

# Effect of Educational Program on Nurses' Knowledge and Practice Regarding Thrombolytic Therapy among Patients with Acute Myocardial Infarction

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**Abstract Background:** improving nurses' practice regarding thrombolytic therapy will prevent the complications resulting from error of administration of thrombolytics, which will have a direct impact on patient's progress and decrease hospital stay. **Aim of the study:** Evaluate the effect of educational program on nurses' knowledge and practice regarding thrombolytic therapy among patients with acute myocardial infarction, **Design:** Quasi-experimental research design was used in the study. **Setting:** The present study was carried out at Critical Care Units affiliated to the Suez Canal University Hospital, **Subject:** A convenient sample of all available staff nurses (40 nurses) who were working at the previously mentioned settings, **Tools of data collection:** The data were collected using two tools named nurses' knowledge assessment questionnaire and nurses' observational checklist. **Results:** The majority of studied nurses (92.5%) had satisfactory level of knowledge regarding thrombolytic therapy post intervention of educational program. The post and follow up-intervention mean knowledge score was high 23.425, 21.825 respectively when compared with pre-intervention mean practice score 13.45 with P value < .001. also, the majority of studied nurses (97.5%) had satisfactory level of practice regarding thrombolytic therapy post intervention of educational program. The post and follow up-intervention mean practice score was high 37.95, 36.05 respectively when compared with pre-intervention mean practice score 24.05 with P value < .001. **Conclusion:** there was statistically significant improvement in the nurses' knowledge and practice mean scores regarding thrombolytic therapy in post and follow up phases compared to pre- program implementation phase. **Recommendation,** regular Application of educational programs to improve nurse's practice in competent level related to administration of thrombolytic therapy.

**Keywords:** myocardial infarction, thrombolytic therapy, educational program, nurses' knowledge and practice

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## 1. Introduction

Cardiovascular diseases (CVDs) are the leading cause of death globally. Estimated to be 17.9 million people died from CVDs in 2019, representing 32% of all global deaths. Of these deaths, 85% were due to heart attack and stroke. Over the three quarters of CVD deaths take place in low- and middle-income countries [1]. Coronary artery disease which accounts for nearly one-third to one-half of all of the cases of CVDs is reported to be one of the major causes of death in developing and middle east countries and Acute myocardial infarction (AMI) is the most common cause of death in the world [2,3].

The time of onset of chest pain was considered as the time of onset of the acute myocardial infarction. Acute

myocardial infarction was diagnosed using the standard 12 lead electrocardiogram and cardiac enzyme (World Health Organization criteria). The time from onset of myocardial infarction to treatment was separated into early (<12 h) or late (>12 h); this was the time from initial onset of pain to the time when the patient received treatment. Rapid restoration of patency of the infarct-related artery is the key to preserving myocardium and improving survival in acute myocardial infarction, increase the quality of life of patients, and decrease health expenditure in many countries [4,5].

Several medications are used in the management of coronary artery diseases and acute coronary events. Thrombolytic agents are widely administered for the treatment of acute coronary events and other thromboembolic diseases. These agents are considered as the first line treatment option in many cases of acute myocardial infarction (AMI). Thrombolytics or fibrinolytics

are a group of medications used in the management and treatment of dissolving intravascular clots. They are in the plasminogen activator class of drugs [6,7].

Nurses are considered the health profession who frequently interact, assess, and give the prescribed treatment to the patients. There is no doubt that the nurse who works in the critical care units must be qualified enough for these tasks in addition to his general duties, therefore, nurses must have a good scientific background about the profession and details related to coronary artery disease and critical care to detect patients' problems, to which make the appropriate decision for and proper medication administration [8,9].

### 1.1. Significance of the Study

In Egypt, mortality due to CVD is one of the highest compared to other countries in the region and worldwide. Acute coronary syndrome (ACS) is often the first presentation and serious acute life-threatening clinical manifestation of CVD which includes unstable angina (UA) and myocardial infarction (MI) [10].

