

# Emergency Nurses' Knowledge and Practice Regarding Care of Acute Ischemic Stroke Patients Undergoing Recombinant Tissue Plasminogen Activator

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## Abstract

**Background:** Stroke is a serious disease that entails an enormous burden of mortality, morbidity, disability and health care cost in the United States. Ischemic stroke accounts for 80 percent of all stroke cases. **The aim of this study** was to assess the emergency nurse's knowledge and practice regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator. **Data collection tools:** the current study was collected by utilized three tools: tool one: socio demographic data, tool two: nurses' knowledge assessment questionnaire and tool three: observational checklist assessment sheet. **Results:** The mean age of the studied nurses was  $25.3 \pm 8.3$  years. More than half of studied nurses had unsatisfactory level of total knowledge regarding care of acute ischemic stroke patients. The most of the studied nurses had competent regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator. There was positive fair correlation between total knowledge of the studied nurses with their total practices regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator. **Conclusion:** The study concluded that more than half of the studied nurses had unsatisfactory level of total knowledge regarding care of acute ischemic stroke patients. Most of the studied nurses had competent regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator. **Recommendations:** Increase knowledge of emergency nurses regarding care of acute ischemic stroke patients through a seminar and workshop about it and encourage the implementation of future educational program for nurses in all hospitals where recombinant tissue plasminogen activator administration is applied.

**Keywords:** Acute Ischemic Stroke, Nurses' Knowledge and Practice, Recombinant Tissue Plasminogen Activator

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## I. Introduction

Stroke is a serious disease that entails an enormous burden of mortality, morbidity, disability and health care cost in the United States. Ischemic stroke accounts for 80 percent of all stroke cases. Thrombolytic treatments to reanalyze the occluded blood vessels have been shown to decrease the infarct size and result in better neurological functional outcomes. Even though there is multiple thrombolytic agents' available, tissue plasminogen activator is the only one approved by the Food and Drug Administration (FDA) for use in ischemic stroke (*Mozaffarian et al., 2016*).

Intravenous recombinant tissue plasminogen activator (IV rtPA) is the only the FDA approved thrombolytic for treating acute ischemic stroke within the first 3 hours of symptom onset. Its main mechanism of action is to lyse a clot that is occluding a cerebral vessel, thereby reperfusion distal ischemic brain tissue and preventing or limiting the area of cell death (*Chapman et al., 2014*).

Thrombolysis with intravenous recombinant tissue plasminogen activator (rt-PA) is currently the most effective therapy to improve clinical outcomes in patients with acute ischemic stroke. However, the efficacy and safety of the therapy for very old patients are still controversial (*Berrouschot, Stoll, Hogh, & Eschenfelder, 2016*).

The role of the nurse is very important in the management of the patient with stroke that resulting in stroke. The nurse should assess the patient neurological status using Glasgow coma scale to determine the effects of stroke and identify the life threatening complication. He should assess past history of cardiac dysrhythmia, hypertension, smoking and TIA as the cardiac workup is warranted if stroke is embolic, arterial fibrillation is a major cause of embolic stroke and hypertension seems to be related to hemorrhagic stroke (*Bledsoe, et al., 2015*).

Nurse should monitor patient vital sign as needed, frequent assessment of blood pressure is essential to assess cerebral perfusion pressure, use pulse oximetry to assess arterial blood gases, monitor the baseline of electrocardiogram and observe for changes, monitor fluid intake and output, administer the medication as ordered (thrombolytic, anticoagulant, antihypertensive, osmotic diuretics). (Loft, et al., 2019)

Nurse should perform active and passive exercise several time daily, perform activities in quite environment without distraction, teach the family exercises and transfer techniques, initiate rehabilitation technique in hospital / home as soon as possible (Li, et al., 2015).

For balance and coordination problem the nurse should assist the stroke patient in performing activities and tasks, begin with the tasks that require small range of movement and encourage control. Encourage focusing in proximal muscles control initially and then distal muscle control, teach the stroke patient and his caregiver the exercise and technique that improve coordination (Gulanick et al., 2013).

In Egypt, according to recent systematic literature was conducted to identify population-based epidemiological studies of stroke in Egyptians. Five studies from five different governorates in southern Egypt (Qena, Sohag, Assiut, New Valley and Red Sea) found that mean and median crude prevalence rates (CPRs) were 721.6/100,000 and 655/100,000, respectively. The average CPR weighted by sample population size was 613/100,000 and the average CIR weighted by sample population size was 202/100,000 and concluded that he incidence and prevalence of stroke in Egypt are high (Abd Allah, et al., 2018).

