

Nurses' knowledge about the symptoms, complications and management of eating and swallowing disorders after a stroke in Greek hospitals

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Abstract: Stroke is one of the leading causes of disability and death worldwide. Swallowing disorders are common after a stroke. Although nurses' knowledge and skills in detecting possible dysphagia disorders is an important factor in providing immediate treatment, studies in this area are limited.

Purpose: The purpose of this study is to investigate the knowledge level of nurses about dysphagia in patients after stroke and factors affecting its variation.

Method: A questionnaire was completed by 201 nurses working in hospitals in Northern Greece. The questionnaire included closed-type questions about clinical signs and symptoms, complications and management of dysphagia. Regression analysis was used to investigate predictors that affect the nurses' knowledge level.

Results: The overall knowledge score in stroke patient care concerning feeding and swallowing problems shows a statistically significant positive correlation with 'prior education in patient care after stroke' ($p < 0,01$) and 'care stroke patients who presented feeding and/or swallowing problems' ($p < 0,05$). The most important independent predictor in the variation of the knowledge score, despite the small effect on variation ($R^2 = 0.103$), was 'patient care training after stroke' and the qualification level of the participants.

Conclusions: The results of this study underline the role of nursing continuing education. The implementation of recent research findings and enforcing implementation programs can reduce clinical practice deficits and better care for stroke patients with feeding and swallowing problems.

Keywords: Swallowing disorders, dysphagia, stroke, nurses, education.

1. INTRODUCTION

Stroke is a rapidly growing clinical focal neurological disorder when symptoms last for more 24 hours which can lead to severe handicap or death (Abu- Snieneh & Saleh, 2018). Stroke is the third most common cause of global mortality (6.5 million deaths) but the first reason for disability worldwide (Benjamin et al., 2017). According to the World Health Organization (WHO), there is a marked increase in stroke mortality rates in Greece. This calls for urgent action to be taken and the implementation of direct strategies for prevention, prompt diagnosis and use of optimal treatments (Vasiliadis & Zikić, 2014).

Stroke lesions in the sub-cortical area are the most common cause for swallowing disorders frequently causing a disorder in the flow through the mouth and pharynx (Daniels 2019; Abu- Snieneh & Saleh, 2018). Safe swallowing is the function of the bolus being transported to the stomach while the most common direct complication of dysphagia is when food enters the airway (ASHA, 2016). In addition, dysphagia is characterized with poor food or fluid intake due to a disorder of one or all of the following swallowing stages (Tanton, 2010). The ingestion process is separated in three stages, i.e. oral, pharyngeal and the esophageal phase. Ingestion has three important roles: the taking and transportation of food, production and use of saliva and the protection of lower respiratory tract from invasion. The swallowing movements involved in the oral cavity and the oropharynx differ between the consumption of solid food and liquids (Matsuo & Palmer, 2008).

The safe management of these phases requires accurate coordination of movements from the central nervous system of all related muscle groups including those of the orofacial system. Only at the start of swallowing there is a voluntary control in the phase where the bolus is promoted towards the back of the oral cavity. The remaining performed functions are the swallowing reflex, and the barrier of the respiratory tract i.e. raising and lowering. In surveys that explored the presence of dysphagia after stroke, wide variations in the results are detected. Teasell et al., (2016), argue that the most common symptom after stroke is dysphagia in about 50% of newly diagnosed patients.

Yet, Arnold et al. (2016) diagnosed dysphagia in only 20% of patients who participated in their study and from these 50% continued to have symptoms after hospital discharge with 30% continuing with a nasogastric tube. Furthermore, when a nasogastric tube was used, mortality rates were raised. Ilott et al., (2014), found dysphagia rates to be present in 20-50% of patients after stroke, which often continued for several months.

The above studies reconfirm a wide range in degrees of dysphagia in patients after stroke but all agree that the incidence is high amongst those diagnosed. It is of great importance on patient admission to analyze the potential swallowing problems early into hospitalization and refer the patient promptly in order to ensure adequate oral feeding and hydration. A further warning is when swallowing function is so poorly coordinated food can enter the airway below the level of the vocal folds, making oral feeding dangerous for the patient. Dysphagia, if not treated in time, leads to serious complications such as aspiration problems, choking, malnutrition, dehydration, pneumonia or even death (Jiang et al., 2016).