Thrombolytic therapy is still a common reperfusion therapy for AMI patients in Egypt and In-hospital mortality was significantly higher and was highest among no reperfusion patients. Thereby, improving nurses' practice regarding thrombolytic therapy will prevent the complications resulting from error of administration of thrombolytics, which will have a direct impact on patient's progress and decrease hospital stay.

## 2. Subject and Methods

### 2.1. The aim of the Study

The current study aims to evaluate the effect of educational program on nurses' practice regarding thrombolytic therapy among patients with acute myocardial infarction.

### 2.2. Study Design

Quasi-experimental (pre - posttest) research design was used in this study.

### 2.3. The Sample of the Study

Convenient sample of all available nurses (40) was utilized in this study

### 2.4. Study Setting

The present study was carried out at Critical Care Units affiliated to the Suez Canal University Hospital in Ismailia, Egypt.

### 2.5. Research Hypothesis

**H1:** The nurses' knowledge regarding thrombolytic therapy among patients with acute myocardial infarction post implementing program will improve.

**H2:** The nurses' practice regarding thrombolytic therapy among patients with acute myocardial infarction post implementing program will improve.

## 2.6. Tools of Data Collection

Data were collected using two tools as the following:

### Tool (1) Nurses' knowledge Assessment Questionnaire

This tool consists of true or false, multiple – choice assessment tool. It was adapted from [11] to assess nurse's knowledge regarding management of thrombolytic therapy among patients with acute myocardial infarction in Arabic language. It was composed of two parts

#### Part (1): Demographic and work-related data: -

It was included six questions regarding nurses' demographic and work-related data e.g., age, education, years of experience in nursing and experience in critical care unit and attending training courses.

#### Part (2): Nurses' knowledge Assessment Questionnaire

It was composed of 25 items divided into 5 subscales as the following: -

- **Subscale (1):** General concepts of Thrombolytic medications, which involved 7 questions
- **Subscale (2):** Indication and contraindication of thrombolytic medications, which involved 3 questions
- **Subscale (3):** Complications of thrombolytic medications, which involved 4 Questions.
- **Subscale (4):** Administration of thrombolytic medications, which involved 4 Questions.
- **Subscale (5):** Nursing role regarding thrombolytic medications, which involved 7 Questions.

### 2.6.3. Scoring system of Nurses' knowledge Assessment Questionnaire

The total score of nurses' knowledges of 25 questions was ranged from 0 to 25. The respondent gave one point for each correct answer and zero for incorrect answers. A total score below 75% considered unsatisfactory, while those equal to or above 75% considered satisfactory [11].

#### Tool (2) Nurses' practice observational checklist

It was adapted from Eweas et al., [11], it was used to assess nurses' practices related to administration of thrombolytic therapy for AMI patients by infusion pump. It was written in the English language to be collected by the researcher. It was composed of 3 subscales which included 43 items divided as the following: -

#### Subscale (1): Thrombolytic therapy preparation procedures which involved three parts.

- A. Patient's preparation before drug administration included 14 steps of practical skills.
- B. Nurse preparation steps included 2 steps of practical skills.
- C. Thrombolytic therapy medication preparation steps included 4 steps of practical skills.

#### Subscale (2): Thrombolytic drug Administration Procedures.

Administration procedures for thrombolytic therapy medications given through an infusion pump included 9 steps of practical skills.

#### Subscale (3): Post – thrombolytic drug administration procedures.

Post – thrombolytic therapy infusion administration steps included 14 steps of practical skills

- 13 steps for general post procedure phase.
- One step for documentation phase.

### 2.6.3. Scoring System of Nurses' Practice Observational Checklist

The total score of the nursing practices was ranged from 0 to 43 of the 43 steps. The possible choice for each step was done and not done. Each nurse was given one point for done step and zero for not done step. A total score of 75% and more was considered satisfactory, while a score below 75% was considered unsatisfactory [11].