### **Aim of the study**

The aim of this study is to assess the emergency nurse's knowledge and practice regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator.

### **Research questions**

**Q1-** What is the level of nurses' knowledge regarding care of acute ischemic stroke patients receiving (rt-PA) in a selected private hospital?

**Q2-** What is the level of nurses' practices regarding care of acute ischemic stroke patients receiving (rt-PA) in a selected private hospital?

### **Subject and Methods:**

- **Technical design.**
  - **Operational design.**
  - **Administrative design.**
  - **Statistical design.**
1. **Technical design:** The technical design included research design, setting, subjects and tools for data collection.
  - **Research design:** A descriptive exploratory research design was utilized in the current study to conduct the study aim.

Exploratory research is as the name implies, intends merely to explore the research questions and does not intend to offer final and conclusive solutions to existing problems. This type of research is usually conducted to study a problem that has not been clearly defined yet and it helps to have a better understanding of the problem (Saunders, Lewis & Thornhill, 2016).

- **Setting:** This study was conducted at Emergency Department affiliated to a selected private health care sector at Al-maady district in Egypt where recombinant tissue plasminogen activator administration is applied.

- **Subjects:** A convenience sample of all the available nurses working in Emergency department 38 nurses. Sample subjects agreed to participate in the study.

**Tools for data collection:** Three tools were used to collect data of the study as following:

#### ***I- Socio Demographic Data Sheet:***

It was self-administered and developed by the investigator and written in simple Arabic language which covered data regarding gender, qualifications, age, and years of experience in the field of nursing and in the emergency department and training programs.

***II- Nurses' knowledge assessment questionnaire*** for the purpose of assessing nurses' knowledge regarding care of acute ischemic stroke patients receiving (rt-PA). It was developed by the investigator based on the related literature review and written in Arabic language which included (37 questions) related to definitions, indications, contraindication and side effects and special nursing precautions during administering (rt-PA) in acute ischemic stroke patients. The total number of questions are 37 questions, 1 degree for each question ("0" for no or wrong answer, and "1" for correct answer)

- The maximum result is "37"
- The minimum result is "0"

- The satisfactory result is  $\geq 28.5$  (75%) according to statistical analysis
- The unsatisfactory result is  $<28.5$

**III-Observational checklist assessment sheet:** for nursing care of acute ischemic stroke patients receiving (rt-PA) in the emergency department. It developed by the investigator to observe nurses during administration and covered data related to assessment and nursing intervention for those patients. scoring system of observational checklist for nursing care of acute ischemic stroke patients

- The selection was done and not done.
- The total number of items are 75 items, "1" degree for each item
- The maximum result is "75"
- The minimum result is "0"
- The satisfactory level of practice is  $\geq 55.5$  which equals 75% .
- The unsatisfactory level of practice is  $<55.5$

## **II- Operational design:**

The operational design includes preparatory phase, pilot study, field work and Ethical consideration.

**1- Preparatory phase:** In this phase the investigator reviewed the current available related local and international literature to develop the study tools for data collection necessary for carrying out the study, and to examine the validity and reliability of these tools.

### **2- Tools validity & reliability:**

Two types of tools validity were done namely face validity and content validity. They were ascertained by a jury group of five experts specialized in neurology medicine and critical care nursing from different four universities namely Ain Shams, Cairo, Helwan and Modern Technology and Information University. Tool reliability refers to the consistency with which an instrument or test measures whatever it is supposed to measure. The more reliable a test or instrument, the more a researcher can rely on the scores obtained to be essentially the same scores that would be obtained if the test were re-administered. Internal consistency and reliability were determined using Cronbach's alpha for the Nurses Knowledge assessment sheet .810. Internal consistency using Cronbach's alpha was .871 for the Nursing Observational check list.

**Pilot study:** was carried out after development of the tools and before starting the actual data collection. The aim of the pilot study was to confirm understanding, clarity, and applicability of the tool, assess the reliability of the tools using internal consistency method, in addition to estimate the time required for filling the questionnaire sheet. The pilot study was conducted one week before collection of the data. It was carried out on four nurses (10%) from the previous mentioned settings. These participants were included in the main study sample because no modifications were done.

**Field work:** The official permission was obtained from the research ethical committee, medical and nursing director of emergency department of selected private health care sector at Al-maady district in Egypt. A letter was issued to them from the Faculty of Nursing, Helwan University, explaining the aim of the study in order to obtain their permission and cooperation. The investigator first met with emergency nurses attended to the emergency department explained the purpose of the study after introducing himself. The nurses were assured that information collected treated confidentially, and it used only for the purpose of the research. Then, individual interviewing was done after obtaining the consent to participate. The investigator was visiting the study setting 2 days / weekly (Monday, Wednesday) at morning, evening and night shift 2 - 3 nurse / 2 days for months from the period of 1 July, to 1 September 2019 to collect data and implement this study. The purposes of the study were explained to the nurses and took 30- 45 minutes nearly to complete the interview and observation.

