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MEASURING KNOWLEDGE OF JORDANIAN NURSES WORKING IN CRITICAL CARE UNITS TOWARD STROKE PATIENTS

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ABSTRACT

Background: Stroke is a devastating disease. It is a major cause for the neurological admission to hospitals all over the world. Limited knowledge among the critical care nurses about stroke in general and specifically about the risk factors, signs, and symptoms of stroke usually is a main source of delayed prompt stroke management and non-compliance with follow-up rehabilitation. Therefore, there is a need for a study that examines the impact of these factors in order to promote stroke management and improve nursing care outcomes.
Aim: This study aimed at measuring the knowledge of Jordanian nurses working in critical care units toward stroke patients.
Methods: This cross-sectional study used the descriptive approach in order to measure the knowledge of the Jordanian nurses working in critical care units regarding stroke patients in the Jordanian hospitals. Data were collected from Jordanian critical care units' nurses from seven hospitals; five private and two public hospitals. Critical care units' nurses were selected conveniently based on specific inclusion criteria. Eligible participants were required to complete self–reported questionnaires about knowledge in addition to completing demographic questionnaires. The descriptive and inferential statistics were conducted using the SPSS software.
Results: A total of (200) Critical care units' nurses from public and private hospitals participated in the study. The nurses in this study exhibited poor knowledge on the study scales. There were statistically significant differences among nurses according to the type of hospital on the one scales (P< .05). There is a negative relationship between the knowledge and years of nursing practice in ER or ICU (P= .013).
Conclusion: The measures of knowledge among the nurses in critical care units in the Jordanian hospitals towards stroke patients seem to be highly poor. Nurses in critical care units seem to have acceptable information, but inadequate to correctly enhance stroke awareness. There is a gap that should be stuffed via planning and implementation of educational and instructional programs focused on hospital nurses as well as community sectors in order to improve the stoke focus and experience and avoid the delay in accessing the medical help which would, in return, improve stroke management and reduce its effect in Jordan.

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Introduction. The prevalence of stroke among general population has increased over the past few decades (Jordan high health council, 2018). As a result, nurses provide specialized care to patients suffering from stroke more frequently. Critical care nurses (CCNs), including nurses working in the

emergency departments, receive stroke patients, who are either newly diagnosed or under investigation (Mason, Rideway & Barton, 2013). Among the concerns at this point is the level of knowledge about stroke, which influences how nurses provide their care to this type of patients. It is, therefore, important to emphasize the need of nurse educationists to prepare nurses to care for patient with stroke. This study aimed to measuring the knowledge of nurses working in critical care units toward hospitalized stroke patients in Jordan.

The magnitude of the problem of stroke is very high and requires raising awareness among nurses in Jordan and other parts of the world. A stroke occurs approximately every 40 seconds and one person dies from a stroke approximately every four minutes in the United States (Niemi, McErlane, &Tillett, 2013). Stroke is the fifth leading cause of death in the United States (Stroke Organization, 2015). In addition, stroke is a leading cause for serious long-term disability in the United States. Over 4 million individuals in the United States are living today with the effects of a stroke (Stroke Organization, 2015).Reports show that 17 million people die from heart attacks and strokes worldwide with approximately 11.569.538 events of incident ischemic stroke (63% in low and middle-income countries), and 5.324.997 events of incident hemorrhagic stroke (80% in low-income and middle-income countries) in 2010 (Krishnamurthi et al., 2013). In the USA, Stroke is the fourth leading cause to death and disability in elderly with an estimated cost of US$73.7 billion in 2010 alone (Mosca et al., 2011). According to the association of neuroscientists, brain stroke is the third leading cause to death in Jordan, accounting for 12% of deaths making it among the most prevalent conditions causing major disabilities and deaths (Jordan high health council,2018).

The common issue among stroke patients in the intensive care unit (ICU) is the unstable condition, which may lead to life threatening as well as a more serious situation. Warning signs, treatment modalities and other issues concerning those patients are extremely important issues that should be taken into consideration by CCNs in order to practice safely, avoid unnecessary complications and promote better standardized care to stroke patients.

Problem Statement.

