraw participation and to leave at any moment without facing any consequences. The research data provided by study participants was kept confidential.

#### **Pilot Study:**

The pilot research involved four nurses and six patients to assess the study tools' clarity, simplicity, and application. Minimal changes were made based on the results of the pilot study and the final forms were created and accepted. The research sample includes nurses and patients from the pilot study that were included in the study sample.

#### **Field work:**

Data for this study was collected during a seven-months period, from the beginning of June to the end of December 2023. Official approval was acquired from Ain Shams University's medical directors as well as the director of nursing service administration. The goal of the study was explained to the nurses under study,

and their consent to participate was obtained. The researchers visited the study setting in the morning and afternoon shifts alternatively, at least 2 days per week. Data was collected by the researcher using the previously mentioned study tools.

Regarding nurses' participants, the current study was conducted through three phases: pre-program implementation phase which was done prior to implementation of educational program, program implementation phase, and evaluation phase. The study tools I, II, and III were used three times as pre-program, immediate post-program implementation, and 2 months follow up later to identify differences, similarities, acquisition of knowledge and areas of improvements among studied nurses.

#### **Pre-program implementation phase:**

The research instruments were used to conduct a baseline assessment of every nurse in order to determine their educational needs and deficient competencies. First, the observational checklists were completed by the researchers, who were available three days a week alternately in the various study settings, while the studied nurses were caring for patients with recent post-stroke dysphagia using continuous indirect observation to ensure the most realistic observations of nurses' practice and minimize the possibility of bias. The studied nurses then completed the questionnaire in the clinical setting. It took each nurse roughly 25-35 minutes.

Based on the baseline assessment, the researchers designed a competency-based program that addressed gaps in knowledge, practice, and attitude. They also reviewed relevant and recent literature. The researchers started with a control group in the period prior to program implementation and assessed their outcomes on admission and before their discharge using study tool IV which took about 25-35 minutes to be accomplished. The patients were asked to sit in bed in at least a 60° upright position before starting the GUSS screen (dysphagia severity assessment).

#### **Implementation phase:**

The competency -based nursing educational program was implemented for nurses in study setting in term of sessions with integration to the relevant latest theory into practice regarding the

care of patient with post-stroke dysphagia. The content of the program was delivered in six sessions: two for theoretical content, three for practical content, and a final session for closure, summary, and follow-up arrangements. Each session lasts 30-45 minutes, including time for discussion based on the nurses' progress and feedback. Each session began with a review of the previous session and the goals for the current one. The researchers carried out 2-3 sessions per day.

The program was provided with an attachment of an educational booklet to help the studied nurses to memorize contents. It was written in Arabic to be easily understood by all categories the nurses, using translation-retranslation approach to ensure its reliability. It included knowledge regarding anatomy and physiology of swallowing, post-stroke dysphagia definition, etiology and risk factors, clinical manifestations, complications, screening using GUSS bedside screening scale for dysphagia, and nursing care regarding care of patient with post-stroke dysphagia. Nursing care for pos-stroke dysphagia includes oral care, nasogastric tube feeding, starting oral feeding, positioning, and encouraging swallowing exercises.

The study program was provided for 40 nurses, separated into eight major groups. Each session has three to five nurses. The instructional session was held at the nursing office, in collaboration with the head nursing staff. The instructional program was conducted for the studied nurses during their regular working hours. Educational booklets, photos, videos, and smart phone apps were used. Many teaching strategies were used at program implementation including small lecture, small-group discussion, demonstration and redemonstration, as well as role playing. Video demonstrations and power point presentation were used for more clarification. Motivational and reinforcing techniques, such praise and appreciation, were used to promote learning throughout the delivery of educational program sessions.

#### **Evaluation phase:**

Regarding nurses, nurses' performance (practice, knowledge, and attitude) was evaluated immediately post program implementation and 2 months follow up later using tools I, II and III which were used in pre-program phase.

Comparison between pre-, program immediate post-program and 2 months post-program implementation findings was done to investigate the effectiveness of program implementation on nurses' performance.

As regards participated patients, patients' outcomes among control and study group were assessed two times, first on their admission and the second before their discharge. The control group outcomes were measured prior to program implementation, meanwhile, study group patients' outcomes were assessed after program implementation. Comparison between study and control group outcomes were done on their admission and before discharge to assess effect of competency-based program on outcomes of patients with post-stroke dysphagia.

#### Administrative Design:

Approval has been taken for carrying out this study in the selected areas from the medical director of Ain Shams University hospitals well as permission from the director of nursing service administration.

#### Statistical Design:

The acquired data was categorized, evaluated, tabulated, and analyzed using a number and percentage distribution. The computer performed statistical analysis, and appropriate statistical tests were applied to evaluate whether or not significant differences existed. Numbers, percentages, means, chi-square ( $X^2$ ) tests, and P values were used in the statistical analysis. The significance of the finding was assessed based on the P value significance level. A P value < 0.05 was regarded significant, a P value > 0.05 was considered non-significant, and a P value < 0.001 was considered highly significant. The current study's statistical presentation and analysis were carried out using SPSS V20, which included the mean, standard deviation, t-test, linear correlation coefficient, and chi-square tests.