## 2.7. Reliability of the Tool

It was determined using alpha Cronbach's coefficient to assess the internal consistency of the tool and its value was (0.77) for Nurses' knowledge Assessment Questionnaire, (0.74) for Nurses' practice observational checklist

## 2.8. Validity of the Tool

The validity of the tools revised by a panel of seven experts in the field. Three experts in Medical-Surgical Nursing and Critical Care Department, Faculty of Nursing, Suez Canal University and two experts in Cardiology Department at Health Insurance Hospital. This in addition to two lecturers from Cardiology department at Faculty of Medicine in Ain Shams University to determine whether the included items are comprehensive, understandable, applicable, clear, and suitable to achieve the aim of the study. The needed modifications done.

## 2.9. Administrative Design

An official permission for collection of data in Suez Canal University Hospital attained from the hospital administrative board by formal letter submission from the Dean of the Faculty of Nursing. Meeting held between the researcher and the nursing administrative personnel to make them aware of the study aim and research objectives, as well as to get better cooperation during the research implementation phase.

## 2.10. Ethical Considerations

The ethical research considerations in this study included the following:

Approval of the ethical committee affiliated to faculty of nursing; Suez Canal University obtained.

-The researcher clarified the aim of the study and the objectives to the studied nurses included in the study prior to starting.

-Nurses informed that they were capable of participating or not in the study, and that they had the right to withdraw from the study at any time.

-Confidentiality and anonymity assured, as well as nurse protection from hazards.

-Each nurse subjected to written consent prior to study participation after simple clarification of the aim and study

expected outcomes. Also, each nurse was aware of the importance of his/her participation.

## 2.11. Field Work

The study data collection performed over ten months period started from 1<sup>st</sup> of April 2019 to the end of January 2020. Collection of data performed through four phases (assessment, planning, implementation, and evaluation phase).

### 2.11.1. Assessment Phase

1. The purpose of the study simply explained to the studied nurses who agree to participate in the study prior to any data collection
2. Assessment of critical care nurses' knowledge about administration of thrombolytic therapy performed using nurses practice observation checklist during their work.
3. Assessment of critical care nurses' practice about administration of thrombolytic therapy performed using nurses practice observation checklist during their work.

### 2.11.2. Planning Phase

The educational program developed based on the nurses' needs and demands determined in the pre-assessment phase, based on reviewing the related literatures and the most recent evidence-based guidelines for thrombolytic therapy administration. Program was covering the knowledge and practical skills related to thrombolytic therapy administration in critical care units. Booklet containing the program content designed by the researcher and written in simple Arabic language and supported by photos and illustrations to help the nurses understand the content.

#### Aim of the program:

The program aimed to improve nurses' knowledge and practice regarding thrombolytic therapy administration in critical care units.

#### Specific content of educational program

The booklet divided into two parts: -

##### 1. Theoretical part:

- Definition of blood circulation
- Anatomy and physiology of the heart (blood vessels and heart chambers).
- Definition of myocardial infarction.
- Early and Late symptoms of myocardial
- Classifications of Myocardial infarction
- Definition of thrombolytic medication and mechanism of action
- Some pharmacological concepts of important drugs
- Types of thrombolytic medication
- Indications of thrombolytic medication
- Relative and absolute contraindications of thrombolytic medication Treatment of an overdose of thrombolytic medication
- General information about Alteplase, tinctetplase, reteplase medications
- Definition and method of action of streptokinase medication.

- Trade names and Various doses of streptokinase medication
- Instructions when taking streptokinase medication
- Warnings when taking streptokinase medication
- General information about Agrastat medication (indications, contraindications, side effects, complications and Instructions when taking it and interactions with other medicines)

**2. Practical part:**

- Nursing care for acute myocardial infarction patients treated with thrombolytic therapy involved: -
  1. Nursing care before administering thrombolytic therapy
  2. Nursing care while administering thrombolytic therapy
  3. Nursing care after giving thrombolytic therapy

**2.11.3. Implementation Phase**

Data of the current study collected from 1<sup>st</sup> of April 2019 to the end of January 2020. Once the objectives developed, the nurses' program designed. Structurally planned study program was implemented in the form of sessions reinforcement and motivation during sessions in order to increase motivation for the sharing in this study.

The total number of sessions were five sessions divided as 3 sessions for theoretical part and 2 sessions for practical part.