To the best of the researcher's knowledge and experience, there are no studies investigating nurses' knowledge toward stroke patients in Jordan. However, there are studies investigating other issues concerning stroke patients in Jordan. In their qualitative study, Abo Kamel and Mohammed (2014) explored caregivers' perception and evaluation of a home caregiver program entitled by "There is patient in our home". They found that women were "inadequately prepared" for their caregiver role before patient discharge from hospital. At home, women expressed "incompetency" in performing care-giving activities. Eshah (2013) explored knowledge of cerebral and cerebrovascular strokes risk factors among 224 Jordanian adults using a self-report questionnaire. He found that the most common risk factors were inactivity 74%, overweight and obesity 59%, and smoking 34%. Moreover, only 30% of the study participants were able to enumerate three or more risk factors. The most commonly recognized risk factors were smoking 76%, hyperlipidemia 60%, and obesity 53%. Participants lacked basic knowledge about stroke. As seen above, the studies in Jordan addressed different topics other than the purpose of the present study.

In brief, the knowledge of CCN in Jordan toward stroke patients are still scarce and Jordanian researchers and educators can only get their information from international literature. Therefore, we conducted the present study, which aimed to measuring the knowledge of CCNs about stroke patients in Jordan.

The Study objective.

This study aimed to measuring the knowledge of Jordanian nurses working in critical care units toward stroke patients.

The significance of the study.

Nurses working at critical care units are key actors in the specialized care provided to stroke patients during the unstable period of their disease. Nurses can be lifesavers, and yet they can cause serious harm when having limitations in their knowledge of the disease process, including the risk factors and warning signs of stroke during the early phase (Baker, 2012). Therefore, nurses in the critical care areas play a significant role in reducing death and disability rates among people suffering from stroke. However, some nurses may not be prepared to meet the challenges of this complex condition (Mason, Rideway& Barton, 2013).

CCNs are members of the teams, which plan, implement and evaluate the care provided to stroke patients (Strume et al., 2013). It is, therefore, essential that nurses be knowledgeable about stroke care to

make a difference with regard to helping patients and families. As the need arises, CCNs are required to upgrade and upscale their knowledge about stroke patients in order to provide safe care and sustain a culture of collaboration and commitment to patients (Niemi et al. 2013). This is especially true when knowing that the prevalence of cerebrovascular risk factors among the Jordanian population is a cause of a significant concern to health care system (Eshah, 2013). In this context, knowledge about the disease warning signs, risk factors and treatment is important to promote a better care to patients.

As literature contains a very scarce knowledge about CCNs knowledge toward stroke patients in Jordan, this study is expected to provide nurse curriculum planners and educationists with information that assist in future educational plans concerning caring for stroke patients.

The Research Questions:

The following research questions will guide the study:

1. What is the level of Jordanian critical care nurses' knowledge about stroke patients?
2. Are there differences in the levels of knowledge toward stroke patients among the nurses working in private and public Jordanian hospitals?
3. What is the relationship between nurses' demographic factors, including gender, age, years of experience, nurses' academic degrees, and knowledge of stroke patient?

The definition of variables.

The Theoretical definition.

Stroke is "the sudden death of some brain calls due to the lack of oxygen when blood flow to the brain is impaired by blockage or rupture of an artery and a focal (or at times global) neurological impairment of sudden onset that lasts for more than 24 hours (or leading to death), and has a presumed vascular origin" (World Health Organization, 2010).

Critical Care Nurse is a "licensed professional nurse responsible for ensuring that acutely and critically ill patients and their families receive optimal care" (AACN,2012).

Knowledge refers to "comprehending the facts, ideas, and information, gained through experience, instruction, and learning for a distinct use" (Merriam-Webster Online Dictionary, 2009).

Operational Definition.

Critical Unit nurses is operationally defined as a registered and associate nurse in a critical care unit (ICU and ED). The sample for this study will consist of (125) critical care nurses in the Jordanian hospitals.

Knowledge refers to the nurses' stroke knowledge test (SKT) regarding stroke, which will be used to measure CCNs' knowledge. It consists of 22 items. The format of the questionnaire includes statements with dichotomy responses (True/False). This questionnaire is scored by the individuals' percentages of the correct responses.

Methodology.

The methods and procedures employed in analyzing the respondent answers. This study used the quantitative approach in order to measure the knowledge of Jordanian nurses working in critical care units toward stroke patients.

The Study Design.

A descriptive quantitative design was used in this cross-sectional study in order to measure the knowledge of the Jordanian nurses working in critical care units regarding stroke patients. A quantitative approach was employed to increase the potency and effectiveness in generating reliable findings through adopting a self–reported questionnaire in collecting data. The questionnaire has the strength of aggregative information from sizable amount of respondents in a comparatively short amount of time while maintaining a value-effective approach (Polit and Hungler, 2010) advised that this format, concerning questionnaires, is not appropriate for getting exhaustive data.

