ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 8, Month: December 2024, Available at: https://hijnrp.journals.ekb.eg/

The Relationship between Early Dysphagia Screening and Incidence of Pneumonia among Acute Stroke Patients

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Abstract

Background: Post-stroke dysphagia is a common complication of acute stroke, which could increase the risk of mortality and aspiration pneumonia. ***Aim:*** This study aimed to assess the relationship between early dysphagia screening and the incidence of pneumonia among acute stroke patients. ***Research design***: A correlational descriptive design was utilized in this study. ***Setting:*** The study was conducted at the stroke and neurology intensive care units at As-Salam International Hospital. ***Subject***: a purposive sample of 87 adult patients newly admitted with a diagnosis of acute stroke was included in the study. ***Tools:*** Three tools were used in this study, **Tool I**: patients' structured interview questionnaire. It consisted of patients' demographic data and current and past history. **Tool II** gagging swallowing screen. **Tool III**: Assessment of stroke-associated pneumonia. ***Results:*** The study findings revealed that more than one third of the studied patients had dysphagia, and the minority of the studied patients had pneumonia with a statistically significant relation between the incidence of pneumonia and the incidence of dysphagia. As well as there was a positive correlation between the incidence of dysphagia and the incidence of pneumonia. ***Conclusion:*** There was a statistically significant relation between early dysphagia screening and the incidence of pneumonia among acute stroke patients. ***Recommendation:*** Early dysphagia screening practices should be applied to acute stroke patients before oral intake and within 24 hours of admission to reduce the incidence of pneumonia.

Key Words: *Acute stroke, Dysphagia screening, Pneumonia.*

Introduction

Stroke remains one of the main causes of long-term disability, causing 11% of all deaths. Medical complications are frequently seen in acute stroke patients and may increase mortality and length of hospital stay in the acute and subacute stroke phases **(Chang et al., 2022).** Pneumonia is a common and important complication of stroke, affecting up to one-third of patients. Pneumonia has a great impact on the prognosis of stroke patients and accounts for about 30% or a 3-fold increase in 30-day mortality. Risk factors associated with post-stroke pneumonia include older age, poor oral hygiene, decreased level of consciousness, severity of post-stroke disability, brainstem stroke, and impaired swallowing function **(Banda et al., 2022).**

Post-stroke dysphagia is a common complication of acute stroke. Dysphagia is defined as an impaired swallowing function or difficulty in holding food and fluid in the mouth. Furthermore, there is a significant risk of aspiration when eating orally in some patients with poor swallowing coordination because food particles can reach the airway below the vocal cords. In acute stroke, dysphagia is considered an indicator of poor prognosis, which could increase the risk of nutritional problems, permanent disability, mortality, and aspiration pneumonia (**Ghoreishi et al., 2024).**

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Pneumonia is one of the leading causes of mortality after a stroke, accounting for approximately 35% of poststroke deaths. Most stroke-related pneumonia is due to dysphagia and the subsequent aspiration of oropharyngeal food material. Moreover, Pneumonia is more common in patients with dysphagia compared to those without dysphagia, and stroke patients with dysphagia have a 3- to 11-fold greater risk of developing pneumonia. The early and accurate identification of post-stroke dysphagia (PSD) is the key to the prevention of pneumonia, which may improve patient outcomes **(Elsyaad et al., 2022).**

Post-stroke dysphagia can be detected instrumentally or non-instrumentally by bedside clinical swallowing assessment. Therefore, critical care nurses have a crucial role in the detection and prevention of pneumonia. Besides, Nurses are more likely to be the first health professionals to detect the early symptoms of oropharyngeal dysphagia as they administer medication and feed patients. Consequently, they are responsible for screening patients' swallowing abilities which should be done before oral intake and within the first 24 hours after admission; also, it is recommended according to clinical guidelines regardless of initial stroke severity. Hence, early detection and proper management of dysphagia will lead to a reduction of pneumonia and consequently decrease the economic burden on medical systems and the risk of mortality. **(Abd El-Hamid et al., 2021).**

In many hospitals, dysphagia screening is performed by speech-language therapists who are often not available on weekends and holidays, which results in delayed dysphagia assessment and might be associated with a higher risk of complications including pneumonia. To manage PSD, nurses need to have good knowledge of PSD symptoms for early identification and avoidance of unfavorable outcomes such as malnutrition, aspiration pneumonia, and death **(Julier & Benfield, 2021)**. The Gugging Swallowing Screen (GUSS) is an accurate clinical assessment method for the diagnosis of dysphagia and risk of aspiration among acute stroke patients. Additionally, the GUSS test is a simple, valid, and reliable test to detect early aspiration and a suitable noninvasive tool to grade the severity of dysphagia as it has high sensitivity and specificity **(Farpour et al., 2023)**.