The total groups' number was 10 groups. The teaching lecture time was determined and modified according to the nurses' free time. The teaching hour was one hour /day for three days/ week. 2 months spent to perform pre-test, 3 months for program implementation, 2 months for immediate post-test and 3 months for follow up.

**(1) Theoretical Phase:**

For theoretical part, 3 teaching sessions were performed for each group (4 nurses) to obtain the related information. The theoretical part in booklet was provided to each nurse. Communication channel kept open between the researcher and the study subjects. Then, immediate posttest and follow up knowledge test performed three months post program implementation.

**(2) Practical Phase:**

For the practical content, each nurse's practice regarding the pre-determined procedure assessed before any obtained information (pre-test) utilizing the tool (II). Then the participants were divided into small groups (4 nurses), demonstration and redemonstration were conducted on 2 sessions for each nurse. Each nurse was given practical part in booklet, continuous feedback was given through the data collection period, then post-test (immediate) and follow up were conducted after 3 months.

The teaching methods for theoretical part, were lecture and discussion. However, demonstrations and redemonstration were used in practical teaching methods as regards to media used; they were booklet, posters, and video.

The tools administered to the study subject three times (1) before program implementation (pre-test); (2) immediately after program implementation; and (3) follow up after 3 months of program to assess the effect of designed program.

**2.11.4. Evaluation of the Educational Program Effect**

The evaluation of the nurses' knowledge and practice evaluated through comparison between knowledge and practice levels pre/ post implementation of program and at follow up phase using tools two tools of study.

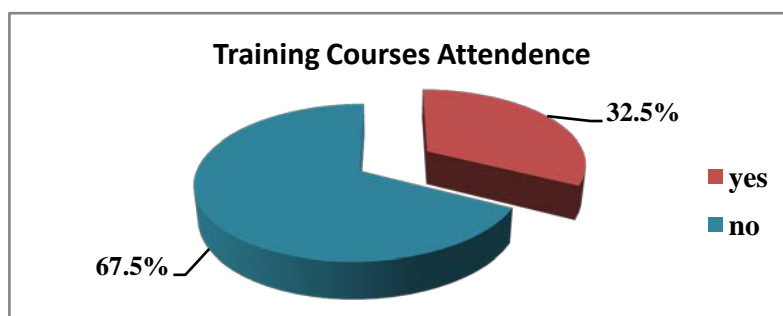
**3. Results**

**Table 1. Percentage distribution of the studied nurses according to their demographic characteristics (n=40)**

Variables	Total subjects (n=40)	
	N	%
<b>Age (Years)</b>		
20 - < 30 years	24	60
30 - < 40 years	16	40
Mean±SD	26.01±3.32	
Range	22-35	
<b>Gender</b>		
Male	15	37.5
Female	25	62.5
<b>Education</b>		
Bachelor's degree	12	30
Technical Institute of nursing	27	67.5
Diploma	1	2.5
<b>Years of experience in nursing</b>		
Mean±SD	5.22±2.64	
Range	1-13	
<b>Years of experience in cardiac care unit</b>		
Mean±SD	2.72±1.66	
Range	1-8	

n: sample size; N: frequency; %: percent; SD: standard deviation.

**Table 1:** Clarifies that 60% of studied nurses' age was from 20 to <30 year with mean 26.01±3.32. As regard the level of education, the technical institute was the highest percent with 67.5% followed by bachelor's degree 30%. Regarding the mean of years of experience in nursing was 5.22±2.64 and the mean of years of experience in CCU was 2.72±1.66.



**Figure 1.** Percentage distribution of studied nurses according to thrombolytic therapy course attendance (n=40)

As shown by Figure 1, more than half of studied nurses (67.5 %) had not attended courses regarding thrombolytic therapy.