Setting and Sample.

This study is conducted in emergency departments and ICU on two types of hospitals. The information for this study was collected from public and private hospitals in Jordan. The purposive sampling technique was used to recruit Jordanian CCNs. There have been total of seven hospitals; five private and two public hospitals.

Sampling is that the method of choosing a small amount of individuals who represent the entire study population. In quantitative studies, the investigator aims to recruit a sample that enhances the generalizability of findings (Polit&Beck,2010). In this study , nurses working in the ED and ICU were the target population, whereas ED nurses operating in Jordan at totally different health care sectors were the accessible population.

Convenience sampling was also used to choose the study participants. This sampling technique is one of the first strategies of non-probability sampling in quantitative studies (Polit&Hungler, 2010). In non-probability sampling, the researchers choose the participants by nonrandom strategies at intervals using specific planned criteria. It is assumed that the information gained from the study sample reflects the population perspective or responses (Polite &Hungler, 2010). Whereas likelihood techniques will limit the accessibility to the specified sample because of its nature of choice, convenience sampling is far easier and more sensible technique to access the specified sample size (Vehovar et al., 2016). ICU and ED nurses who were eligible to participate in the study complied with the subsequent criteria.

The statistical analysis of data.

Data analysis were done by using the descriptive statistics (frequency, percentages, mean (M), and Standard Deviations (SD)). The inferential statistics were performed using t-tests. Correlation coefficients were also used to spot possible variations among some demographic variables. All employed nurses in the seven hospitals at the time of conducting the study were invited to participate in the study. All nurses, who were willing to participate, were included in the study.

The following is a presentation of the characteristic of the study sample.

Table (1) illustrates the characteristics of the nurses who completed the study questionnaire, including hospital type, gender, the highest academic degree and job description.

Table 1. The characteristics of the sample

Factor		**Frequency**	**Percentage** %
Gander	Male	84	35.6%
	Female	116	49.2%
Hospital Type	Public	91	45.5%
	Private	109	54.5%
Level of education	Diploma degree	55	23.3%
	Baccalaureate degree	133	56.4%
	Masters degree	12	5.1%
Area of practice	ICU	104	44.1%
	ED	96	40.7%
Job description	Registered Nurses	145	61.4%
	Associate Nurses	55	23.3%

Among the participants, there were 84(35.6%) male and 116(49.2%) female nurses. The ratio between both genders in the units that participated in the study was comparable to that obtained in the study, whereas male nurses represented 42% and female nurses were 58% of the total number of critical units care nurses.

Nurses from public hospitals who participated in this study were 45.5%, while 54.5% were working in private hospital.

The age of the nurses ranged between 25 and43 years old with a mean of 31.15 years of age (SD 4.55). The above explained data given in Table 2 also show that the majority of nurses were below 29 years. The overall nursing practical experience ranged between 2 years and 17 years with a mean of 6.06 years. On the other hand, the estimated range of nurses' experience in the ICU or ED range was2 – 15 years, with a mean 4.54 years.

Table 2. Participant' age, general nursing practice, and practice in the ER or ICU

Factor	**Minimum**	**Maximum**	**M**	**SD**
Age	25	43	31.15	4.55
Nursing Practice (In years)	2	17	6.06	3.67
Critical Care nursing practice (In years)	2	15	4.54	3.05

Additionally, On the participation in studies examining problems related to stroke and stroke management, seventeen nurses reported that they took part in stroke analysis. Forty four nurses

reported that they had personal experience of stroke in the past, and ninety two nurses stated having family member, who suffered from stroke (Table 3).

Table 3. Practice variables related to stroke patient

Statement	Yes	
	Frequency	**Percentage**
Education on stroke management in the past 3 years	42	17.8%
Attended stroke conference last years	20	8.5%
Participated as a respondent in any stroke research	17	7.2%
Personally undergone any personal experience of stroke	44	18.6%
Any family member who suffered from stroke	92	39%

Research Question1

"What is the Jordanian critical care nurses' knowledge toward stroke patients?"

The first component of the questionnaire was knowledge. It consisted of (22) items investigating the current level of stroke knowledge among critical care nurses.