#### Results

Table 1 displays the percentage distribution of demographic data among the nurses under study. Regarding the age of nurses under study, it was found that 52.5% of them were within the age group 20 - <30 with mean age  $31.38 \pm 6.88$ , meanwhile 82.5% and 77.5% of them were female and married respectively. Regarding

academic qualifications, it was found that 47.5% of them were diploma nurses while 12.5 of them were bachelor nurses. Concerning years of experience, it was found that 65 % of studied nurses had from 5 to less than 10 years of experience with mean years of experience  $7.65 \pm 6.13$  years. The findings revealed also that 87.5 % of studied nurses had not received previous training regarding care of patient with post-stroke dysphagia and 100 % of them exhibit no presence of manual booklet regarding care of patient with post-stroke dysphagia in their working unit.

**Table (2)** revealed competency level of knowledge related to care of patient with post-stroke dysphagia among nurses under study in pre-, post- and follow up phases. It was illustrated that 12.5 %, 67.5 % and 62.5% of nurses under study respectively attained competency level of knowledge regarding anatomy and physiology of swallowing with significant statistical differences between pre/post -program and pre /follow up phases (at  $p < 0.05$ ). Also, it was noticed that 23.3% versus 80% and 63.3% of studied nurses respectively got competency level of knowledge regarding nursing care for patient with post-stroke dysphagia with highly statistically significant differences between pre- and post-implementation phases ( $p < 0.001$ ) and statistically significant variation between pre - and follow up phases ( $p = 0.002$ ). Moreover, the total level of competent knowledge among studied nurses at pre-program phase was 32.5% which was increased to 80% and 75 % at post-implementation and follow up phases respectively with statistically highly significant increase in the level of knowledge in between pre / post-program phases ( $X^2=24.34$  &  $p < 0.001$ ) and pre/ follow-up phases ( $X^2=20.26$  &  $p < 0.001$ ).

As noticed from **table (3)** that 22.5%, 80% and 77.5 % of the nurses' participants respectively had a competency level of practice regarding dysphagia screening using Gugging Swallowing Screening tool at pre, post and follow up phases with highly statistically significant differences between pre- and post-implementation phases ( $X^2=19.00$  &  $p < 0.000$ ) and pre-and follow up phases ( $X^2=17.00$  &  $p < 0.000$ ). In addition, there were statistically significant increase of the level of competency practice level at post and follow up phases among studied nurses as compared to pre-implementation phase regarding nasogastric tube feeding, assisting patient to assume swallowing posture and maneuvers, oral care,



assisting in swallowing training as well as provision of discharge instructions at  $p < 0.001$ .

Concerning total competency level of practice about care of patient with post-stroke dysphagia, it was illustrated that 80% and 77.5% of studied nurses got competent level of practice at post-implementation and follow up phases versus 32.5% of them at pre-implementation phase as indicated by test analysis and p-significance values between pre/post- implementation phase ( $X^2 = 19.00$  &  $p < 0.001$ ) and pre/follow-up phases ( $X^2 = 17.00$  &  $p < 0.001$ ).

**Table (4)** displays total attitude of studied nurses toward care of patient with post-stroke dysphagia at pre, post-implementation and follow up phases. It was found that 27.5% of studied nurses had positive attitude at pre-program implementation phase in comparison to 72.5% and 75 % of them at post-implementation and follow up phases respectively with extremely statistically significant variation between pre/post and pre/ follow up phases ( $X^2 = 13.067$  &  $15.017$ ,  $p < 0.001$ ).

**Table (5)** shows the correlation between nurses' knowledge, skills, and attitude at the pre, post-implementation and follow-up phases, the table shows that there is no statistically significant correlation between the studied nurse's level of knowledge and their level of practice and attitude regarding care of patient with post-stroke dysphagia at pre-program phase ( $r = 0.066$ ,  $P = 0.707$  &  $r = 0.155$ ,  $P = 0.373$  respectively).

However, positive statistically significant correlations were found between the studied nurses' level of knowledge and their level of practice as well as attitude at post-program phase ( $r = 0.358$ ,  $P = 0.035$  &  $r = 0.320$ ,  $P = 0.044$  respectively). As regards follow up phase, the results illustrate that statistically positive significant correlations were detected between the studied nurses' level of knowledge and their level of attitude and practice ( $r = 0.438$ ,  $P = 0.008$  &  $r = 0.135$ ,  $P = 0.048$  respectively).