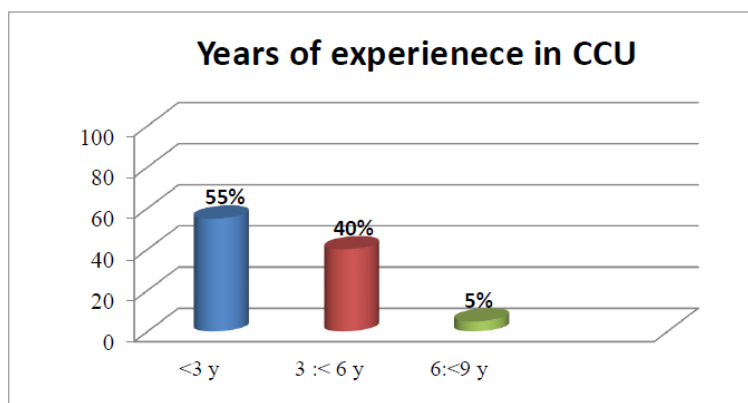


Figure 2. Distribution of studied nurses according to their years of experience in CCU (n=40)

Figure 2 illustrates that 55 % of studied nurses had less than three years of experience in CCU.

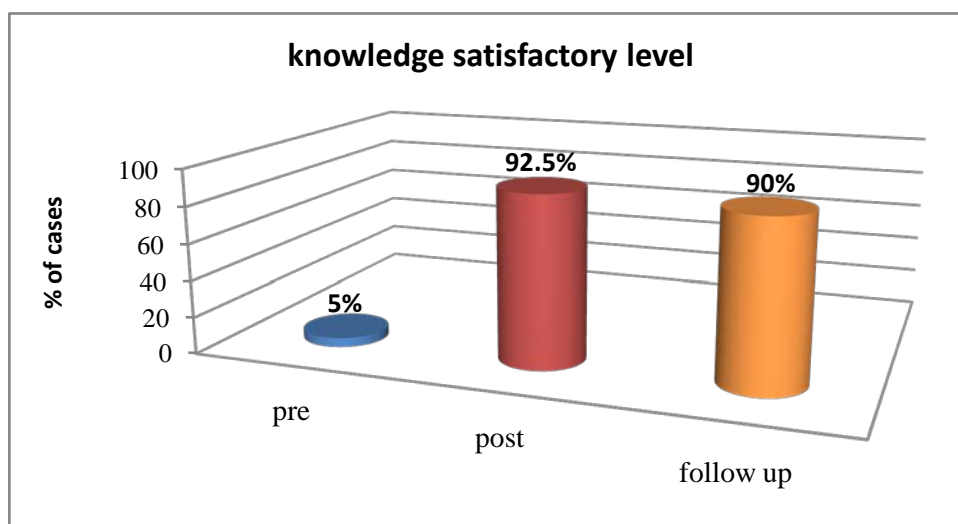


Figure 3. Distribution of studied nurses regarding satisfactory level of knowledge throughout the study phases (n= 40)

As shown by Figure 3, 5% of studied nurses had satisfactory level of knowledge regarding thrombolytic therapy before program implementation, which becomes 92.5 % and 90% post Program implementation and in the follow up period, respectively.

Table 2. Relation between total mean scores of studied nurses 'knowledge regarding thrombolytics throughout the study phases (n=40)

Knowledge item	Pre-Program Implementation		Post Program Implementation		Follow up Program		F test	P value
	Mean	SD	Mean	SD	Mean	SD		
General pharmacological concepts (7 questions)	3.775	1.25	6.62	0.586	6.20	1.042	84.24	<0.001
Indication and contraindication (3questions)	.950	0.719	2.800	0.405	2.55	0.714	117.58	<0.001
complication (4 Questions)	2.37	0.806	3.77	0.479	3.500	0.716	53.67	<0.001
Administration (4 Questions)	2.67	0.693	3.825	0.446	3.55	0.677	44.73	<0.001
Nursing role (7 Questions)	3.67	1.163	6.40	1.057	6.025	1.097	89.37	<0.001
Total Score (25 Questions)	13.45	2.08	23.425	2.061	21.825	2.925	222.89	<0.001
Significance	t 1=19.24 P value <.001 t 2= 13.48 P value <.001							

n: sample size; SD: standard deviation; F repeated measures anova P value is significant  $\leq .05$ ; t test is paired sample t test, P value is significant  $< .05$ .

