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Nurses' knowledge and practice of thrombolytic therapy in the emergency department of King Salman Hospital: A comparative analysis

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ABSTRACT

This study aimed to assess the knowledge and practice of nurses regarding thrombolytic therapy for patients with acute myocardial infarction (AMI) in the emergency department of King Salman Specialist Hospital, Hail, Saudi Arabia. Using a descriptive, correlational, cross-sectional design, data were collected from staff nurses in the emergency department through a questionnaire that included their demographic details and assessed their knowledge and practice concerning thrombolytic therapy. Analysis methods such as frequency and percentage, ANOVA, t-test, and bivariate analysis were utilized. Findings showed that nurses had an acceptable level of knowledge and practice with scores of 1.18 (SD=.361) and 1.29 (SD=.391), respectively. There was no significant difference in knowledge based on gender, age, or years of experience. However, years of experience significantly affected practice levels. The study highlights that while demographic factors do not majorly influence knowledge of thrombolytic therapy, experience plays a crucial role in the practical application of this knowledge in the emergency care of AMI patients. In conclusion, nurses at King Salman Specialist Hospital demonstrated competent knowledge and practice in administering thrombolytic therapy to AMI patients, underscoring the importance of experience in enhancing practical skills. This suggests a need for continuous education and training to maintain high standards of care in emergency departments.

1. Introduction

Coronary artery disease refers to the blockage of blood flow from the coronary arteries to the heart muscle cells, which is often caused by atherosclerosis. If blood flow is not restored, coronary artery disease (CAD) can induce angina and progress to myocardial infarction or sudden death (Williams and Hopper, 2015). Acute myocardial infarction (AMI) is one of the world's top causes of death. The disease affects over three million people globally, with more than one million deaths occurring in the United States each year. Myocardial infarction is defined as myocardial necrosis in the presence of clinical evidence of myocardial ischemia. Non-ST-segment elevation MI (NSTEMI) and ST-segment elevation MI (STEMI) are the two types of AMI (Nascimento et al., 2019).

Thrombolytic therapy is the simplest and most effective treatment for AMI. Thrombolytics, also known as fibrinolytics, are a class of drugs used in the prevention and treatment of intravascular clots. They belong to the plasminogen activator drug class (Ali et al., 2014). The purpose of thrombolytic therapy is to restore blood flow to the tissue serviced by the blocked vessel as rapidly as possible. Ischemia and lasting tissue damage might occur if circulation is not restored quickly. Thrombolytics have a higher therapeutic impact when provided no later than 4 hours after clot formation (Adams et al., 2014). Medication administration is a difficult and critical nursing role (Perry et al., 2021). The nurse performs an important and effective role in many sorts of medical care. There is no doubt that the nurse who

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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 in 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 (Farokhzadian et al., 2021; Rezayi et al., 2022).

Furthermore, by completing extensive and regular patient assessments, nurses can identify and resolve problems in the emergency room (Rothman et al., 2012; Magnusson et al., 2020; Tam et al., 2018). In Saudi Arabia, however, no research has been conducted to investigate nurses' knowledge and practice in the emergency department about thrombolytic therapy in acute myocardial infarction. To the best of our knowledge, no research has been undertaken in King Salman Hospital-Hail on the knowledge and practice of nurses in the emergency department. As a result, the purpose of this study is to assess nurses' knowledge and practice in the emergency department of King Salman Hospital in Hail, Saudi Arabia, when patients with acute myocardial infarction were getting thrombolytic therapy.

2. Conceptual framework

Thrombolytic treatment has developed into a significant therapeutic option for patients with arterial and venous thrombosis since the first study was reported in 1959. All thrombolytic drugs are plasminogen activators, and they have various structural characteristics. The transformation of plasminogen into plasmin is the main mechanism of action. Then, fibrinogen and fibrin are broken down by plasmin into fibrin degradation products. Without inducing systemic fibrinogenolysis, the ideal thrombolytic drug would result in total clot breakup. To attain and maintain arterial patency, thrombolytic drugs are used in concert with other medications. They have a special place in the treatment of thrombosis. For individuals with an acute myocardial infarction, thrombolytic therapy is one of the first-line treatments. The use of thrombolysis in acute cerebrovascular thrombosis has grown significantly. Clinical trials are being conducted to further define the role of these agents and how they should be used. Both systemic and catheter-directed techniques have been utilized with varying degrees of effectiveness. Thrombolytic treatment is also used to treat peripheral artery thrombosis and other vascular thrombosis.