Significance of study

Stroke is a devastating disease that affects 15 million patients worldwide each year, resulting in death in about one-third of patients and severe disability in two-thirds of the survivors. Globally, there were 6.5 million stroke deaths, making stroke the second-leading cause of death behind ischemic heart disease **(Abdelmonem et al., 2021).**

On the other hand, aspiration pneumonia is one of the major complications among hospitalized stroke patients with global incidence ranging from five to 83 % and a mortality rate of up to 70 %. The global incidence of aspiration pneumonia among post-stroke is 14 % **(Bayeh, et al., 2022).**

Dysphagia is found in 29 to 80% of those presenting with an acute stroke. The presence of dysphagia in stroke patients may cause poor dietary intake, dehydration, malnutrition, and pulmonary complications, which can lead to poor prognosis. In many cases (50 to 90%) rapid improvement may be expected over the short to medium term, but persistent dysphagia is seen in approximately 20 to 50% of patients. Around half of those with acute strokes develop aspiration and 35% develop aspiration pneumonia. Even a year later, 15 to 20% of post-CVA patients develop pneumonia and almost half of CVA patients are malnourished **(Ghoreishi, et al. 2024)**

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In Egypt, according to recent estimates, the overall prevalence rate of stroke is high with a crude prevalence rate of 963/100 000 citizens. Patients with acute stroke are at risk of developing a wide range of complications such as dysphagia with an incidence rate of 51%-78% and aspiration pneumonia with incidences of 13%-33% **(Sabry & Moerman, 2023)**. Accordingly, this study aimed to assess the relationship between early dysphagia screening and the incidence of pneumonia among acute stroke patients

Aim of the study:

This study aimed to assess the relationship between early dysphagia screening and the incidence of pneumonia among acute stroke patients through the following objectives:

- Assess the incidence of dysphagia among acute stroke patients.
- Assess the incidence of pneumonia among acute stroke patients.
- Identify the relation between early dysphagia screening and the incidence of pneumonia among acute stroke patients.

Research questions:

- What is the incidence of dysphagia among acute stroke patients?
- What is the incidence of pneumonia among acute stroke patients?
- Is there a relation between early dysphagia screening and the incidence of pneumonia among acute stroke patients?

Operational definition:

Early dysphagia screening: Assessment of patients with acute stroke for the incidence and severity of dysphagia within 24 hours of patient's admission.

Subjects and methods:

Research design:

A descriptive correlation design was utilized

Study Settings:

The study was conducted at the stroke unit and neurology intensive care unit at As-Salam International Hospital.

Study Subjects:

A purposive sample of (87) adult patients of both genders with stroke were involved in this study from the previously mentioned settings under the following criteria:

- Patients who are diagnosed with acute stroke (ischemic and hemorrhagic).

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- Patients of both genders more than 18 years old.
- Conscious patients.
- Oral feeding.
- Patients who are admitted within the first 24 hours after the onset of stroke symptoms.

Tools for data collection:

Data was collected through using the following three tools:

Tool I: patients' structured interview questionnaire:

This tool was developed by the investigator after reviewing relevant recent literature **(Abd El-Hamid et al., 2021) & (Chang, et al., 2022).** It consists of three parts:

Part one: Patients' demographic data:

It included the patient's age, gender, educational level, and employment status.

Part two: Current and past history:

It included data regarding length of hospital stay, duration between admission & dysphagia screening (hrs.), types of stroke, history of chronic diseases, and types of chronic diseases.

Tool II: Gagging Swallowing Screen (GUSS):

This tool was adopted from **(Trapl et al., 2007).** It was used to assess the incidence severity of dysphagia. It is composed of two tests:

Test one (Indirect swallowing test) was used to evaluate the ability to maintain vigilance for 15 min, produce a voluntary cough, and successfully swallow saliva without voice change or drooling. The scoring system of each subset is pathologic items (0 points) and physiologic items (1 point). The maximum score (5) must be attained to continue to the next test.

Test two (Direct swallowing screening test) was used to evaluate swallowing performance; it consists of three subtests, starting with a semisolid test followed by a liquid test then a solid test. In each subset, the following was assessed.

1. Deglutition was scored using a numerical scale (swallowing not possible "0", swallowing delayed "1", swallowing successful"2").
2. Involuntary coughing, drooling, voice change during swallowing and were scored using a dichotomous scale of (Yes "0" and no"1"). The score of each subset of this test is a maximum of 5 points and the total score of this test = 15. The GUSS is designed as a scoring system from 0 to 20 that classifies levels of dysphagia severity.