Table 2: Clarifies that there were statistically significant differences between studied nurses' knowledge regarding thrombolytic therapy pre-, post- program implementation and at follow up-phases with P value =  $< 0.001$  with significant increase in their knowledge mean scores regarding thrombolytic therapy post program implementation and at follow up phase with total mean was (23.425 and 21.825) respectively.

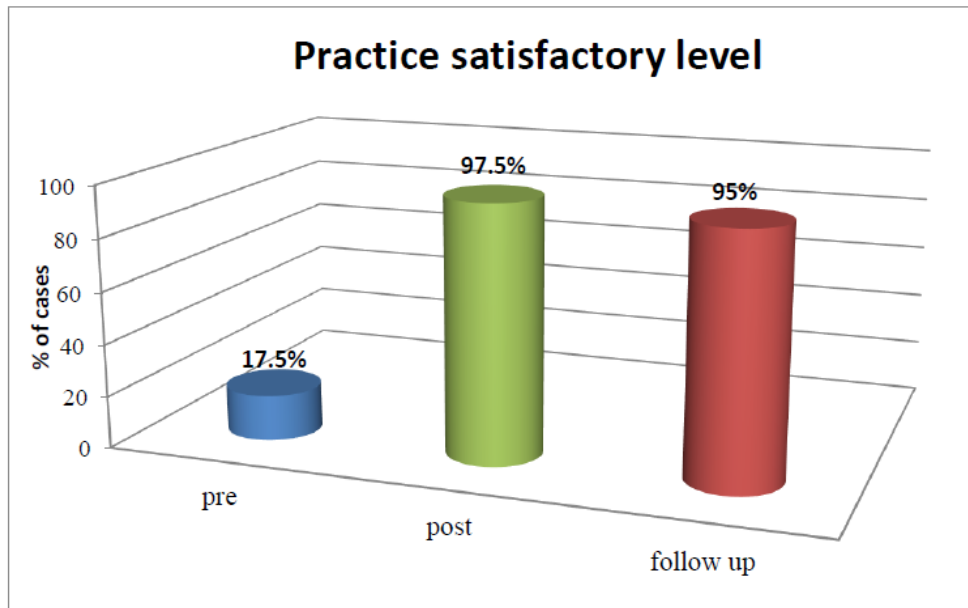


Figure 4. Distribution of studied nurses regarding satisfactory level of practice throughout the study phases (n= 40).

As shown by Figure 4, the satisfactory level of practice before Program implementation was 17.5 %. Which improved, in the post Program implementation and at follow up phase 97.5 % and 95% respectively.

Table 3. Relation between total mean scores of studied nurses' practice regarding thrombolytics throughout the study phases (n=40)

Practice item	Pre-Program implementation		Post Program Implementation		Follow up Program		F test	P value
	Mean	SD	Mean	SD	Mean	SD		
Preparing phase	12.10	2.48	18.80	1.090	17.87	1.32	195.19	<.001
Administration phase	4.70	1.39	6.75	.49	6.70	.51	79.10	<.001
Post infusion	7.25	1.89	12.40	.77	11.72	1.13	235.13	<.001
Total Score	24.05	4.06	37.95	1.88	36.05	2.75	320	<.001
Significance	t 1=53.87 P value <.001 t 2= 44.69 P value <.001							

n: sample size; SD: standard deviation; F repeated measures anova P value is significant ≤.05; t test is paired sample t test, P value is significant <.05.

Table 3: Clarifies that there was statistically significant difference between the nurses' practice regarding thrombolytic therapy pre-, post- and follow up phase with P value = <0.001 with significant increase in their mean scores of total practice post Program implementation and at follow up with total mean was (37.95 and 36.05) respectively compared to pre implementation (24.05).

#### 4. Discussion

Acute myocardial infarction is a major cause of death and disability worldwide and require emergency management. Acute myocardial infarction includes two categories, non-ST-segment elevation MI (NSTEMI) and ST-segment elevation MI (STEMI) [12]. More than 90% of myocardial infarction caused by acute thrombotic obstruction in coronary artery. The cornerstone of therapy for myocardial infarction is thrombolytic therapy [13,14,15].