In recent years, surveys concerning stroke, the accompanied feeding disorders and safe swallowing with relevance to optimum care are increasing (Teasell et al., 2016; Arnold et al., 2016; Jiang et al., 2016). However, in Greece recent applied knowledge in this field is limited and health professionals who care for such patients often find themselves in a conflicting clinical position. A specialized speech therapist or nurse could effectively contribute to dealing with the above disorders. Clinical assessment by qualified professionals plays an important role in patient evaluation and prognosis by determining the type of dysphagia, i.e. the stage of swallowing in which the disorder and its severity may affect the course of patient treatment and rehabilitation (A. Ricci Maccarini, et al., 2007).

However, when a speech therapist is unavailable in a hospital, nurses are the ones who are called upon to face the difficulties that arise and to make appropriate decisions as they have direct and continuous contact with the patient throughout the day. For this reason, it is important for all nurses to have some sound knowledge on the symptoms, complications and safe management of feeding and swallowing disorders in patients after a stroke.

According to Malfitano et al. (2013) the role of a specialized nurse is to define the care interventions and treatment strategies in the best interest of the stroke patient, including the education of other directly involved healthcare professionals on risk management, medication, and symptoms or clinical signs.

A safe and sufficient feeding protocol should be established ensuring the necessary nutrients and providing the required safety strategies during feeding. This is essential to provide the necessary help and reassurance for a patient with swallowing disorders and reduce the possibility of a significant respiratory burden. Research results indicate that it would be beneficial to control dysphagia early in all patients after a stroke, especially before taking anything by mouth, including medication. Until checking for dysphagia is completed, this is particularly critical for preventing future complications. Thus, the patient should remain in total fasting mode and should have high priority for early specialized healthcare initiatives (Tanton, 2010; Donovan et al., 2012; Martino, Maki & Diamant, 2014).

Deborah et al. (2003) showed that the risk of pneumonia is less in patients who have passed over these precautions phases but rather greater in those who only passed a simple swallowing control test. This way, it is possible to prevent complications such as pneumonia, prolonged hospitalization or even death. Targeted detection of the feeding disability and swallowing difficulties in patients after stroke should be considered a significant priority on admission due to the high risks involved.

In this context, nurses can play a decisive role in patient safety with dysphagia after stroke, so the investigation of their knowledge on the symptoms of patients with dysphagia, the identification of complications that may occur, and their proper management was the primary concern of this study.

Aim

The main objectives of the study were to assess the nurses' knowledge level in feeding or swallowing disorders in Greece and the exploration of possible reasons that could interpret the variation of this level.

Design

A cross-sectional descriptive design was used. This was considered the most appropriate as it is commonly used in the investigation of research fields in which there is insufficient empirical evidence (Burns & Grove, 2001).

Population, sample and selection criteria

The target population consisted of all clinical nurses working in public hospitals in northern Greece (i.e. 5232) and in all clinical fields of nursing staff. These included: nurses, permanent employees or part-time, and nurses with administrative jurisdiction (heads or deputy heads) as they are also considered to participate in the immediate care of patients. The exclusion criteria were the absence of a nursing qualification (i.e. other specialties, or nursing students). Assistant nurses, although often involved in direct patient care in Greece, were also excluded as they are closely supervised by a staff nurse because they do not have the same theoretical background as staff nurses. The final sample consisted of 201 nurses working in the above mentioned areas.

Research instrument

After exploring the relevant literature for post-stroke dysphagia, the Rhoda & Pickel-Voight (2015) questionnaire was selected. The tool consists of 30 closed questions, in three sub-groups and has been already tested for content and face validity by experts on the subject. Its reliability has also been tested by the test-retest method with satisfactory results (intra-class correlation coefficient >0.7). With the creator's permission, the questionnaire was translated into Greek by two bilingual health professionals. Backward translation into English and comparison with the original version was made and minimal cultural and language differences were considered acceptable. The Greek version of the final questionnaire was piloted on 15 nurses and only a few final minor linguistic corrections were made. The resulting knowledge questionnaire is divided into three thematic subgroups of questions related to:

- (a) knowledge of clinical signs or symptoms of dysphagia (13 questions)
- (b) direct complications of feeding and swallowing (10 questions) and
- (c) management of feeding - swallowing disorders (7 questions).