**Table (6)** reveals that 46.7 % of the control group and 50 % of the study group subjects their age were in the age group from 40 to less than 60 years with mean age of  $63.88 \pm 12.79$  years for the control group and  $64.15 \pm 12.51$  years for the study group. In respect to gender, 53.3% of the control group and 50% of the study group

participants were males. Concerning level of education, 40% of the control group participants compared to 30 % of the study group can read and write. As regards residence, 63.3 % of the control group compared to 56.7 % of the study group lived in urban areas. Regarding occupation, 43.3 % and 56.7 % of the control and study group subjects respectively were retired or not working, while most of them were diagnosed with ischemic stroke (73.3% in study group and 80% of control group)

Meanwhile, the present study revealed also that 73.3% of the control group subjects in comparison to 80% of study group subjects had ischemic stroke. Also, 63.3% and 60 % of control and study group participants respectively had history of chronic illness. Moreover, there were statistically insignificant variations between the study and control groups regarding their age, gender, educational level, residence, occupation, type of stroke and history of chronic illness with  $P$ . value  $> 0.05$ .

**Figure (1)** shows the difference between study and control group patients regarding dysphagia severity as an outcome for nursing competency-based program on their admission and before their discharge. The results illustrated that 50% of control group versus 45.3% of the study group had severe dysphagia on admission as a baseline assessment with no statistically significant variation was detected ( $X^2 = 3.77$  &  $p = 0.155$ ) on this phase. Comparison of dysphagia severity between study and control group upon their discharge revealed statistically significant difference as evident by statistical test analysis and significance test ( $X^2 = 12.06$  &  $p = 0.007$ ), whereas, only 14.7% of study group versus 33.3% of control group had severe dysphagia upon their discharge.

**Table (7)** displays the variations between the research and control groups with regard to mean scores of SWAL-QOL as patients' outcome for nursing competency-based program on admission and before their discharge. It was illustrated that there were statistically insignificant differences between study and control groups regarding mean scores of all items of swallowing quality of life scale and their composite score on their admission as a baseline assessment ( $p$ -value  $> 0.05$ ).

However, The results reveal that there was a statistically significant increase in swallowing

quality of life items concerning burden, eating desire, food selection, mental health, sleep, and fatigue among study group as compared to control group upon their discharge ( $t= 3.460$  &  $p= 0.041$ ,  $t= 3.607$  &  $p= 0.037$ ,  $t= 6.100$  &  $p= 0.024$ ,  $t= 4.669$  &  $p= 0.044$ ,  $t=3.371$  &  $p=0.045$ ,  $t=4.603$  &  $p=0.017$ , respectively); meanwhile, there was a highly statistically significant increase in mean scores among the study group as compared to the control group regarding eating duration and dysphagia symptoms (DSB) ( $t=3,622$  &  $p=< 0.001$ ,  $t=6.277$  &  $p= 0.000$ , respectively).

Furthermore, no statistically significant variations were found in the study and control groups with respect to communication, fear, and social functioning ( $t=1.078$  &  $p= 0.387$ ,  $t= 1.245$  &  $p= 0.326$ ,  $t= 0.800$  &  $p= 0.512$ , respectively). In addition, A statistically significant increase in the total composite score of swallowing quality of life was detected among study group participants in comparison to the control group upon their discharge ( $t= 9.24$  &  $p= 0.01$ ).

**Table (1):** Frequency and percentage distribution of nurses under study according to their characteristics (n=40)

Items	N= (40)	%
Age:		
• 20 - <30	21	52.5
• 30 - <40	16	40
• $\geq 40$	3	7.5
<b>Mean <math>\pm</math> SD (years)</b>	31.38 $\pm$ 6.88	
<b>Gender</b>		
• Female	33	82.5
• Male	7	17.5
<b>Qualifications</b>		
• Diploma	19	47.5
• Technical health institution	13	32.5
• Bachelor's degree	5	12.5
• Post-graduate nursing degree	3	7.5
<b>Marital status</b>		
• Single	9	22.5
• Married	31	77.5
<b>Years of experience</b>		
• <5	10	25
• 5- <10	26	65
• $\geq 10$	4	10
<b>Mean <math>\pm</math> SD (years)</b>	7.65 $\pm$ 6.13	
<b>Previous training regarding care of patient with post-stroke dysphagia</b>		
Yes	5	12.5
No	35	87.5
<b>Presence of manual booklet for care of patient with post-stroke dysphagia in the unit</b>		
Yes	0	0
No	40	100

**Table (2):** Frequency and percentage distribution of studied nurses according to their level of knowledge regarding care of patient with post-stroke dysphagia at pre-, immediate post and follow-up phases (n=40).