The efficiency of nursing procedure through thrombolytic therapy considered essential factor for success of AMI treatment and saving the patients' life. So, the nurse is a vital and important part of health care system and Medication administration process is considered the core nursing practice [16,17]. Thereby, enhancing and expanding nurses' knowledge regarding thrombolytic therapy will ensure success of AMI treatment and have a direct impact on patient's health progress.

The results of the present study revealed that more than half of the studied nurses were in the age group from twenty to less than thirty years old and the mean of age was 26.01±3.32. Regarding gender, more than half of studied nurses were females. Concerning years of experience, mean years of experience for studied nurses were 5.22 ± 2.64, and more than half of studied subjects had less than 3 years of experience in the cardiac care unit. Also, most of the studied nurses didn't take courses on the topic of thrombolytic therapy administration.

These results were in accordance with a study done by Allawy [18] who assessed "the effect of guidelines regarding administering inotropic medications for critically ill patients on nurses' knowledge and practice" and found that the highest percentage of the respondents were in the age group from twenty to less than thirty years old with a mean age about twenty-six plus and minus three, more than half of the studied nurses had technical degree. Also, more than two thirds of studied nurses ranged from 1-6 years of experience in the critical care unit.

Regarding training courses, these findings were in accordance with the study done by Hussien, & Al-Ganmi, [19] who assessed "nurses' knowledge concerning cardiogenic shock for patients in cardiac care unit at Baghdad hospitals" and found that few nurses were participating in training courses. Added that, these findings were on the same context with a study done by Lamkhede [20], Rodrigues Júnior & Gasparino, [21] who revealed that the majority of nurses had not received training on vasoactive drugs related to their critical care work.

The results of the current study revealed that the minority of studied nurses working in critical care units had satisfactory level of knowledge regarding thrombolytic therapy administration before implementation of educational program. The possible explanation of these results could be that topics about thrombolytic therapy and safety of drug administration were not incorporated deeply in the nursing curriculum and lack of drug administration proficiency with reviewing the physician during medication administration procedure.

In congruent with our study results of Ismail et al., [22] who conducted a study aimed to assess "nurse's knowledge and practice regarding management of thrombolytic therapy among acute myocardial infarction patients" revealed that, the majority of studied subjects had unsatisfactory knowledge. On the same line, Sallam, [23] who showed that more than fifty percent of nurses had an unsatisfactory level of knowledge.

Also, Allawy et al., [18] found that most of studied nurses working in critical care units had an unsatisfactory knowledge regarding inotropic medications administration and interpreted their result as related to nursing implications and the scope of nursing role about pharmacology were not explained deeply in the nursing curriculum and lack of confirmation process in medication administration.

Concerning the total mean score of nurses' knowledges about administering thrombolytic therapy during the immediate post and follow up of the educational program, the results revealed significant increase in the knowledge score as compared with pre-program period with highly significant difference with increasing the mean score. Also, there are high significance difference with increasing the mean score of each sub-items of nurse's knowledge during the immediate post and follow up of the educational program about administering thrombolytic therapy for patients with AMI compared with pre-program period. Therefore, the first study hypothesis was empirically justified. These results confirm the effectiveness of the educational program which confirm the effectiveness of the provided program to improve nurse's knowledge.

The posttest and follow up results could be interpreted in the light of the fact that the nurses' knowledge increased immediately due to increasing memory retention after educational program, knowledge refreshment through program session and use of educational materials such as booklets and flyers during program implementation and this point of view was supported by Chun & Heo, [24] who stated that providing a flipped materials could overcome forgetting curve theory that normally occurs after elapsing time.

These study results were consistent with a study done by Hami & Atiyah, [25] mentioned that Nurses' knowledge regarding nursing management for thrombolytic therapy for acute myocardial infarction patients has been improved after application of the educational program in the study group. On the same line, D'Souza, [26] aimed to assess the knowledge and practices of nurses before and after the planned teaching regarding the care of patients receiving anti-coagulant therapy among the nurses in the intensive care unit reported that the study revealed that the planned teaching is an effective means to improve the knowledge of nurses.