A content validity test on the Greek version of the questionnaire using the Content Validity Index (CVI) from experts specialized in this the research subject was performed. According to Polit, Beck & Owen (2007) CVI is the most appropriate validity test in nursing research. Four senior nurse experts were asked to evaluate the questionnaire's relevance

using a 4-point Likert scale at question level (1= relevant, 2= somewhat relevant, 3= relevant, 4= extremely relevant). Thus, these experts (two academics with research experience, a clinical nurse at doctoral level, and one with high clinical and research experience) participated in this process and helped refine the questionnaire. After calculating the CVI of each question, the final mean CVI score was 0.942 and this is considered to be acceptable (Lynn, 1986). A reliability test-internal consistency evaluation was also carried out by the Cronbach coefficient calculation. The final data collection form contained a total of 40 questions in two parts. The first part contained 10 demographic questions (i.e. age, level of study, clinical area, overall professional experience, as well as general questions about their experience and education. The second part (30 questions) was the Greek version of the Rhoda & Pickel-Voight Knowledge Questionnaire as fine-tuned in the above mentioned procedure. The maximum score (i.e. =30) was determined as the sum of each question providing one point to each correct answer and zero points to each wrong answer or "I do not know" answer (Park et al., 2011). The level of knowledge was classified as 'low', 'moderate' and 'high', with total score 0 to 15, 15 to 22.5 and 22.5 to 30, respectively.

Data collection

The study was carried out via the Internet by using a specific web-based link to a relevant licensed website, i.e. the 'Hellenic Regulatory Body of Nurses'. The link led to a specially configured question form tool. The survey lasted from April 15 to May 15, 2020. The questionnaire was self-completed, anonymous and free of personal data from which the identity or workplace of the participants could be identified. Participation was voluntary and contained explicit acceptance of the study's content on the part of the respondents with confidentiality assured.

2. STATISTICAL ANALYSIS

For the statistical analysis the IBM Statistics SPSS V25© program was used. The level of statistical significance was set at $p < 0.05$. Mean values and standard deviations were used in order to describe the quantitative variables. The main depended variable was set as the total score of knowledge. A regression analysis was conducted with the independent variables being the demographic features and that gave interpretation for the variation in the level of knowledge.

3. RESULTS

In total, 206 questionnaires were collected and 201 were considered valid to be analyzed. The largest percentage of the sample (30.8%) was of 31-40 years (N=62), 73.6% (N=148) were registered nurses with a university degree, 24.9% (N=50) had a postgraduate degree and 1.49% (N=3) possessed a doctoral title. The larger group of the sample 36.3% (N= 73) worked in medical wards while 65.2% (N=131) were nurses with more than 10 years of clinical experience. Table 1 below shows the demographic characteristics of the sample.