Knowledge items	Competent level of knowledge						Test / p-significance			
	Pre-program		Post-program		Follow up		Pre/ post		Pre /follow up	
	N	%	N	%	N	%	X <sup>2</sup>	P	X <sup>2</sup>	P
▪ Anatomy and physiology of swallowing	5	12.5	27	67.5	25	62.5	4.00	<0.05*	3.06	<0.05*
<b>Post-Stroke Dysphagia</b>										
▪ Definition	16	40.0	34	85.0	34	85.0	19.0	<0.001**	18.0	<0.001**
▪ Etiology and risk factors	12	30.0	33	82.5	27	67.5	21.0	<0.001**	6.0	<0.05*
▪ Clinical manifestations	12	30.0	33	82.5	27	67.5	21.0	<0.001**	6.0	<0.05*
▪ Bedside screening of dysphagia	13	32.5	34	85.0	30	75.0	16.00	<0.001**	12.25	<0.001**
▪ Nursing care regarding care of patient with post-stroke dysphagia	7	23.3	24	80	19	63.3	19.288	<0.001**	9.774	0.002*
▪ Discharge instruction regarding post-stroke dysphagia	14	35.0	33	82.5	32	80.0	19.00	<0.000***	18.00	<0.000***
<b>Total competent knowledge</b>	<b>13</b>	<b>32.5</b>	<b>32</b>	<b>80.0</b>	<b>30</b>	<b>75.0</b>	<b>24.34</b>	<b>&lt;0.001**</b>	<b>20.26</b>	<b>&lt;0.001**</b>

Non-significant>0.05    significant <0.05\*    High significant <0.001\*\*

**Table (3):** Frequency and percentage distribution of studied nurses according to their level of practice regarding care of patient with post-stroke dysphagia at pre-, immediate post and follow-up phases (n=40).

Skill competencies	Competent level of practice						Chi-square test/ p value			
	Pre-program		Post-program		Follow up		Pre / post		Pre / follow up	
	N	%	N	%	N	%	X <sup>2</sup>	P	X <sup>2</sup>	P
<b>▪ Applying bedside dysphagia screening using Gugging Swallowing Screening tool (GUSS)</b>										
<b>A-Preliminary investigation (Indirect swallowing test)</b>	3	7.5	22	55.0	22	55.0	19.00	<0.000**	19.00	<0.000**
<b>B-Direct swallowing test</b>	10	25.0	33	82.5	33	82.5	23.00	<0.001**	21.00	<0.001**
<b>Subtotal screening</b>	9	22.5	32	80.0	31	77.5	19.00	<0.000**	17.00	<0.000**
▪ Nasogastric tube feeding	19	47.5	33	82.5	33	82.5	13.89	<0.000**	13.12	<0.000**
▪ Oral feeding with diet modification	12	30.0	31	77.5	29	72.5	4.00	<0.05*	3.06	<0.05*
▪ Assisting patient to assume swallowing posture and maneuvers	15	37.5	32	80.0	30	75.0	14.0	<0.001**	5.02	<0.001**
▪ Oral care	21	52.5	37	92.5	35	87.5	16.00	<0.001**	12.25	<0.001**
▪ Assisting in swallowing training	5	12.5	27	67.5	25	62.5	21.00	<0.001**	17.00	<0.001**
▪ Provision of discharge instructions regarding post-stroke dysphagia.	12	30.0	32	80.0	30	75.0	20.00	<0.001**	18.00	<0.001**
<b>Total competency level</b>	<b>13</b>	<b>32.5</b>	<b>32</b>	<b>80.0</b>	<b>31</b>	<b>77.5</b>	<b>19.00</b>	<b>&lt;0.000**</b>	<b>17.00</b>	<b>&lt;0.001**</b>

Significant <0.05\*    High significant <0.001\*\*

**Table (4):** Frequency and percentage distribution of studied nurses according to their total attitude level toward care of patient with post-stroke dysphasia at pre-, immediate post and follow-up phases (n=40).

Attitude	Pre-program		Post-program		Follow up		Pre / post		Pre / follow up	
	N	%	N	%	N	%	X <sup>2</sup>	P-value	X <sup>2</sup>	P-value
Positive	11	27.5	29	72.5	30	75.0	13.067	<0.001**	15.017	<0.001**
Negative	29	72.5	11	27.5	10	25.0				

Non-significant>0.05                      High significant at p<0.001\*

**Table (5):** Correlation between the studied nurse's competency level of knowledge, practice, and attitude regarding care of patient with post-stroke dysphasia at pre, immediate post and follow up phases (n=40)

Item		Knowledge		Practice	
		r	P-value	r	P-value
Pre	Practice	0.066	0.707		
	Attitude	0.155	0.373	0.332	0.051
Post	Practice	0.358	0.035*		
	Attitude	0.320	0.044*	0.449	0.013*
Follow up	Practice	0.376	0.041*		
	Attitude	0.438	0.008*	0.135	0.048*