Moreover, these study results congruent with study done by Mariani et al., [27] that aimed to assess student knowledge and competence regarding medication safety which denoted that there was significant increase in post-intervention mean knowledge score compared with pre-mean knowledge scores. Also, Ltheeth & Abbas, [28] who depicted highly significant difference between pre-intervention, post-intervention and follow up intervention nurses' knowledge.

Otherwise, Charalampopoulos et al., [29] reported that, there was a rapid decline in knowledge during the two months following a training course compared to the immediate post-test mean scores where, there was some deterioration of the nurse's knowledge scores two months after implementation the study protocol.

Concerning nurses' total practice regarding administration of thrombolytic therapy before program implementation, the present study results revealed that, the minority of studied nurses had satisfactory level of practices related to administration of thrombolytic therapy. These study results could be attributed to lack of related knowledge and previous training which reflected on their performance as more than half of nurses were technical institution graduates, lack of number of nursing staff and lack of close supervision.

On the same line Sneek et al., [30] in the study of medication competency of nurses, according to theoretical and drug calculation revealed lack of nurses' medication practical skills, and Gorgich et al., [31] who reported that nurses had insufficient practice regarding the medication administered. Similarly, Sambu et al., [32] found that most of studied nurses had unsatisfactory practical level regarding care of patient with AMI included medication administration.

In contrast, El-Sayed et al [13], denoted that about two thirds of studied nurses had satisfactory level of practice regarding management of AMI within the golden hours included administration of thrombolytic therapy. Also, the current study result disagreed with result of Hessaen & Fadlalmola [33] who showed that most of studied nurses had satisfactory practical level regarding administration of streptokinase.

Concerning the nurses' practice after and in follow-up phase of program implementation, the current study results revealed that the great majority of studied nurses had satisfactory level of practice regarding administration of thrombolytic therapy with significant increase in the total mean score in comparing with pre-program period. Also, there are high significant difference with increasing the mean score of each sub-items of nurse's practice

during the immediate post and follow up of the educational program about administering thrombolytic therapy for patients with AMI compared with pre-program practice level. Therefore, the second study hypothesis was empirically justified. This result might be due to, the willingness and enthusiasm of studied nurses to improve their skills, commitment to educational program and interaction during sessions of the program.

These results were in correspondence with Toppo et al, [34] who conducted a study aimed to compare the knowledge and practice of staff nurses pre- and post-teaching about thrombolytic drug therapy and reported the mean post practice scores were significantly higher than mean pre-test practice scores.

On the same line, Sambu et al., [32] showed that there was significant improvement on the nurse's performance regarding common cardiac procedures during AMI attack from pre –test to post-test and regarding administer intravenous thrombolytic therapy. Also, D'Souza, [26] revealed that, post-test scores were s higher than pre-test scores regarding nursing practice in checking for the side effects of Heparin therapy such as bleeding gums, hematuria and melena. Furthermore, these results were in correspondence with Zakria & Mohamed, [35], who denoted that there was a statistically significant difference between the post mean than pre in medication practice.

In this regard, Slater et al., [36] mentioned that teaching programs for nursing staff play an important role in assist in staff nurses in developing and enhancing their skills needed to provide high standards of care to their patients. This agreed with the present study as nurse's practice improved after implementation of the nursing educational program. Similarly, Mohamed et al., [37] reported that, nurse's practice improved after implementation of the nursing educational program.

## 5. Conclusion

Based on the findings of the present study, it can be concluded that, there was statistically significant improvement in the mean scores of nurses' knowledge and practice regarding thrombolytic therapy in post and follow up as compared to pre- program implementation.

## 6. Recommendation

In the light of the findings of the current study, the following measures recommended.

1. Regular Application this educational program to improve nurse's knowledge and practice in competent level related to administration of thrombolytic therapy.
2. Offering advanced courses about ECG interpretation to improve nurses' knowledge and practice related to ECG interpretation
3. Availability of updated learning facilities (books, journals and protocols) recommended for the nurses CCU for refreshment of their knowledge.
4. Replicate the current study on larger sample selected from different geographical areas

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