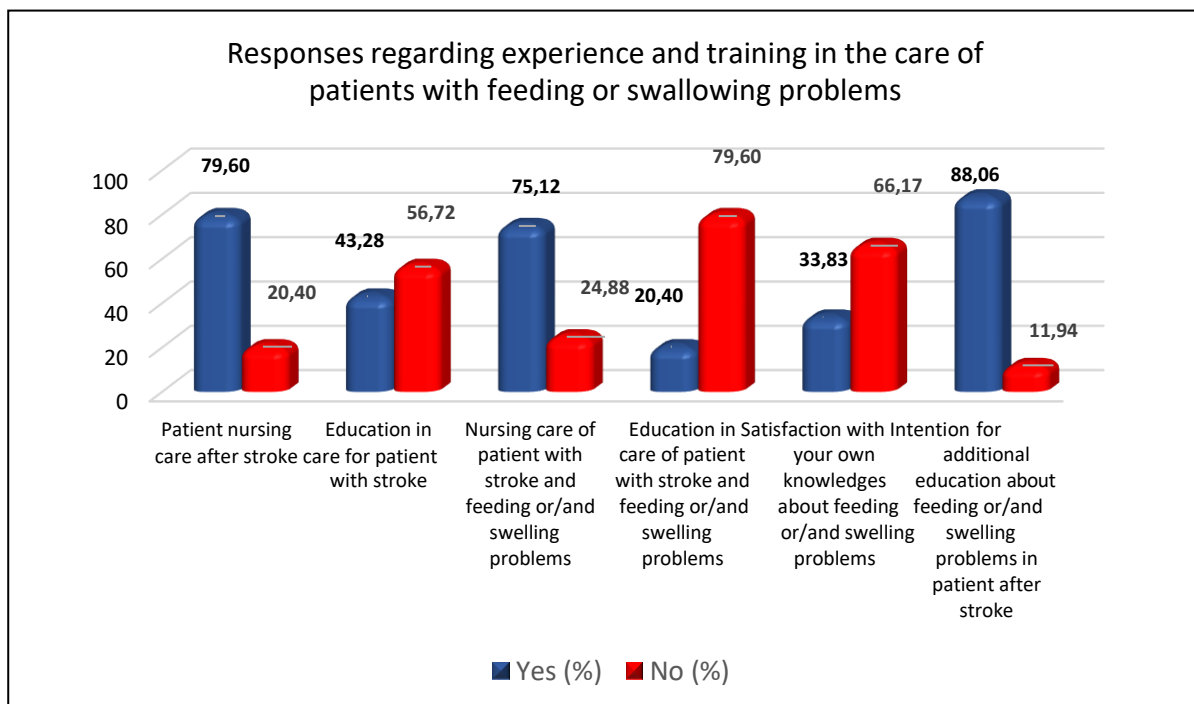
Table 1. Demographic characteristics of the sample

Variables	Frequency (N)	Percent (%)	
Age	21-30	32	15.9
	31-40	62	30.8
	41-50	57	28.4
	51-60	50	24.9
	Total	201	100
Qualification	University/diploma	148	73.6
	Msc level	50	24.9
	PhD level	3	1.5
	Total	201	100
	Medical ward	73	36.3
	Neurology department	9	4.5
	Cardiology department	11	5.5

Work at	ICU	18	9
	Emergency Department	13	6.5
	Surgical department	35	17.4
	Other	42	20.9
	Total	201	100
Experience (years)	0-3	29	14.4
	4-6	22	10.9
	7-9	19	9.5
	10+	131	65.2
	Total	201	100

79.6% (N= 160) had been involved in taking care of stroke patients while only 43.3% (N=87) has received a relative training. The same condition also applied to feeding and swallowing problems, while the desire for more training was 88.1% (N=177). Graph 1 below shows the relevant sample responses.

Graph 1. Sample responses regarding experience and training in stroke patient care with feeding or swallowing problems (%).



Knowledge level

The internal consistency of the questionnaire was carried out via the Cronbach coefficient and was considered satisfactory (Cronbach's A = 0.776). None of the questions had a significant impact on the coefficient after its removal (Max Cronbach's Alpha IF ITEM Deleted = 0.784). The average score across the sample was 18.75±4.28 SD, (Graph 2 and Table 2) and did not follow the normal distribution (p<0.05). Table 3 shows the correct answers of the sample (frequencies, rates) per question (n, %).

Graph 2. Participants’ total score and subscores means on their knowledge of dysphagia.