The total mean score for knowledge test was 12.23 (SD = 5.684) accounting for approximately (55.6%) of correct responses, and the total scores ranged between 1 and22 (4.5% - 100%) for the nurses. More than half of the participants (n = 119) achieved a score of 11out of 22 or less, 80 participants obtained a score between 12 and 21 (54.5% – 95.4%), and only one participant obtained a score of 22 (100%).

Reliability was calculated using the Kuder Richardson 20 (KR 20) for total knowledge test and the result was .876. The KR 20 was adopted as the appropriate measure for a dichotomous tool (Thomas et al., 1999). Mostly, the characteristics of the selected sample as well as the characteristics of the test items can influence alpha coefficient. Nurses in this study represented a group of homogenous participants that achieved similar total scores on the scale. On the knowledge test, items tested knowledge about the etiology of stroke, pathology and diagnosis, acute assessment and prognosis, as well as the nurses' role in the care provided to stroke patient. The test consisted of 22 items as illustrated in Table 4.

Table 4. Results of nurses on the knowledge test ranked as per the correct responses

Items	**No. of correct responses**	**%**
1	2	3
19. Over 30% of acute stroke patient who are admitted to hospital die in the first three months post stroke.	41	20.5%
3.It is possible to reliably distinguish cerebral infarction from cerebral hemorrhage on the basis of clinical history and examination.	49	24.5%
14. A stroke due to cerebral infarction typically appears as a white area on a CT scan.	69	34.5%
11. Shoulder pain is a rare complication after stroke.	71	35.5%
8. The right cerebral hemisphere is almost always dominant for speech in right-handed individuals.	74	37%
21. Despite good physical recovery, many people experience lower levels of social activity after stroke.	78	39%
20. Reduced consciousness is a predictor of poor recovery.	91	45.5%
22. Most mood complication go unrecognized by health professionals.	91	45.5%
2. People with atrial fibrillation are not at increased risk of stroke.	91	45.5%
13. The majority of stroke are due to brain infarction rather than hemorrhage.	97	48.5%
4. Perceptual problems only occur if a stroke patient has weakness loss.	97	48.5%
6. An intact gag reflex indicates a safe swallow.	98	49%
7. A patient with dysphasia after stroke will always be able to understand the written word.	101	50.5%

Continuation of table 4

1	2	3
17. The barthel activities of daily living index is a measure of functional dependency.	105	52.5%
9. Emotionalism (pathological crying) is an untreatable complication of stroke.	106	53%
12. Carotid surgery can significantly reduce the risk of further strokes in patients with severe symptomatic carotid stenosis.	119	59.5%
1. The majority of patients have had a transient ischemic attack prior to their stroke.	121	60.5%
16. Silent aspiration can be detected with video fluoroscopy.	121	60.5%
15. Agnosia is a condition in which the patient loses the ability to recognize objects.	124	62%
5. Dyspraxia is due to muscle weakness.	138	69%
18. Persistent urinary incontinence following a stroke is a predictor of poor prognosis.	147	73.5%
10. Inability to understand the spoken word is called expressive dysphasia.	169	84.5%

*n=200

Research Question 2

Is there a difference in the knowledge toward stroke patients among nurses working in private and public hospitals?

This question has been answered using the independent t-test where the one group are compared in relation to their scores in order to identify whether there are any statistically significant differences among participants with regard to the issue investigated in this study and for the total scores on the one main elements of the questionnaire; knowledge. The F value for Levene's test was 38.338($p< .001$) for the knowledge test. Because the significance value is less than .05, it can be assumed that there is a significant difference the one group (Table 5).

Table 5. The results of Levene's test for knowledge Scales.

Scale	**Levene's Test**	
	F	**P**
Knowledge	38.338	.000

As for knowledge scale, there was a significant difference in the scores for public (M = 10.15, SD = 4.28) and private (M = 13.96, SD = 6.12) at the significance level of($p =.000$). The results of the independent t –test indicate that there is a statistically significant difference between participants due to the type of hospital on the knowledge test (Table 6).

Table 6. the results of t-Test and level of significance for the knowledge Scales.

Factor	**Hospital**	**N**	**M**	**SD**	**t-test**	**P**
Knowledge	Governmental	91	10.15	4.28	-5.153-	.000
	Private	109	13.96	6.12		

Research Question 3

What is the relationship between nurses' demographic factors (e.g., gender, age, years of experience, nurses' academic degrees, and knowledge toward stroke patients?