Tool III: " Assessment of stroke Associated Pneumonia":

This tool was adopted from **(Smith et al., 2015)** it was used to assess pneumonia based on the Centers for Disease Control and Prevention (CDC) Criteria 7; these criteria include fever, leukopenia, mental status, purulent sputum, bronchial breath sounds, worsening gas exchange, and chest radiographs.

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Validity:

Content and face validity were conducted to determine whether the tools covered the aim and test its appropriateness, comprehensiveness, accuracy, correction, clearance, and relevance through a jury of 5 experts (assistant professors of medical surgical nursing) from the Faculty of Nursing- Helwan University. Their opinions were elicited regarding tools consistency, rephrasing for some statements, and scoring system. As well as Ethics, values, culture, and beliefs were respected.

Reliability:

Cronbach's Alpha was used to determine the internal reliability of the tools. The reliability of the questionnaire normally ranges between 0 and 1. Higher values of Cronbach's alpha (more than 0.7) denote acceptable reliability. The tool showed good reliability, it was (0.978) for the patient's structured interview questionnaire, (0.826) for GUSS tool, and (0.87) for SAP assessment tool.

Pilot Study:

Pilot study: The pilot study was done on 10% (9 patients) of the sample to examine the clarity of questions and the time needed to complete the study tools. Subjects included in the pilot study weren't excluded from the study sample because no tool modifications were made.

Fieldwork

- Data collection for this study was carried out once permission was granted to proceed with the study.
- The studied patients who were involved in the study were interviewed and assessed four days per week in the morning and afternoon shifts.
- Data collection lasted for 6 months, from the 1st of September 2023 to the end of February 2024.
- The purpose of the study was explained to each eligible patient who agreed to participate in the study before any data collection.
- Voluntary participation and confidentiality were assured by the investigator for each study subject by clarifying to them that all information would be used for scientific research only.
- All patients included in the study were assessed for pneumonia in admission by chest X-ray (hospital routine).

Ethical Considerations:

Official permission was obtained from the scientific research ethics committee of the Faculty of Nursing at Helwan University to conduct the proposed study. Participation in the study is voluntary and subjects were given complete information about the study and their role before signing the informed consent. The ethical considerations will include explaining the purpose and nature of the study, stating the possibility to withdraw at any time, and confidentiality of the information will not be accessed by any other without obtaining the permission of the participants. Additionally, Ethics, values, culture, and beliefs will be respected.

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Statistical analysis:

Upon completion of data collection, data was computed and analyzed using Statistical Package for the Social Science (SPSS), version 24 for analysis. The P value will be set at 0.05. Descriptive statistics tests as numbers, percentages, and mean standard deviation (± SD), were used to describe the results. Appropriate inferential statistics such as the "F" or "t" test were also used.

Results:

Table 1: Frequency and percentage distribution of the studied patients according to their demographic characteristics (n=87)

Demographic Characteristics	N	%
Age		
• 20 ≥ 30 years	5	5.7
• 31 ≥ 40 years	10	11.5
• 41 ≥ 50 years	27	31.1
• 51 ≥ 60 years	45	**51.7**
Mean($\bar{x}$) ± SD	**48.5 ± 9.1**	
Gender		
• Male	68	**78.2**
• Female	19	21.8
Education		
• Can't read and write.	8	9.2
• Read and write.	45	**51.7**
• Primary Education	14	16.1
• Secondary Education	10	11.5
• Higher Education	10	11.5
Employment status		
• Employed	**46**	**52.9**
• Not employed.	41	47.1

Table (1): Shows that (51.7%) of the studied patients were aged between 51 and 60 years, with a mean age of 60.29 ± 14.40. 78.2% of them were male patients, and 51.7% of them can read and write. 52.9% of the studied patients were employed.

Table 2: Frequency and percentage distribution of the studied patients according to their current and past history (n=87)**.**

Current history	N	%
Length of hospital stay		
• 1 > 5 days	51	**58.6**
• 5 > 10 days	6	7
• 10 > 15 days	23	26.4
• ≤ 15 days	7	8
Mean($\bar{x}$) ± SD	**4.03 ± 2.45**	
Duration between admission & dysphagia screening (hrs.)		
• 0 – 4	63	**72.4**
• 5 – 9	18	20.7
• 10 – 14	6	6.9

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Mean($\bar{x}$) ± SD	**4.6 ± 2.94**	
Type of Stroke		
• Ischemic stroke	83	**95.4**
• Hemorrhagic stroke	4	**436**
Past History		
History of chronic diseases		
• Yes	**61**	**70.1**
• No	26	29.9
Types of chronic diseases		
• Diabetes	10	16.4
• Hypertension	27	**44.3**
• Both	24	39.3

Table (2): shows that 58.6% of the studied patients had a hospital stay ranging from 1 to 5 days, with a mean age of 4.03 ± 2.45. Additionally, 72.4% of them underwent dysphagia screening within 0-4 hours of admission, with a mean duration of 4.6 ± 2.94 hours between admission and screening. Furthermore, 95.4% of the studied patients had ischemic stroke. Moreover, 70.1% of the studied patients had chronic illnesses, and 44.3% of them had hypertension.