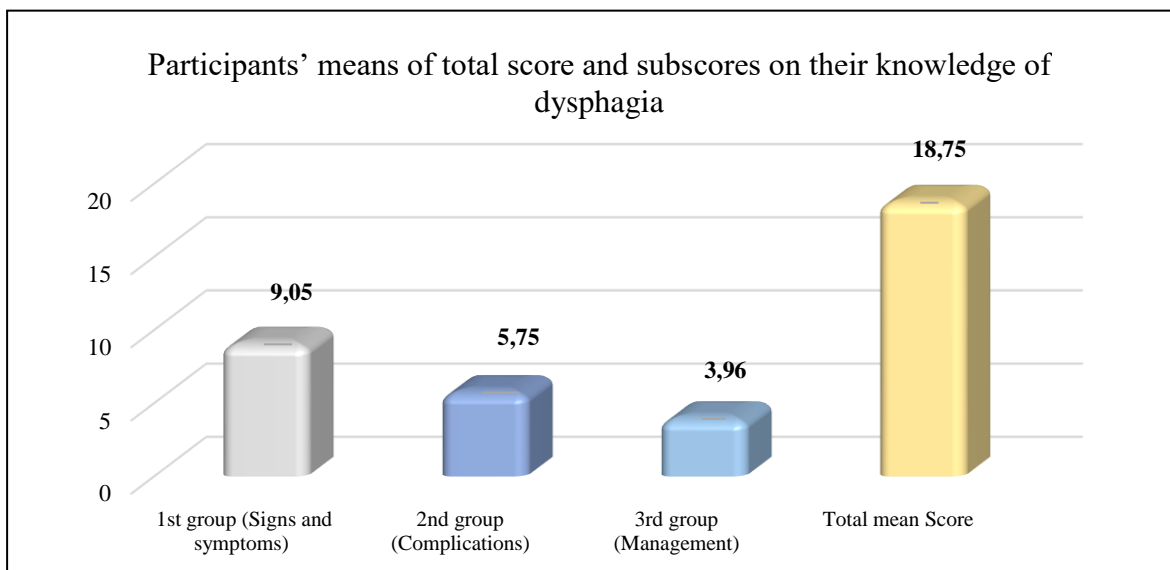


Table 2. Dispersion measures of subgroups of knowledges and the overall score.

Answers	Signs and symptoms)	Complications	Management	Total Score
N	201	201	201	201
Mean	9,05	5,75	3,96	18,75
Median	10	6	4	19
Mode	11	6	1	22
Std. Deviation	2,275	1,578	2,074	4,283
Variance	5,178	2,49	4,303	18,348
Range	13	8	7	21
Minimum /Maximum	0/13	1/9	0/7	5/26

Table 3. Participants’ responses on their knowledge of signs and symptoms (Q1-13), complications (Q14-23) and management of dysphagia (Q24-30).

	Items	Correct responses (N)	%
Signs and symptoms			
Q1	Coughing whilst eating.	183	91.0
Q2	Skin irritations.	85	42.3
Q3	Feeling of food getting stuck in the throat.	184	91.5
Q4	Choking on saliva during non-mealtimes.	167	83.1
Q5	Poor movement of the tongue	175	87.1
Q6	Food remains in the mouth	177	88.1
Q7	Poor chewing.	176	87.6
Q8	Patients always cough if they aspirate.	133	66.2
Q9	Difficulty closing lips.	51	25.4
Q10	Weight loss.	135	67.2
Q11	Frequent throat clearing after swallowing.	152	75.6
Q12	Hoarse voice.	124	61.7
Q13	Chest pain.	77	38.3
Complications			
Q14	Increased mortality	130	64.7
Q15	Pneumonia	142	70.6
Q16	Anaphylactic shock	75	37.3
Q17	General weakness	145	72.1

Q18	Problems with digestion	197	98.0
Q19	Aspiration	9	4.5
Q20	Dehydration	169	84.1
Q21	Sudden heart attack	50	24.9
Q22	Malnutrition	176	87.6
Q23	Haematemesis	62	30.8
Management			
Q24	Patients with a feeding tube need daily oral hygiene (mouth washing and brushing of the teeth).	188	93.5
Q25	Thickened liquid should be avoided.	58	28.9
Q26	Watery liquids are the safest substances to drink.	67	33.3
Q27	All patients with difficulty in swallowing need a feeding tube.	87	43.3
Q28	The best position whilst feeding the patient is when the patient lies flat on his back.	153	76.1
Q29	The patient can always eat normal hospital food.	135	67.2
Q30	Feeding tube is only indicated in patients with impaired consciousness.	107	53.2

Exploring the relationship of the overall knowledge score showed a statistically significant positive correlation with ‘prior education in patient care after stroke’ ($p < 0.01$) and with ‘patient care with stroke showing feeding and/or swallowing problems’ ($p = 0.023$). A linear regression analysis was used to investigate the demographic features that may explain independent variables and the variation of knowledge scores. The analysis showed that, despite a small effect on the variance ($RSquare = 10.3\%$) of the knowledge score, the most important predictors with a positive statistically significant correlation were ‘training in patients after stroke’ and the qualification level (Table 4).