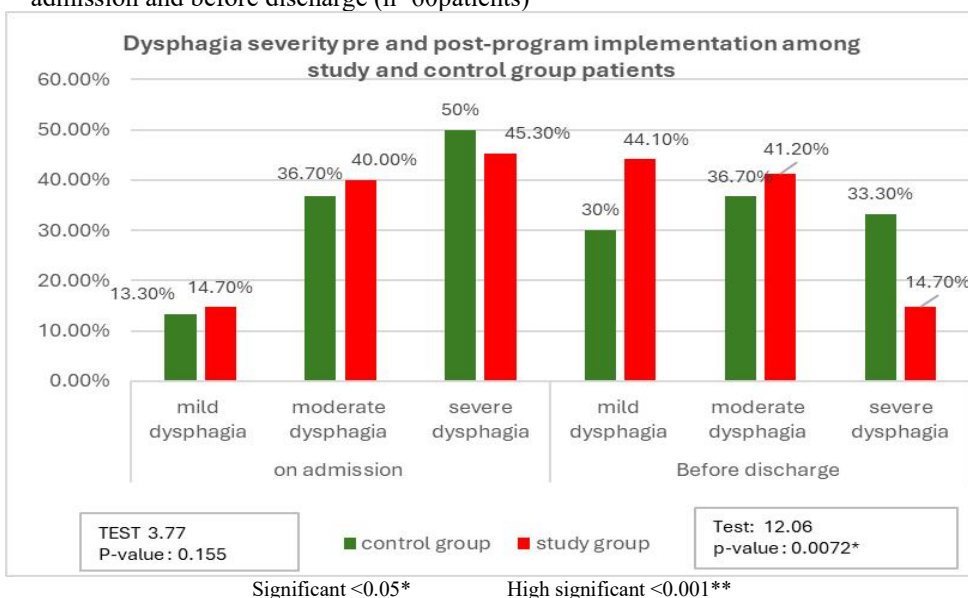
Non-significant>0.05                      significant <0.05\*                      High significant <0.001\*\*

**Table (6):** Frequency and percentage distribution of the study and control group patients according to their demographic and clinical data (n= 60).

Demographic data	Control group (n=30)		Study group (n=30)		Chi-square	P-Value
	No.	%	No.	%		
<b>Age (years):</b>						
• <40 years	9	30	7	23.3	1.35	0.452
• 40-<60 years	14	46.7	15	50		
• ≥ 60 years	7	23.3	8	26.7		
▪ <b>Mean± SD (years)</b>	63.88 ±12.79		64.15 ±12.51		0.20	0.625
<b>Gender:</b>						
▪ Male	16	53.3	15	50	2.82	0.163
▪ Female	14	46.7	15	50		
<b>Level of education:</b>						
▪ Can't read and write	10	33.3	8	26.6	4.010	0.405
▪ Read & write	12	40	9	30		
▪ Basic education	4	13.3	6	20		
▪ Secondary education	3	10	5	16.7		
▪ University education	1	3.3	2	6.7		
<b>Residence:</b>						
▪ Rural	11	36.7	13	43.3	1.33	0.648
▪ Urban	19	63.3	17	56.7		
<b>Occupation:</b>						
▪ No working / retired/ housewife	13	43.3	17	56.7	1.50	0.32
▪ Sedentary work	5	16.7	4	13.3		
▪ Manual work	12	40	9	30		
<b>Stroke type</b>						
• Ischemic stroke	22	73.3	24	80	0.389	0.823
• Hemorrhagic stroke	8	26.7	6	20		
<b>History of chronic illness</b>						
▪ Yes	19	63.3	18	60	0.233	0.463
▪ No	11	36.7	12	40		

Non-significant>0.05      Significant <0.05\*                      High significant <0.001\*\*

**Figure (1):** Difference between study and control group patients regarding dysphagia severity on admission and before discharge (n=60patients)



**Table (7):** Difference between study and control group patients regarding mean scores of SWAL-QOL on admission and before discharge (n=60)

Item	On admission (n=30)		Test (t-test)	P value	Before discharge (n=30)		Test (t-test)	P value
	Study group	Control group			Study group	control group		
	Mean (SD)				Mean (SD)			
• Burden	41.67 (28.86)	41.13 (29.65)	1.265	0.249	61.22 (1.50)	57.77 (32.98)	3.460	0.041*
• Eating duration	60.65 (8.39)	58.35 (17.24)	1.104	0.270	78.52 (19.15)	70.43 (39.87)	3,622	0.001**
• Eating desire	56.89 (25.73)	58.08 (22.21)	1.056	0.305	82.49 (24.67)	79.15 (19.35)	3.607	0.037*
• Food selection	41.67 (38.59)	41.68 (24.1)	1.036	0.305	78.42 (14.65)	69.61 (30.22)	6.100	0.024*
• Communication	47.5 (14.44)	48.01 30.73	1.67	0.19	57.09 (91.30)	55.778 (40.54)	1.078	0.387
• Fear	52.5 (39.87)	51.34 (32.65)	0.075	0.94	68.87 (25.69)	66.87 (78.86)	1.245	0.326
• Mental health	61.23 (32.3)	60.81 (24.1)	1.431	0.173	83.98 (71.23)	76.5 (18.54)	4.669	0.044*
• Social functioning	54.22 (35.22)	55.82 (23.76)	1.13	0.26	71.56 (47.05)	71.34 (85.10)	0.800	.0 0.512
• Sleep	44.36 (78.93)	47.35 (22.02)	1.52	0.14	66.25 (39.10)	62.22 (32.44)	3.371	0.045*
• Fatigue	50.34 (16.09)	52.21 (24.42)	1.146	0.605	70.8 (28.06)	68.89 (16.51)	4.603	0.017*
• DSB (symptoms score)	45.76 (32.38)	447.27 (21.65)	1.263	0.261	79.72 (21.25)	70.31 (18.03)	6.277	.000**
<b>Composite score (0-100)</b>	<b>49.23 (18.71)</b>	<b>48.65 (27.31)</b>	<b>8.75</b>	<b>0.386</b>	<b>71.34 (35.3)</b>	<b>68.76 (53.91)</b>	<b>9.24</b>	<b>0.01*</b>