Table7 shows that there is a statistically significant positive correlation between nurses, who have more years of nursing practice in ER or ICU, and knowledge level towards stroke patients. The results reveal that there is a statistically significant negative correlation between the two variables ($r = -.176-$, $p = .013$).

Table 7. Correlations between the mean score on the scales and the characteristics of the participants

Factor	Knowledge	
	R	**Sig**
Age	-.051-	.477
Gender	.042	.558
Highest level of nursing education completed	-.104-	.144
Years of nursing practice in ER/ICU	-.176	**.013**

Discussion the results.

This study measured the knowledge of Jordanian nurses working in critical care units toward stroke patients. This chapter focuses on the most evident findings of this analysis.

In short, this study has achieved the following:

1. It measured the level of Jordanian critical care nurses' knowledge about stroke patients.
2. It explored the impact of gender, age, years of experience, nurses' academic degrees and sort of hospital on critical care unit nurses' knowledge regarding stroke patients.

The Jordanian critical care nurses' knowledge toward stroke patients.

As the care provider and the most in-touch health professional with the stroke patients, it is necessary that nurses recognize many issues concerning this health condition. These include knowing the etiology, pathology, diagnosis, acute assessment and prognosis of stroke. In addition, nurses should know the proper interventions and the timely decisions when caring for stroke patients in order to promote better health outcomes. Early identification of the stroke and initiation of the prompted interventions can help avoiding more adverse complications (Demel et al., 2018). Within the current study, the majority of participants responded correctly when asked about the widely observed signs and symptoms of stroke, such as abrupt weakness or numbness on one body side, abrupt confusion, light headedness or unsteadiness or an abrupt visual problem. The results of the correct answers reflected nurses' knowledge in this particular topic; however, other issues of concern have been found to require further consideration and attention concerning knowledge.

Nurses' knowledge of the stroke-related complications.

It was found in this study that more than 50% of the participants' answers indicated low level of knowledge among nurses with regards to complications of stroke. Although reported good level of knowledge in the common sign and symptoms, this finding showed that participants weren't knowledgeable about the complications. In addition, nurses reported that dizziness, weakness, and numbness were the most frequent signs. Similarly, these signs were also identified in a study conducted on health professionals as similar findings were reported in Jordan by Madae'en et al. (2013). The knowledge of stroke symptoms by participants was low, in that the participants weren't able to differentiate between symptoms of stroke and the decoy symptoms. Paralysis of the whole body, brain paralysis and numbness, tingling sensation all over the body are the decoy symptoms used in this study to examine knowledge level. Similar findings were reported in other hospital-based studies by Shehata et al. (2016) in Egypt. In this study, knowledge about the complications of stroke was low. Jenkins et al. (2018) also conducted a public-hospital-based study in a developed country and found comparable findings. As can be seen, knowledge about the symptoms among nurses and the general population has been reported in this study and the literature to be relatively low, which could inevitably lead to incompetent practice. Therefore, emphasis should be put on improving nurses' knowledge about both the real and the decoy symptoms so that better practice and patient outcome could be achieved. The major concern here is that nurses' knowledge in this study has been compared with the general population, and not with the health professionals. This necessary means that nurses' knowledge was only comparable to the general population. A serious point of concern that requires attention by nurse managers and educationists.

Nurses need to receive training to improve their knowledge and experience about stroke patients. The literature emphasized the importance of training and education in this area. Pothiban et al. (2018) stated that job status as a health professional, who were exposed to stroke patients, was an indication of a better knowledge of stroke. Komolafe et al. (2014) reported that trained nurses were more familiar with the stroke than non-trained nurses. The limited knowledge of stroke signs reported among the participants in this study might be attributed to the fact that more than a quarter of the working participants didn't receive educational courses about stroke.

Nurses' knowledge of the risk factors and diagnosis of stroke.

Although the overall knowledge of risk factors was low, transient ischemic attack prior to their occurrence was identified as the most important risk factor; 34.5% of the participants were aware of that. Similar results have been reported by Owolabi et al. (2018) in Ghana and Nigeria, and Marshall et al. (2013) in Australia. These studies also investigated the knowledge of stroke in patients with high blood pressure. In these studies, high blood pressure was classified as a risk factor for stroke. The results contradict with recent published studies conducted by Wang et al (2013) in China, where fewer participants, less than (50%), identified other risk factors for stroke, including diabetes, family history of stroke, smoking and malnutrition. This response was also evident in the study of O'Donnell et al. (2016), which found that participants who identified other risk factors for stroke were fewer.