Table 4. Multiple regression. Dependent variable: Total Knowledge Score

Model		Coefficients ^a						
		Unstandardized Coefficients		Standardize d Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	15.692	1.397		11.236	0.000	12.937	18.446
	Qualification_Level s (Diploma, Msc/PhP)	1.519	0.672	0.57	2.262	0.025	0.195	2.843
	Hospital Unit	-0.092	0.124	-0.053	-0.745	0.457	-0.337	0.152
	Total experience time (years)	-0.024	0.273	-0.006	-0.089	0.929	-0.562	0.513
	Care experience in patients with stroke	-0.483	1.046	-0.046	-0.462	0.645	-2.547	1.581
	Special education in patients with stroke	2.189	0.631	0.254	3.468	0.001	0.944	3.433
	Care experience in patients with stroke and dysphagia problems	1.469	0.960	0.149	1.531	0.127	-0.423	3.362
	Special education in patients with stroke and dysphagia problems	-0.468	0.767	-0.044	-0.610	0.542	-1.980	1.044

4. DISCUSSION

Dysphagia is a frequent problem after stroke that requires immediate attention in order to avoid complications that will delay the patient's recovery. This study was conducted in order to investigate the level of knowledge of clinical nurses in swallowing disorders. The results revealed a moderate level of knowledge about the clinical signs, symptoms of dysphagia and the management of its complications.

The review of the international literature has shown that improved patient outcomes are interrelated with higher numbers of nursing staff, the highest skill mix, the highest level of nursing training and specialization in each healthcare sector (Lankshear, Sheldon & Maynard, 2005).

In Greece there is a lack of data on the distribution of nursing resources and their specific characteristics (i.e. geographic, sectoral, age-based, educational level, specialized skills, etc.) while existing data is extracted by multiple sources, with different collection methodologies and without frequent updates making it difficult to provide an accurate picture of care (Tziallas et al., 2018).

According to this paper's results, a large number of nurses (79.6%) said they had previous experience caring for stroke patient. Yet, only 43.3% had received a formal training on stroke care.

In addition, 75.1% of nurses said they had taken care of a patient after stroke that presented with swallowing problems. At the same time, the majority (79.6%) stated that they had not received any formal training in dealing with swallowing difficulties for a patient with stroke.

In a study carried out by Tourangeau, et al. (2002) in 75 hospitals in Canada investigating the nursing variables that effect the mortality rates in stroke patients, a strong correlation between mortality and high degree of nursing skills was found. Moreover, the largest percentage of the respondents, stated that they did not feel satisfied with their knowledge on swallowing disorders and the overwhelming majority (88.1%) needed extra specialization and further training.

Therefore, despite the willingness for specialized knowledge, there are practical issues, such as general access to seminars, training or continuing postgraduate programs.

In our study, the level of nurses' knowledge was moderate both in total and also in the three subgroups of questions. Similar results were found in the Rhoda & Pickel-Voight (2015) survey. However, in the literature there is a longstanding lack of debate on the skills and specific skills required by nurses working on the rehabilitation of patients after stroke (Nolan & Nolan 1998).

In the first question group, clinical signs and symptoms of dysphagia, a large percentage agreed that coughing during the feeding process and the feeling of food 'stuck' in the neck are both visible and concrete signs of swallowing disorders.

It is also noteworthy in responses associated with silent aspiration that only 50% knew that a patient may not always cough when he/she aspirates but still may be in grave danger. However, in the second subgroup of questions, a large percentage of nurses recognized pneumonia and aspiration problems as direct complications of feeding disorders.