Composite score: an average of the subscale/ total scores  
 Non-significant>0.05    significant <0.05\*    High significant <0.001\*\*

## Discussion

It is critical for nurses, particularly those in neurology, to gain a better understanding of post-stroke dysphagia since they routinely observe patients while they eat and are typically the first ones to identify dysphagia. As a result, nurses must be aware of dysphagia symptoms in order to act promptly. Nurses have the ability to avoid complications and minimize the incidence of post-stroke dysphagia-related deaths by diagnosing dysphagia earlier (Fang et al., 2022).

The current study aim was to evaluate the effect of competency-based program on performance of nurses and outcomes of patients with post-stroke dysphagia. It hypothesized that the nurses' level of competency (knowledge, practice & attitude) regarding care of patient with post-stroke dysphagia will significantly increase after implementing nursing competency-based program and will positively affect patients' outcomes in terms of dysphagia severity level and swallowing quality of life.

Discussion of the present study findings covered main parts including; demographic characteristics of the studied nurses, competency level of knowledge, practice and attitude among studied nurses regarding care of patient with post-stroke dysphagia at pre, post and follow-up phases, demographic characteristics of the studied patients in addition to discussing findings related to outcomes of patients with post-stroke dysphagia in terms of dysphagia severity level and swallowing quality of life.

Concerning demographic data of the studied nurses, the findings revealed that the mean age among studied nurses is about thirty one years, most of them were female and married. In relation to qualifications of studied nurses, it was found that four fifths of them were diploma and technical institute nursing graduates, and the rest were bachelor and post-graduates which require using simple Arabic language in all teaching and learning materials and media. As regards years of experience, it was found that mean years of experience among studied nurses was slightly more than seven years which one of the contributing factors for successfulness of study competency -based program from researchers' point of view..

Moreover, a majority of studied nurses didn't receive any training regarding post-stroke dysphagia care and all of them exhibit no presence of manual booklet regarding care of patient with post-stroke dysphagia in their working unit. This finding necessitates and highlights the need of those nurses for education and training regarding post-stroke dysphagia to improve their nursing competencies. The previously mentioned finding was in agreement with Zhang et al. (2022) in a study titled "Implementation strategies to improve evidence-based practice for post-stroke dysphagia identification and management: A before-and-after study" and stated in their study there were no specialized nursing strategies or protocols for addressing post-stroke dysphagia in the unit, nor were there any resources available to teach nurses about the disorder. Also, a study conducted by Knight et al. (2020) about nurses' knowledge of stroke-related oropharyngeal dysphagia concluded that the nurses' participants, who play a crucial role in the management of oropharyngeal dysphagia, have received little training.

According to Syahrin et al. (2022), nurses often view dysphagia as a complex issue that requires specialized skills and knowledge, as well as scientific expertise. Other studies suggest that that both theoretical and practical parts of dysphagia management may be required. Further study is needed on implementing sustainable education programs to minimize unfavorable outcomes from improper dysphagia management.

In relation to the competency level of knowledge related to care of patients with post-stroke dysphagia among nurses under current study in pre, post- and 2-months follow up phases, the current results revealed statistically significant increase in their competency level of knowledge at immediate post and follow up phases after the implementation of educational program as compared to pre-implementation phase as regards their knowledge about anatomy and physiology of swallowing, definition of post-stroke dysphagia, etiology and risk factors, clinical manifestations, bedside screening of dysphagia, nursing care regarding care of patient with post-stroke dysphagia and discharge instruction. Also, the results revealed highly statistically significant increase in the total competency knowledge among studied nurses at immediate post-

implementation and follow up phases versus pre-implementation phase, whereas four fifths and three quarters of nurses had competent knowledge after program implementation compared to less than one third of them before program implementation.