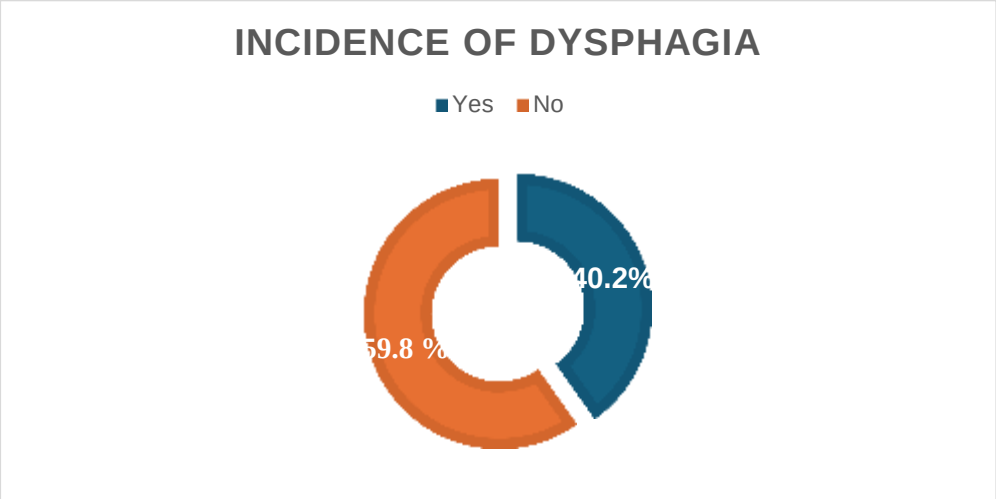

Figure 1: Distribution of studied patients according to the incidence of dysphagia (n=87)

Figure (1): reveals that 59.8% of studied patients did not have dysphagia, while 40.2% of them had dysphagia.

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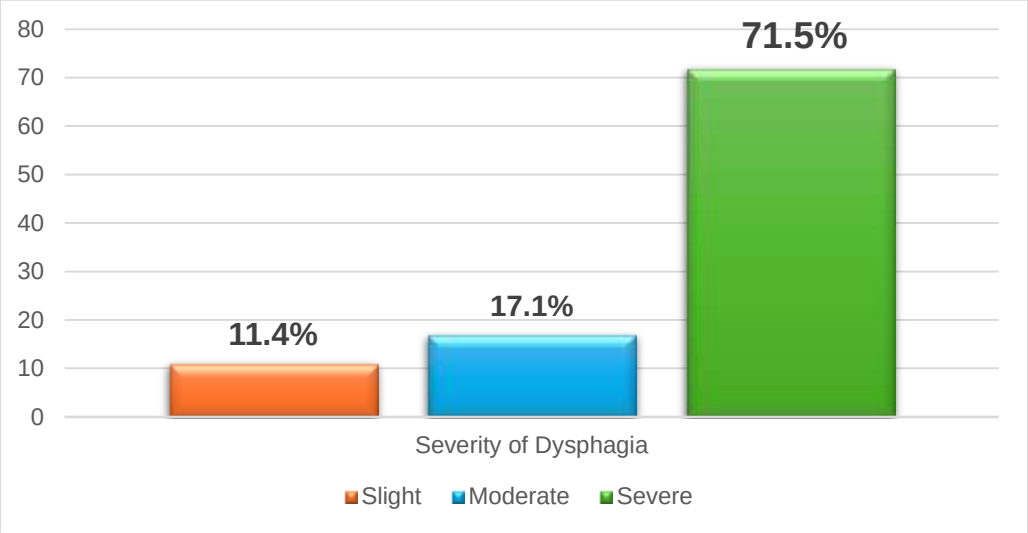

Figure 2: Distribution of studied patients according to dysphagia severity (n=35)

Figure (2): shows the distribution of the studied patients who had dysphagia according to the severity of dysphagia as 11.4% of them had slight dysphagia, 17.1% of them had moderate dysphagia, and 71.5% of them had severe dysphagia.