Aspiration typically causes the release of the cough reflex. However, if sensation has been disturbed, a silent aspiration without coughing or throat clearing is observed. Because of this complication, not been recognized, it is possible to cause respiratory distress with negative consequences for the patient's condition.

Additionally, a large proportion of nurses are aware of the risk of dehydration (84.1%), malnutrition (87.6%) and generalized weakness (72.1%) that the patient may experience. Yet, the corresponding proportion of correct answers in the question about the increased mortality rate observed in this patient category was smaller (64.7%). In the third question subgroup, i.e. management of feeding- swallowing disorders, the results also indicated a moderate level of knowledge, which was even lower (56.5%) compared to the other two subgroups.

Although nurses surveyed agree that patients on nasogastric feeding need daily oral hygiene, almost one in two nurses believe that a feeding tube is only appropriate for patients with loss of consciousness.

The answers of the respondents show some gaps in information about alternative ways of feeding through a nasogastric tube. The need for education in management, safety and feeding effectiveness of dysphagic patients with nasogastric tube as well as a defined protocol on the placement and safety of the nasogastric tube, is confirmed by Mahoney et al. (2015).

A remarkable 32.8% of the sample responded incorrectly when asked when a patient is able to eat routine hospital food. The majority of patients with severe dysphagia are unable to eat meat or hard foods safely, and soft foods are often recommended initially (Palmer et al., 2000).

Regarding the food and fluids recommendation that patients with dysphagia should receive, it seems that there was poor comprehensive training as only 28.9% of the participants answered correctly for the greater safety provided by viscous liquids and only 33.3% recognized the danger posed by thin liquids respectively.

Yet, often, a patient can receive adequate hydration through thin or viscous fluids. However, there is a possibility that in case of risk of aspiration, hydration should be limited to a viscous form, i.e. soft pudding (Palmer et al, 2000). The lack of specialized skills in nurses caring for patients after stroke has been highlighted in the international literature (Booth et al., 2001), and this demonstrates the need for all nurses to develop the skills to be able not only to decide when to intervene but also to way to do it correctly (O'Connor 2000).

Hence, although data are limited, there is a lack of knowledge about the documented care of stroke and corresponding swallowing difficulties. There is a need for specialized knowledge and training opportunities for nursing educators and clinical nurses to bridge the gap between theoretical background and clinical practice. Only in this way will optimal treatment be provided to patients who have undergone stroke (Harper, 2007).

Our findings suggest that the level of knowledge has a statistically significant correlation with education in the care of patients after stroke ($p < 0.01$). However, results regarding training on feeding-swallowing disorders and the level of knowledge presented with no statistically significant correlation. This is probably due to the content of education regarding eating-swallowing disorders, which is limited in Greece but also the way in which this training is provided. In addition, the results show that the experience of caring for a stroke patient and feeding-swallowing problems were correlated with the level of knowledge - although this experience was not confirmed as an independent variable for the knowledge score variation. Nurses who provide care to patients with eating and / or swallowing disorders seem to have gained more experience in terms of complications that may arise and their management. An additional study with a more representative sample and by detecting more independent factors that affect nurses' knowledge could explore the role of nurses further.

5. CONCLUSION

The contribution of nurses in the recognition of feeding-swallowing disorders in patients after stroke is valuable for the course of patients' recovery. In addition, they could enhance collaboration with speech therapists, who need to be informed, monitor and contribute to patient treatment on a daily basis for the rest of their hospital stay. According to the findings nurses possess a moderate level of knowledge regarding eating-swallowing disorders. It is obvious that there is room for knowledge enhancement and better clinical training. Yet, a more representative and thorough study could show specific deficits, ways of implementing the appropriate education and also a possible need for more education at a postgraduate level related to patient care after stroke.

This study highlights the valuable role of nurses and the need for better utilization of nursing resources and practical skills in order to enhance the rehabilitation of patients with eating-swallowing disorders after stroke. In this context, continuing support is to be provided not only for those suffering from stroke but also the nurses, in order to contribute to the best possible outcomes for the swift rehabilitation of such patients.

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