The knowledge of stroke diagnosis was related to nurses' experience in this study. Participants with 8 to 15 years of experience were more familiar with the diagnosis of stroke than those with 2 to 7 years of experience. Comparable findings have been found by Shehata et al. (2016), who examined knowledge among hospital workers in Cairo University Hospital. In their study, participants with more than 9 years of experience were more likely to identify a specific diagnosis of stroke compared to those with less than 9 years of experience. The same thing applies to education, in that the participants, who had more education, were more knowledgeable regarding the risk factors and diagnosis than those with lower levels of education. The reason for this correlation could be that nurses with higher education will be experience a range of educational and training sessions and would achieve better ways to obtain knowledge. For example, Islam et al. (2017) reported that people with various educational backgrounds might act differently to interventions directed to stroke patients, emphasizing that higher levels of education correlated with better practice and knowledge.

General nurses' knowledge of stroke.

The general knowledge of stroke is related to the definition of stroke, the affected organ by stroke, participants' knowledge regarding the cause of stroke, and the difference between a stroke and a heart attack. Approximately half of the participants defined stroke as a paralysis of the whole body (48.5%). This has also been reported among Nigerian adolescents compared with adults in different studies by (Komolafe et al., 2014). Although 45.5% of the participants indicated that stroke occurred in the brain, 48.5% responded that the majority of strokes were due to brain infarct instead of hemorrhage, and only 45.5% said that it occurred among people with atrial fibrillation who were at increased risk of stroke. This response was also seen in other studies by O'Donnel et al. (2016) and McDermott et al. (2018), who had their studies conducted among the general population. In these studies, participants also confused stroke and heart attack. They perceived all heart diseases as a result of hypertension and, therefore, they thought that these two diseases were similar.

It is also important to realize that this perception has changed because the emergency treatment for stroke and heart attack differs. Some participants in the study by Khalema, Goldstein and Lucas (2018) in south Africa focused on impairment and disability. This view is consistent with the present study where the majority of the participants (37%) stated that the right cerebral hemisphere is almost always dominant for speech in the right-handed people. While (84.5%) suggested that the inability to understand the spoken word is called expressive dysphasia. The findings in the present study revealed that there is a positive relationship between the general knowledge of stroke and the level of education. In a study conducted on Cairo university hospital workers by Shehata et al. (2016), they found similar results. These studies also found that the participant's level of education was a predictor of knowledge about stroke. Participants with a higher level of education had a greater knowledge of stroke.

The nurses' knowledge about intervention for stroke patients.

The findings of the present study revealed nurses intervention to stroke patients based on the information obtained from the findings of the questionnaire and the relevant literature. The results showed that there is a lack in nurses' knowledge regarding stroke, especially in managing stroke patients. One reason for this could be attributed to the lack of guidelines for training nurses in this field (William et al. 2018) which, in turn, affects the role of nurses in managing stroke which is still unclear Baatiema et al. (2017). Although (39%) of the participants indicated that despite the good level of physical recovery, many people experience lower levels of social activity after stroke. Training nurses demonstrated high levels of improvements in knowledge and in the ability to recognize and treat stroke patients Edward et al. (2017). Furthermore, nurses with knowledge are more self-confident and therefore more willing to make decisions regarding the management of patients. Similar findings

which reveal a positive relationship between the overall knowledge of stroke and level of education among employees in Cairo university hospital were reported by Shehata et al. (2016).

Currently, there's no consensus on the amount of knowledge nurses need in order to provide a better care and gain favorable outcomes for patients; therefore, this level of knowledge should be determined (Thomas et al., 1999). This findings indicated that nurses couldn't match the proposed passing score, reflecting little information regarding stroke patients (Farraga et al., 2017) although these results were higher than some reported results (Shehata et al., 2016). The results of the statistical analysis for the response of the study sample confirmed that the nurses responsible for providing the critical care for stroke patients have the lowest percentage of knowledge on each of the diagnosis, risk factors, complications, role and culture; that's why they have an educational program with regard to patients with a stroke.

Difference in knowledge towards stroke patients among nurses working in private and public hospitals.