The aforementioned findings reflect the efficiency of competency-based program on improvement of nurses' level of knowledge immediate and two months after program implementation which might be due to appropriateness of program content to the study aims, effective educational strategies, easiness of language, readiness, and feasibility of educational Arabic booklet to reinforce learning process which lead to more nurses' acquisition of knowledge to reach the competent level.

This was in accordance with **Behairy et al. (2022)** who conducted a study with a title "Effect of A Dysphagia Assessment Education Program on Nurses' Knowledge and Skills Regarding Early Detection and Prevention of Aspiration for Patient with Stroke" and stated that the nurses' knowledge at the post-program implementation stage differed statistically significantly from the baseline assessment in terms of definition, signs and symptoms, patient complications, dysphagia assessment, as well as nursing and medical management. Also, **Zhang et al. (2022)** found that discovered that the degree of knowledge and commitment to recommended practices among nurses was significantly improved following the adoption of educational approaches to enhance dysphagia identification and management with best practices.

Regarding practice competency level, the current findings demonstrate that, when compared to the pre-implementation phase, there were highly statistically significant improvement in the total competency level of nurses' practice regarding dysphagia screening using the GUSS tool among the nurses under study at the post and follow-up phases. Accordingly, the previous finding shows that the competency-based program was successful in improving studied nursing staff 'competencies to screen for dysphagia using the GUSS tool, prove its effectiveness as a standardized tool for dysphagia screening and assessment and suggest it as a mandatory tool for assessment of all patients who were admitted with recent stroke. **Bagheri et al.**

**(2021)** supported this finding in their study about the effect of dysphagia screening education in patients with cerebrovascular stroke on nurses' knowledge and practice and reported that education influences nurses' knowledge regarding screening of dysphagia in patients with cerebrovascular strokes.

Furthermore, competency level of practice regarding starting oral feeding with diet modification, assisting patient to assume swallowing posture, assisting in swallowing training, provision of discharge instructions regarding post-stroke dysphagia in addition to the overall competency level of practice revealed statistically significant variations throughout the study from pre- to post-implementation and follow up phases which indicate marked improvement of their level of practice competency after program implementation. From researchers' point of view, studied nurses' participation in the program with no previous attendance to such program for the majority of them and unavailability of procedure manual guide for practice guidance in their hospital setting allowed them to identify and acquire the necessary nursing competencies and adopting of gap practices regarding caring for patients with dysphagia following a stroke, which may account for the improvement in the nurses' skills in addition to effective practical content, strategies and media.

Additionally, **Zhang et al. (2022)** found in their research that there were notable variations seen in the nurses under study's adherence to management skills for post-stroke dysphagia after training regarding screening time, screening skills, postural adjustments, nutritional modification, swallowing stimulation exercises and patient education. Additionally, **Naga et al. (2021)** discovered that immediate, and two-month periods after the competency-based training, nurses had shown a statistically significant increase in their overall skills as compared to assessment baseline data.

One of the noticeable findings in the current study is that a modest decrease in the total level of knowledge and practice was seen two months following the program's implementation as compared to the immediate post-program. This may be pertained to the time element since they require frequent and ongoing in-service education

to enable them to refresh and update their competencies.

In relation to the overall attitude of the studied nurses towards the care of patients with post-stroke dysphagia at the pre, post, and follow-up phases. It was discovered that approximately three quarters of nurses at immediate and follow up phases had positive attitude level as compared to one quarter of them before program implementation, with highly statistically significant differences between pre/post and pre/follow up phases This could be related to the efficacy of competency-based program implementation on improving attitude in addition to improving knowledge and practices related to post-stroke dysphagia which reflect positively on their attitude

The previous findings were in agreement with **Qian and Yanling (2020)** who stated in his study of "Status quo of knowledge, attitude and practice of neurological nurses in dysphagia after stroke" that education and training regarding the management of dysphagia following a stroke are useful ways to get information and enhance attitudes about managing dysphagia. Also, **Naga et al. (2021)** found that when the competence-based program was implemented, nurses' competency levels in caring for stroke patients significantly improved, demonstrating the program's efficacy in raising nurses' skills, expertise, and attitudes.

Regarding the correlation between nurses' knowledge, skills, and attitude at the pre, post-implementation and follow-up phases, there were statistically significant correlation between the studied nurses' level of knowledge and their level of skills and attitude at post-program phase. As regards follow up phase, statistically positive significant correlations were reported between the studied nurses' level of knowledge and their level of skills and attitude at post-program phase at follow-up phase. According to the researcher, this improvement in nurses' attitudes could be attributed to an increase in nurses' knowledge and skills, which improved their attitude as they became more aware of their role in providing care for dysphagia post-stroke patients.

The abovementioned result was in accordance with **Syahrun et al. (2022)** who displayed that greater participation in the treatment of stroke patients who have dysphagia conditions could raise

the frequency of giving patients the proper care, which can greatly enhance nurses' expertise and consequently improve their behaviors and attitude regarding their care provision.