### **Administrative design:**

An official letter requesting permission to conduct the study was directed from the dean of the Faculty of Nursing/Helwan University to the hospital' directors to obtain their approval to carry out this study. This letter included the title of the study in order to get the permission and help for collection of the data.

### **Ethical consideration:**

Prior study conduction, approval was obtained from the scientific research ethical committee in Faculty of Nursing/ Helwan University. In addition, the investigator met the directors of the previous mentioned hospital and explained the aim of the study to gain their approval. The study subjects assured that anonymity and confidentiality would be guaranteed and they informed that they allowed choosing to participate in the study or not and that they have the right to withdraw from the study at any time, ethics, values, culture and beliefs were respected; and study subjects were informed about research purposes.

**Statistical design:**

The collected data were tabulated & statistically analyzed using software program and statistical package for social science version 25 (IBM SPSS 25.0) to evaluate nurses under study. The statistically analysis included percentage (%), mean, stander deviation (SD). Fisher's exact test used to detect differences between more than two variables and the sample size is small. Graphs were done for data visualization using Microsoft Excel. Correlation test and P - value of  $\leq 0.05$  indicates a significant result while, P value of  $>0.05$  indicates a non-significant result.

**II. Results:**

Results in **table 1** showed that 57.9% of the studied nurses were male, 42.1% of them age ranged 25 - <35 years with mean  $25.3 \pm 8.3$  years. moreover, 71.1% of the studied nurses had Bachelor of Nursing. Also, 42.1% and 44.7% of them their year of experience ranged between 1 - < 5 year in the field of nursing and in the emergency department respectively and 81.6% of them was attending training program about care of acute stroke.

Results in **figure1**:illustrated that 39.5% of the studied nurses had satisfactory level of total knowledge regarding care of acute ischemic stroke patients. while 60.5% of them had unsatisfactory level of total knowledge regarding care of acute ischemic stroke patients.

Results in **figure2**illustrated that 97.4% of the studied nurses had competent regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator while only 2.6% of them not competent.

Result in **table 2**analyzed that there was positive fair correlation between total knowledge of the studied nurses with their total practices regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator ( $r=.466$  &  $P - \text{value} \leq .003$ )

Result in **table 3**presented that no statistical significance differences between knowledge and practices of the studied nurses regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator which  $P - \text{value} \leq .413$

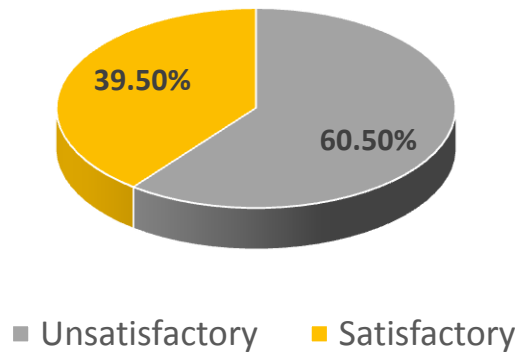
Result in **table 4**presented that there was statistically significant relation between total knowledge of the studied nurses and their age, educational levels, attend training program about care of acute stroke and number of training program ( $P \leq 0.02, .014, .02, \text{ and } .013$  respectively). Also, there was a highly statistically significant relation between total knowledge of the studied nurses and their years of experience in the emergency department which  $P \leq 0.0001$  respectively.

**Table (1):**Number and percentage distribution of the studied nurses according to their demographic characteristics (n= 38).

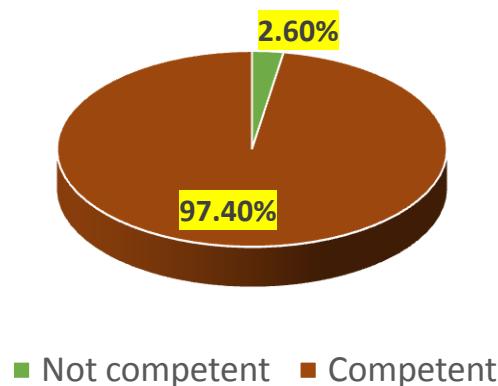
Items	No.	%
<b>Gender</b>		
Male	22	57.9
Female	16	42.1
<b>Age/ year</b>		
16 - < 25	12	31.6
25- < 35	16	42.1
35- <45	8	21.1
More than 45	2	5.2
Mean $\pm$ SD	$25.3 \pm 8.3$ years	
<b>Educational levels</b>		
BCs	27	71.1
Technical nursing	11	28.9
<b>Years of experience in the field of nursing</b>		
Less than 1 year	8	21.1
1-<5	16	42.1
5- < 10	8	21.1
More than 10 years	6	15.8
Mean $\pm$ SD	$3.1 \pm 3.5$ years	
<b>Years of experience in the emergency department</b>		
Less than 1 year	14	36.8
1-<5	17	44.7
5- < 10	1	2.6
More than 10 years	6	15.9
Mean $\pm$ SD	$2.2 \pm 3.5$ years	
<b>Attending Training program about care of acute stroke</b>		
Yes	31	81.6
No	7	18.4
<b>Number of training programs (n =31)</b>		
One	12	38.7