It was obvious that critical care unit nurses in each health care sectors had some differences in their responses toward stroke patients. The findings showed that there are borderline variations between critical care unit nurses in public and private hospitals in terms of knowledge towards stroke patients. Nurses in private hospitals perceived their knowledge above that of the nurses in public hospitals. With regards to the findings of previous studies conducted in Cairo, there have been variations between health care sectors in terms of stroke knowledge (Shehata et al., 2016).

Shehata, et al. (2016) reported the variations between health care sectors in public hospitals in terms of stroke knowledge. The study found that the level of knowledge among nurses in public hospitals was low. The results revealed that there are significant variations between health care sectors in terms of uncertainty regarding treatments, inadequate preparation and lack of support for nurses.

In this study, borderline variations were found between public and private hospitals. However, there were statistically significant differences between the responses of the sample individuals in favor of the nurses working in private hospitals, in that they had more knowledge towards stroke patients in comparison with those working in public hospitals.

The Relationship Between Nurses' Characteristics and the Knowledge toward Stroke Patients.

There were three significant relationships between the study scales and nurses characteristics. However, very limited studies have examined the relationship between gender as well as knowledge of stroke patients.

The possible rationale for not considering gender among factors influencing stroke patients was associated with the comparatively massive proportion of male nurses participating in these studies. This proportion would then interfere significantly with the results of those studies (Jenkins, et al., 2018). Typically, in the present study, education was extremely related to the knowledge of stroke.

The literature suggests that older respondents of (27) years and above scored high marks on knowledge scale, indicating an association of ($p=0.03$); this is supported by a study conducted in Bangladesh among nursing students (Islam et al., 2017). There was also an association between the older respondents of forty years as well as experience and knowledge about stroke patients ($p=.003$). This finding corresponds with the study conducted by Farraga, et al. (2017) on the Egyptian population. However, other researchers found contradicting results, indicating that there is a negative correlation between knowledge score and demographic variables, such as age and education in Iranian population (e.g. Haghighi, et al. 2010). This means that as nurses get older, their knowledge on stroke patients decreases. Other studies showed that there were no significant differences in nurses' stroke information among subgroups, nurse's experience years and ranks (Shehata et al., 2016).

The results revealed that the years of experience didn't influence nurses' knowledge toward stroke patient in the present study. However, Shehata, et al. (2016) reported an inverse correlation between years of experience in nursing and information regarding stroke patients. In other words, nurses might experience decreased complications towards patients stroke.

The information regarding the years of experiences among the participants are contradictory. The low participation of nurses with three or less years of experience corresponds with the low variety and the low number of young nurses recruited in hospital and reflects the falling interest of young people in nursing as a career (William et al., 2018).

Another domain of the study was related to correlating the knowledge of nurses with their demographic variables in an attempt to identify how nurses gain their information. Therefore, the knowledge of nurses was correlated to their job as nurses (registered or associate), their qualification

(Academic Degree; Diploma, Bachelor or Master degree), their specific work experience in taking care of stroke patients, also to whether or not they have received specialized training in nursing stroke patients (Edward, et al. 2017).

Stroke could be a major reason for impairment among the adult population worldwide. Since the prevalence of stroke is predicted to extend within the close future, the impact of chronic impairment can create a challenge to the future care and rehabilitation of stroke patients. Additionally, the study conjointly explored whether or not the demographic variables had an impact on the participants' level of knowledge towards stroke.

The study motivation was related to the fact that the lack of knowledge towards stroke has been recognized as a limiting cause for the early presentation at hospital, delayed immediate initiation of stroke management, and consequently the state of discontentment and frustration among stroke patients. However, it should be emphasized that not only do knowledge apply; in fact other factors are concerned. These factors could also be related to purpose, awareness, personal interest, traditional values, workplace policy, availability of stroke prevention instrumentality, policy relating to the utilization of stroke prevention guidelines, or the nurse patient ratio.

Recommendations. The following recommendations were cited in order to improve the critical care unit nurses' knowledge regarding stroke patients:

1. In-service training and refreshing courses about stroke should be designed for Jordanian nurses. This should provide them with up-to-date knowledge to understand stroke which can be translated into practice.

2. Further interventions studies should be conducted in order to examine the level of Knowledge after nurses participate in service-training programs.

3. A guideline for nurses should be developed and implemented in all the hospitals. This will encourage the nurses to ensure that each stroke patient receives the correct treatment for stroke since the time of admission.

4. A replication study is recommended in other settings in order to promote the generalizability of the findings mentioned above.

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