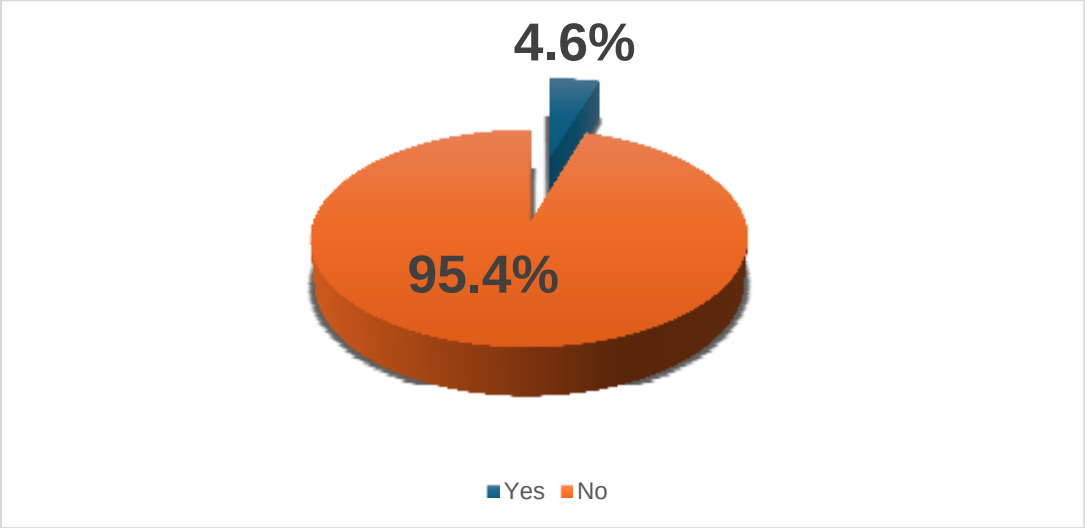

Figure 3: Frequency and percentage distribution of the studied patients according to the incidence of pneumonia (N=87)

Figure (3): presents that the incidence of pneumonia 4.6% of the studied patients had stroke-associated pneumonia compared to 95.4% of them didn't have stroke-associated pneumonia.

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Table 3: Relations between incidence of dysphagia and incidence of pneumonia among the studied patients (n=87).

		Incidence of pneumonia				Chi-square	P-Value
		Yes		No			
		N	%	N	%		
Incidence of dysphagia	Yes	3	3.4	32	36.8	9.108	0.04*
	No	1	1.1	51	58.6		
Severity of dysphagia	Slight	0	0	56	64.3	10.398	0.01*
	Moderate	0	0	6	6.9		
	Severe	4	4.6	21	24.1		

*** Significant P ≤ 0.05**

Table (3): shows that there were statistically significant relations between the incidence of pneumonia and both the incidence of dysphagia and its severity with a P value (0.04, 0.01) respectively.

Table4: Correlation between early dysphagia screening and incidence of stroke-associated pneumonia among the studied patients (N=87).

Items	Early Dysphagia Screening	
	Correlation coefficient (r)	P-Value
Incidence of stroke-associated pneumonia	0.620	0.002**

*** * Highly significant P ≤ 0.001**

Table (4) shows that there was a positive correlation between early dysphagia screening and the incidence of stroke-associated pneumonia among the studied patients (P = 0.002).

Discussion

As regards the studied patients' age, the present study showed that more than half of the studied patients were aged between 51 and 60 years, with a mean age of 48.5 ± 9.1. According to the investigator's perspective, these findings may be due to stroke event rates increasing substantially in the oldest age groups. These findings are in the same line with a published study done by **Eltringham et al. (2020),** about **"**Factors associated with risk of stroke-associated pneumonia in patients with dysphagia" and reported that most of the study and control group ranged between 51 and less than 60 years old.

Concerning gender, the current study revealed that the majority of the studied patients were males. From the investigator's point of view, this may be explained as men are more likely to engage in behaviors that increase the risk of stroke than female patients such as smoking, excessive alcohol consumption, and leading a sedentary lifestyle. These behaviors can lead to conditions like hypertension, diabetes, and high cholesterol,

which are major risk factors for stroke. This finding is in agreement with a study done by **Elsyaad et al. (2022),** titled "Early assessment of aspiration risk in acute stroke by fiberoptic endoscopy in critically ill patients" they found that there was an increased percentage of stroke incidence in males more than in females. While these study results in disagreement with **Abd El-Hamid et al. (2021),** who conducted a study about **"**Effect of early dysphagia screening, feeding strategies and oral care on occurrence of stroke associated pneumonia among critically ill patients with acute stroke" and stated more than half of the study and control group were females.