Two	6	19.3
Three	3	9.7
More than three	10	32.3

**Figure (1):** Percentage distribution of the studied nurses according to their total knowledge levels regarding care of acute ischemic stroke patients (n = 38).



**Figure (2):** Percentage distribution of the studied nurses according to their total practice levels regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator (n = 38).



**Table (2):** Correlation between total knowledge and practices of the studied nurses regarding care of acute ischemic stroke patients.

Items	Nurses knowledge	
	r	P – value
Nurses practice	.466	.003**

\*\*Correlation is significant at the 0.01 level

**Table (3):** Relation between knowledge and practices of the studied nurses regarding care of acute ischemic stroke patients (n = 38)

Total Practice levels	Total knowledge levels				Test of significance	
	Satisfactory (n = 15)		Unsatisfactory (n= 23)		fisher test	P value
	No.	%	No.	%		
Competent	15	100.0	22	95.7	.670	.413 NS
Not competent	0	.0	1	4.3		

**Table (4):** Relation between demographic characteristics of the studied nurses and their total knowledge levels regarding care of acute ischemic stroke patients (n= 38).

Demographic Characteristics	Total knowledge levels				Test of significance	
	Unsatisfactory (n= 23)		Satisfactory (n= 15)		X <sup>2</sup> / fisher test	P value
	No.	%	No.	%		
<b>Gender</b>						
Male (n= 22)	12	54.5	10	45.5	.782	.376 NS
Female (n= 16)	11	68.8	5	31.3		
<b>Age/ year</b>						
16 - < 25 (n= 12)	7	58.3	5	41.7	9.988	.02*
25- < 35(n= 16)	6	37.5	10	62.5		
35- < 45 (n= 8)	8	100.0	0	.0		
More than 45 (n= 2)	2	100.0	0	.0		
<b>Educational levels</b>						
BCs (n= 27)	13	48.1	14	51.9	5.982	.014*
Technical nursing (n= 11)	10	90.9	1	9.1		
<b>Years of experience in the field of nursing</b>						
Less than 1 year (n=8)	6	75.0	2	25.0	2.598	.458 NS
1-<5(n= 16)	10	62.5	6	37.5		
5- < 10(n= 8)	3	37.5	5	62.5		
More than 10 years (n= 6)	4	66.7	2	33.3		
<b>Years of experience in the emergency department</b>						
Less than 1 year (n= 14)	14	100.0	0	.0	21.882	.0001**
1-<5 (n= 17)	9	52.9	8	47.1		
5- < 10 (n= 1)	0	.0	1	100.0		
More than 10 years (n= 6)	0	.0	6	100.0		
<b>Attending Training program about care of acute stroke</b>						
Yes(n= 31)	16	51.6	15	48.4	5.596	.02*
No (n= 7)	7	100.0	0	.0		
<b>Number of training programs (n =31)</b>						
One (n= 12)	8	66.7	4	33.3	10.652	.013*
Two (n= 6)	5	83.3	1	16.7		
Three (n= 3)	2	66.7	1	33.3		
More than three (n= 10)	1	10.0	9	90.0		

NS= > 0.05 insignificant \*≤ 0.05 significant \*\*≤ 0.001 highly significant

### III. Discussion:

Regarding distribution of the studied nurses according to their demographic Characteristics The present study showed that showed that more than half of the studied nurses were male, less than half of them age ranged 25 - <35 years with mean 25.3 ± 8.3 years. This result come in consistent with (McDaniel, 2016) who studied "Improving Nurse's Knowledge of Stroke " and stated that the age ranges included 18-29, 30-39, 40- 49, 50-59, and greater than 60 years. The average age was 18-29. This result were confirmed with (Yeganeh, Bagheri, Mohammadi, Roshan, & Pouralizadeh, 2019) who studied "The Knowledge of Nurses about Evidence-based Guideline in Patients with Acute Ischemic Stroke" and reported that the majority of the studied nurses were female with an average age of 32.74 ± 7.108 years. (Yeganeh et al., 2019) reported that the majority of the studied sample were female and less than half with an average age of 32.74 ± 7.108 years and in a 20- to 30 – year - old age group.