In relation to frequency and percentage distribution of the study and control group patients according to their demographics, current study reveals that there were no statistically significant differences between the study and control groups in terms of patients' demographic characteristics including age (approximately half of them were age were in the age groups from 40 to less than 60 years), gender (near half of both group were males), type of stroke (most of study and control group were ischemic stroke). These findings reflect the homogeneity between study and control group participants and highlight the efficacy of study program on the outcomes of studied patients.

These were consistent with the findings of **Elfetoh and Karaly (2018)**, who found in their research titled "Effect of swallowing training program on dysphagia following cerebrovascular stroke" that most of the patients they evaluated were over sixty-year-old and males, **Hinkle et al. 2021** explained that stroke prevalence was increased with advanced age which leads to a high prevalence of dysphagia. This finding is also consistent with the findings of **Savcı and Acaroğlu (2021)** who discovered in their study about the effects of swallowing training and follow-up on the problems associated with dysphagia in patients with stroke that the most common type of stroke accompanied by dysphagia was an ischemic stroke.

In relation to comparison between study and control group patients regarding dysphagia severity as an outcome for nursing competency-based program on their admission, the results illustrated that there was no statistically significant variation was detected on admission between both groups as demonstrated from statistical analysis. This might be attributed to the homogeneity between the patients in both groups as regard to their demographic characteristics, type of stroke, and history of chronic diseases as well as the fact that both groups were not received any care upon their admission can influence their outcomes.

Comparison of dysphagia severity between study and control group upon their discharge revealed statistically significant improvement among the study group in the severity of



dysphagia as compared to control group. This improvement among study group versus control group from researchers' point of view might be due to the positive effect of competency-based program on performance of studied nurses which was proved through statistical analysis which indicate statistically significant improvement of their performance regarding post-stroke screening and care which was reflected positively on outcomes of patients whom they care.

In this accordance, **Elabdeny et al. (2020)** in their study about the effect of nursing intervention protocol on the severity of dysphagia among recently stroke patients and revealed a substantial difference in dysphagia severity between study and control group patients. In addition, **Hassan and Mahmoud (2017)** in their study titled "Effect of Nursing Intervention Program on Minimizing Dysphagia for Post Stroke Patients" showed that the study group's ability to swallow improved more than the control group's after applying an exercise nursing training program.

Findings of the current study show that almost all SWAL-QOL items were increased among study group participants in comparison to control group. Statistically significant variation were detected between study and control groups regarding burden, eating desire, food selection, mental health, sleep, fatigue, and composite score. Besides, highly statistically significant differences were found between them regarding eating duration and swallowing associated symptoms (DSB), while there were statistically insignificant differences were detected between study and control group subjects regarding communication, fear, and social functioning.

The improvement of swallowing quality of life items among study group might be due to effective nursing intervention they received from nurses after acquisition of basic competencies regarding care of post-stroke dysphagia which reflect positively on patients' swallowing abilities and its associated swallowing quality items. Insignificant differences regarding communication, fear and social functioning might be due to insensitivity of these indicators to nursing care and it might need time to be improved which suggest further research to assess the effectiveness of nursing education on SWAL-QOL after patient discharge.

The previous result was to somewhat in agreement with **Zhang et al. (2022)** who illustrated that the post-intervention scores of SWAL-QOL domain scores, including communication and social functioning were not statistically significant after the intervention than before. The study's authors clarified this by pointing out that post-stroke patients frequently deal with a range of complications, including dysarthria, anxiety, depression, pain, and hemiplegia, which have a direct impact on their ability to communicate verbally, interact socially, sleep, and feel tired and need more time to recover from. Another study revealed that swallowing nursing training significantly improved dysphagia levels and QOL mean scores among patients with cerebrovascular stroke compared to the control group (**Hafez & Mohamed, 2023**).

### **Conclusion**

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The level of nurses' competencies in form of knowledge, practice, and attitude regarding care of patients with post-stroke dysphagia were significantly improved after implementation of nursing competency-based program. Furthermore, implementation of nursing competency-based program revealed significant reduction in dysphagia severity and improved swallowing quality of life total score among study group as compared to control group patients. The findings of the current study supported both study hypotheses.

### **Recommendations**

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The current study's findings proposed the following recommendations:

- Continuous in-service competency-based programs for nurses caring for patients with stroke to refresh and update their knowledge and practice on post-stroke dysphagia assessment and management.
- Replicating the study with a bigger probability sample from other places in Egypt to further understand the problem.
- Educational booklet, brochure, manual guide and learning resources in Arabic language regarding post-stroke nursing management should be available in all health care settings dealing with stroke patients.
- Periodic regular supervision and guidance for nurses caring for patient with recent stroke to

address and manage gap in nursing competencies regarding care for post-stroke patients.

- Longitudinal research is proposed to assess the impact of a competency-based program on post-stroke dysphagia patients following discharge.

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