Regarding length of hospital stay, the finding of the current study reported that about two-thirds of the studied patients had a hospital stay ranging from 1 to 5 days, with a mean age of 4.03 ± 2.45. From the investigator's point of view, this finding was because the presence of dysphagia increased the hospital stay to 9 days. While stroke patients who have dysphagia and pneumonia their hospital stay increased to 30 days. The result from the current study is consistent with **Ding (2021),** published study about" dysphagia incidence and comorbidity in hospitalized acute stroke patients" which stated that stroke patients with dysphagia had double the length of stay than those without dysphagia; with the comorbid conditions of dysphagia and pneumonia, the hospital stay tripled.

Regarding the duration between admission and dysphagia screening, this study results mentioned that more than two-thirds of the studied patients had the dysphagia screening within 0-4 hours of admission. The mean duration between admission and the dysphagia screening was 4.6 ± 2.94 hours. Regarding the investigator's perspective, conducting dysphagia screening tests soon after patient admission to initiate appropriate intervention. This finding is similar to a published study done by **Abd El-Hamid et al. (2021),** which concluded that the duration between admission and dysphagia screening was more than two-thirds of the study group were screened for dysphagia during the first four hours of admission.

As regards the history of chronic diseases, the current study found that more than two-thirds of studied patients had chronic illnesses, and more than one-third of them had hypertension. Regarding the investigator's perspective, these findings may be due to stroke event rates increasing substantially in people with risk factors such as atherosclerosis, hypertension, diabetes, and heart conditions. these results are consistent with a study conducted by **Ghoreishi et al. (2024)** "The incidence of dysphagia in acute stroke patients a study on influential factors and 3-oz water test" and reported that more than two-thirds of stroke patients had hypertension and diabetes.

Additionally, the finding of the current study revealed that the most encountered stroke type among studied patients was ischemic stroke. From the investigator's perspective, this could explain as ischemic stroke often results from atherosclerosis. As people age, atherosclerosis becomes more common, increasing the risk of ischemic stroke; consequently, as mentioned above more than half of the studied patients were aged between 51 and 60 years. This finding is congruent with **Chang et al. (2022),** in their study about "The relationship between dysphagia and pneumonia in acute stroke patients: a systematic review and meta-analysis" and reported that the majority of patients had an ischemic stroke. As well as similar finding was documented by **Salvadori et al. (2020)**, who illustrated that more than two-thirds of patients had an ischemic stroke while more than one-third of them had a hemorrhagic stroke.

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Helwan International Journal for Nursing Research and Pratctice
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Considering the incidence of dysphagia, the current study reported that more than one-third of studied patients have dysphagia. From the investigator's perspective the high prevalence of this condition emphasizes the need for routine screening and assessment; also, identifying dysphagia early is crucial for stroke patients. These findings are supported by **Boaden et al. (2021)** in their study about **"**Screening for aspiration risk associated with dysphagia in acute stroke" and found that less than half of studied patients have moderate and severe dysphagia.

On the other hand, this finding contrasts with **Elsyaad et al. (2021)** who conducted a study about "Early assessment of aspiration risk in acute stroke by fiberoptic endoscopy in critically ill patients" and revealed that more than two-thirds of studied patients had dysphagia while less than one-third of them had no dysphagia. As well as these results were also inconsistent with a study conducted by **Ghoreishi et al. (2024)** who reported that more than half of the studied patients had dysphagia.

By evaluating the dysphagia severity, this study results showed that less than one-fifth of the studied patients had slight and moderate dysphagia, while more than two-thirds had severe dysphagia. From the investigator's point of view, these findings may be because the severity of dysphagia is associated with the severity of stroke, old age, and the presence of chronic illness. The findings of the current study are in agreement with **Abd El-Hamid et al. (2021)** who reported that more than one-quarter of the study and control group had moderate dysphagia, and more than two-thirds of the study and control group had severe dysphagia.

Regarding the incidence of pneumonia, the current study illustrated that the minority of the studied patients had stroke-associated pneumonia. These findings may be associated with early dysphagia screening in the management of acute stroke patients. A similar finding was documented by **Teuschl et al. (2022)** about "systemic dysphagia screening and dietary modifications to reduce stroke-associated pneumonia rates in a stroke unit" and reported that a minority of the studied patients developed SAP after GUSS screening. As well as similar findings supported by **Arnold et al. (2019)** in their study about "Dysphagia in acute stroke: incidence, burden and impact on clinical outcome" and stated that patients with dysphagia had a much higher risk for pneumonia as compared to patients with normal swallowing in their study, which may further increase the hospitalization costs.

Concerning the relations between the incidence of dysphagia and the incidence of pneumonia among the studied patients, the current study showed that there was a statistically significant relation between the incidence of pneumonia and both the incidence of dysphagia and its severity. From the investigator's point of view, this may be due to early detection of PSD fostering prophylactic strategies against aspiration such as a nil-per-os status, nasogastric tube feeding, and dietary modifications thereby reducing aspiration and hence the rate of SAP.