The present study showed that more than two third of the studied nurses had bachelor of nursing, this result come in the line with (McDaniel, 2016) who stated that the most frequent educational degree was bachelor's. This result were confirmed with (Yeganeh et al., 2019) who mentioned that the majority of the nurses had a bachelor's degree and 63.57% had a clinical experience of 1 to 10 years. (Yeganeh et al., 2019) reported that the majority of the nurses had a bachelor's degree and two third of them had a clinical experience of 1 to 10 years and more than two third of them had a work experience of 1 to 6 years in the emergency department.

Also, the present study showed that less than half of them their year of experience ranged between 1 - < 5 year in the field of nursing and in the emergency department respectively and the most of them was attending training program about care of acute stroke. this result come in the line with (McDaniel, 2016) who mentioned that the nursing experience ranges included 0-5, 6-10, 11-15, 16-20, 21-30 and greater than 30 years. The average number of years of nursing experience was 16-20 years. This result were confirmed with (Yeganeh et al., 2019) who mentioned that less than two third had a clinical experience of 1 to 10 years and more than two third of them had experience of 1 to 6 years in the emergency department.

The present study illustrated that more than one third of the studied nurses had satisfactory level of total knowledge regarding care of acute ischemic stroke patients. This result comes in agree with (Baatiema et

al., 2017) who studied "Barriers to evidence-based acute stroke care in Ghana: a qualitative study on the perspectives of stroke care professionals" and reported that the staff had limited knowledge in acute stroke care and inadequate team collaboration and coordination. This result was confirmed with (Yang, Zhang, Ou, Wang, & Wang, 2015) who studied "Knowledge of Community General Practitioners and Nurses on Pre-Hospital Stroke Prevention and Treatment in Chongqing, China" and stated that more than one third of the studied sample were aware of the clinical guidelines for cerebrovascular diseases, whereas less than half of them considered themselves to have stroke management capabilities.

This result comes in consistent with (Elsayed, et al, 2016) who studied "Effect of Educational Program on Nurses' Performance Caring for Patients with Cerebrovascular Stroke" in Cairo reported that most of the nurses had got unsatisfactory level of knowledge regarding caring of patients with CVS.

The present study illustrated that the majority of the studied nurses had competent regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator. This result comes inconsistent with (Hasnain et al., 2019) who studied and reported that the nurses were not competent and need more training program to improve their practices regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator. This result may be related to that most of the studied sample attending training courses about caring of acute ischemic stroke.

The present study revealed that there was positive fair correlation between total knowledge of the studied nurses with their total practices regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator ( $r=0.466$  &  $P$  - value  $\leq 0.003$ ). The nursing practices must be related to their knowledge; the good nursing practices mean that the nurses have good knowledge.

The current study illustrated that there was statistically significant relation between total knowledge of the studied nurses and their age, educational levels, attend training program about care of acute stroke and number of training program ( $P \leq 0.02, .014, .02, \text{ and } .013$  respectively). Also, there was a highly statistically significant relation between total knowledge of the studied nurses and their years of experience in the emergency department which  $P \leq 0.0001$  respectively. This result comes in the line with (Elsayed, et al, 2016) who studied "Effect of Educational Program on Nurses' Performance Caring for Patients with Cerebrovascular Stroke" in Cairo and reported that the majority of the study sample had got statistically significant improvement in their knowledge and practice regarding caring of patients with CVS post program implementation.

#### **IV. Conclusion:**

Based on the findings of the current study, this study concluded that: more than half of the studied nurses had unsatisfactory level of total knowledge regarding care of acute ischemic stroke patients. Most of the studied nurses had competent regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator. There was positive fair correlation between total knowledge of the studied nurses with their total practices regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator. There were no statistical significance differences between knowledge and practices of the studied nurses regarding care of acute ischemic stroke patients undergoing recombinant tissue plasminogen activator.

#### **V. Recommendations:**

**Based on the results of the current research, the following suggestions for future research and practice are proposed**

- Increase knowledge of emergency nurses regarding care of acute ischemic stroke patients through making a seminar and workshop about it.
- Encourage the implementation of future educational program for nurses in all hospitals where recombinant tissue plasminogen activator administration is applied.
- Future studies can be replicated in different settings to strengthen the findings of the present study.

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