These findings are supported by a study done by **Palli et al., (2020),** about **"**Early dysphagia screening by trained nurses reduces pneumonia rate in stroke patients: a clinical intervention study" who found that the training of nurses to perform GUSS in acute stroke patients lead to a significantly lower rate of SAP compared with standard dysphagia testing by the speech-language therapist during routine working hours only.

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As regards to correlation between early dysphagia screening and the incidence of stroke-associated pneumonia among the studied patients, the study results revealed that there was a positive correlation between early dysphagia screening and the incidence of stroke-associated pneumonia (p= 0.002). According to the investigator's perspective, it can be explained that patients with dysphagia have a higher risk of aspiration pneumonia, and early screening can help mitigate this risk. Besides dysphagia screening and its timely management are critical factors in reducing the incidence of pneumonia among stroke patients.

The same results were supported by **Banda, et al (2022),** in their recent studies titled "Prevalence of dysphagia and risk of pneumonia and mortality in acute stroke patients: a meta-analysis" and reported that dysphagia significantly has a positive correlation with the development of pneumonia after stroke. Similarly, **Chang et al., (2022)**, conducted a study about "The Relationship between dysphagia and pneumonia in acute stroke patients: a systematic review and meta-analysis" The results revealed that the incidence of pneumonia was significantly higher in the dysphagia group than in the non-dysphagia group.

Conclusion

Based on the findings of the present study, it can be concluded that:

More than one-third of the studied patients had dysphagia, and a minority of the studied patients had stroke-associated pneumonia. There was a statistically significant relation between the incidence of pneumonia among the studied patients and both the incidence of dysphagia and its severity. There was also a positive correlation between the incidence of dysphagia and the incidence of pneumonia among the studied patients.

Recommendations

Based on the findings of the present study, the following recommendations were suggested:

- Implement routine early dysphagia screening protocol for acute stroke patients in other hospitals using GUSS before oral intake and within the first 24 hours after admission.
- Conduct regular assessments of swallowing function in stroke patients throughout their hospital stay. This will allow timely adjustments to feeding strategies and nutritional support to prevent complications.

Recommendations for further studies:

- Replication of the study on a larger sample acquired from different geographical areas for generalization of the findings.
- Evaluate the effect of implementing various dysphagia management strategies in reducing the incidence of SAP.
- Effect of implementing initial stroke care bundle to prevent SAP.

References:

1. **Abd El-Hamid, S., Ahmed, N., Ahmed, I., & Abd El-Fattah, F. (2021).** Effect of early dysphagia screening, feeding strategies, and oral care on the occurrence of stroke-associated pneumonia among critically ill patients with acute stroke. *Alexandria Scientific Nursing Journal*, *23*(2), 52–64. https://doi.org/10.21608/asalexu.2021.219102

2. **Abdelmonem, S., Zaytoun, T. M., & Elabd, M. A. (2021).** Outcome predictors after acute stroke in Egyptian patients admitted to the ICU (OPASEP study). Research and Opinion in Anesthesia and Intensive Care, 8(4), 212. https://doi.org/10.4103/roaic.roaic_30_21
3. **Arnold, M., Liesirova, K., Broeg-Morvay, A., Meisterernst, J., Schlager, M., Mono, M. L., El-Koussy, M., Kägi, G., Jung, S., & Sarikaya, H. (2019).** Dysphagia in Acute Stroke: Incidence, Burden and Impact on Clinical Outcome. *PloS one*, *11*(2), e0148424. https://doi.org/10.1371/journal.pone.0148424
4. **Banda, K. J., Chu, H., Kang, X. L., Liu, D., Pien, L.-C., Jen, H.-J., Hsiao, S.-T. S., & Chou, K.-R. (2022).** Prevalence of dysphagia and risk of pneumonia and mortality in acute stroke patients: A meta-analysis. *BMC Geriatrics*, *22*(1). https://doi.org/10.1186/s12877-022-02960-5
5. **Bayeh, T., Wassie, G., & Muluneh, E. (2022).** Incidence and Predictors of Aspiration Pneumonia among Stroke Patients in Western Amhara Region, North-West Ethiopia: A Retrospective up-Follow. Research Square. Retrieved March 19, 2023, from https://www.researchgate.net/publication/362018844_. Last accessed 16-3-2023
6. **Boaden, E., Burnell, J., Hives, L., Dey, P., Clegg, A., Lyons, M. W., Lightbody, C. E., Hurley, M. A., Roddam, H., McInnes, E., Alexandrov, A., & Watkins, C. L. (2021).** Screening for aspiration risk associated with dysphagia in acute stroke. *The Cochrane database of systematic reviews*, *10*(10), CD012679. https://doi.org/10.1002/14651858.CD012679.pub2
7. **Chang, M. C., Choo, Y. J., Seo, K. C., & Yang, S. (2022).** The relationship between dysphagia and pneumonia in acute stroke patients: A systematic review and meta-analysis. *Frontiers in Neurology*, (*13),* 834240 https://doi.org/10.3389/fneur.2022.834240
8. **Ding. R, (2021).** Dysphagia Incidence and Comorbidity in Hospitalized Acute Stroke Patients. Int J Cerobrovasc Dis Stroke 4: 140. DOI: https://doi.org/10.29011/2688-8734.000041
9. **Elsyaad, M. S., Fayed, A. M., Megahed, M. M., Hamouda, N. H., & Elmenshawy, A. M. (2022).** Early assessment of aspiration risk in acute stroke by fiberoptic endoscopy in critically ill patients. *Acute and Critical Care*, *37*(3), 276–285. https://doi.org/10.4266/acc.2021.01375
10. **Eltringham, S. A., Kilner, K., Gee, M., Sage, K., Bray, B. D., Smith, C. J., & Pownall, S. (2020).** Factors Associated with Risk of Stroke-Associated Pneumonia in Patients with Dysphagia: A Systematic Review. *Dysphagia*, *35*(5), 735–744. https://doi.org/10.1007/s00455-019-10061-6
11. **Farpour, S., Asadi-Shekaari, M., Borhani Haghighi, A., & Farpour, H. R. (2023).** Improving Swallowing Function and Ability in Post Stroke Dysphagia: A Randomized Clinical Trial. *Dysphagia*, *38*(1), 330–339. https://doi.org/10.1007/s00455-022-10470-0
12. **Ghoreishi A, Artishedar S, Hadiloo K, MalekMahmoudi G, Alvwandi F. (2024)**. The incidence of dysphagia in acute stroke patients, a study on influential factors and 3-OZ Water Test. *Research Square.* DOI: 10.21203/rs.3.rs-3948545/v1.
13. **Julier, R. and Benfield, J. K. (2021).** Evaluating the use of oral trials for inpatient dysphagia management: an initial cross-sectional database study. American Journal of Speech-Language Pathology, 30(4), 1793-1804. https://doi.org/10.1044/2021_ajslp-20-00387
14. **Palli, C., Fandler, S., Doppelhofer, K., Niederkorn, K., Enzinger, C., Vetta, C., Trampusch, E., Schmidt, R., Fazekas, F., & Gattringer, T. (2017).** Early Dysphagia Screening by Trained Nurses Reduces Pneumonia Rate in Stroke Patients: A Clinical Intervention Study. *Stroke*, *48*(9), 2583–2585. https://doi.org/10.1161/STROKEAHA.117.018157
15. **Sabry, K. & Moerman, M. (2023).** Normal swallowing and pathophysiology of dysphagia. In B. Kyriakou. K & Moerman, M. (Eds.), *Fast Facts: Neurogenic Dysphagia.* (pp. 18-31). S. Karger Publishers Ltd.
16. **Salvadori, E., Papi, G., Insalata, G., Rinnoci, V., Donnini, I., Martini, M., Falsini, C., Hakiki, B., Romoli, A., Barbato, C., Polcaro, P., Casamorata, F., Macchi, C., Cecchi, F., & Poggesi, A. (2020).** Comparison between Ischemic and Hemorrhagic Strokes in Functional Outcome at Discharge from an Intensive Rehabilitation Hospital. *Diagnostics (Basel, Switzerland)*, *11*(1), 38. https://doi.org/10.3390/diagnostics11010038
17. **Smith, C. J., Kishore, A. K., Vail, A., Chamorro, A., Garau, J., Hopkins, S. J., Di Napoli, M., Kalra, L., Langhorne, P., Montaner, J., Roffe, C., Rudd, A. G., Tyrrell, P. J., van de Beek, D., Woodhead, M., & Meisel, A. (2015).** Diagnosis of stroke-associated pneumonia. *Stroke*, *46*(8), 2335–2340. https://doi.org/10.1161/strokeaha.115.009617
18. **Teuschl, Y., Trapl, M., Ratajczak, P., Matz, K., Dachenhausen, A., & Brainin, M. (2022).** 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
19. **Trapl, M, Enderle,P, Nowotny, M, Teuschl,Y , Matz,K,Dachenhausen, A& Brainin, M, (2007).** Dysphagia bedside screening for acute-stroke patients: the Gugging Swallowing Screen. Stroke, 38, 2948–2952