One of the study approaches, known as the fundamental theory or theory of the ground, has its roots in the historical practice of symbolic interaction used for explanation. It is regarded as one of the theories that influenced nursing knowledge in the 1960s before expanding over the next two decades. The Earth hypothesis was centered on nursing interventions, procedures, and circumstances that affected nurses (Benoliel, 1996). It also emphasized adaptability to illness. Shaaban Khalil et al. (2018) examined nurses' habits and knowledge about patients with coronary heart disease who underwent thrombolytic treatment and concluded that most nurses lacked adequate understanding of anticoagulant medication. Furthermore, ninety percent of the nurses had deficient practices in delivering anticoagulant medicine, and the study advocated offering programs to increase patients' understanding and practice of thrombosis treatment (Shaaban Khalil et al., 2018). In one of the studies conducted on nurses' knowledge about the risk factors for myocardial infarction bleeding for patients receiving thrombolytic therapy, in addition to knowing the effectiveness of the educational program among nurses, it was discovered that patients have little knowledge about thrombosis treatment, as their knowledge improved after the educational program (Skal and Ahmed, 2021).

One study on cardiac practice and the nurse's role in assessing, diagnosing, and prescribing care for myocardial infarction patients with thrombotic cases concluded that the preparation and training necessary to ensure nurses' competence regarding counseling are sparse and ambiguous. As more nurses are employed in positions such as acute chest pain nurses, thrombolytic nurses, nurse-led thrombolytics, or nurse-initiated thrombolytics, research has shown the value of national consultation in developing practice guidelines and patient care plans (Siebens et al., 2007).

According to one of the studies done through a questionnaire survey, there is a poor level of understanding among hospital personnel concerning thrombolytic therapy and the proper way of treatment. As a result, the study suggested educational programs for hospital personnel in order to enhance patient care (Mellon et al., 2015).

One of the research projects sought to assess the impact of a training program on nurses' knowledge, practices, and behavior regarding acute myocardial infarction nursing care. According to the study's findings, nurses' knowledge has significantly increased because of the training program. There was an improvement in patients' cognitive behavior and behaviors linked to myocardial infarction. The study discovered that nurses require ongoing, systematic training in terms of knowledge and performance in terms of myocardial infarction knowledge and practices (Sambu et al., 2018).

Reference to one of the critical care studies, which involved 139 nurses from five teaching hospitals. The study discovered a lack of awareness about coagulation state variables, and the study concluded that there is a lack of understanding among individuals about the medications used in the early procedures for acute instances of myocardial infarction (Mustafa and Elfaki, 2017).

3. Methods

A descriptive, correlational, cross-sectional design was adopted. Using a convenience sample,

this study was conducted to assess nurses' knowledge and practice of thrombolytic treatment administered to patients with acute myocardial infarction in the above-stated settings.

The data were gathered using a standard tool that consists of two parts: Part 1 focuses on the social profile of the respondents' nurses, whereas Part 2 is all about the skills and knowledge of emergency nurses. A checklist was utilized by the researchers to assess emergency department nurses' practices before, during, and after administering thrombolytic treatment to AMI patients.

This study encompassed all nurses in the emergency department at King Salman Hospital-Hail who directly care for patients with AMI receiving thrombolytic treatment. A random sample of 56 nurses from this department was selected for participation. Nurses not involved in the emergency department or those not administering thrombolytic therapy to AMI patients were excluded from the study to avoid any bias that might affect the results.

3.1. Study instruments

The study utilized a standardized assessment tool developed through a review of relevant literature (Shaaban Khalil et al., 2018). This tool was divided into two sections. The first part collected demographic and work-related data from the nurses, including age, education, and years of experience. The second part consisted of a questionnaire designed to evaluate the nurses' knowledge and practices. This included a checklist used to assess the practices of emergency department nurses in administering thrombolytic therapy to AMI patients evaluating them before, during, and after the procedure. The knowledge assessment was based on five true or false questions, with scoring categorized as follows: 0-0.5 indicates no knowledge, 0.6-1.00 suggests better knowledge and 1.00-2.00 reflects good knowledge. The practice section contained 22 items, scored on whether practices were followed, with scoring interpretations ranging from 0-0.5 for not practiced, 0.6-1.00 for better practice, and 1.00-2.00 for good practice.

3.2. Data collection procedure

The study received formal approval from the head of the Emergency Department and the Nursing Director at King Salman Specialist Hospital. The researcher conducted a meeting with nursing administrative personnel to explain the study's objectives and ensure understanding and cooperation. Once the research instrument was validated and its reliability confirmed, sufficient copies were produced and distributed to the chosen participants through convenience sampling. The researchers clarified any unclear statements to the respondents. Emergency department nurses collected questionnaires immediately after they were completed. Subsequent to data collection, the questionnaires were organized and coded. The compiled data were then analyzed using the appropriate statistical tools.

3.3. Data analysis

To assess the demographic characteristics of emergency department nurses at King Salman Specialist Hospital in Hail, Saudi Arabia, including age, educational background, and years of experience, researchers used frequency counts and percentage distributions. Descriptive statistics were applied to evaluate the nurses' knowledge and practices concerning thrombolytic therapy for patients with acute myocardial infarction. To explore any significant differences in the nurses' knowledge of thrombolytic therapy based on age, education, and experience, as well as differences in their practices when grouped by these demographics, the Chi-Square test was utilized. Hypotheses 1 and 2 were also tested using the Chi-Square test, with a significance level of 0.05 set as the criterion for accepting or rejecting the hypotheses. This approach helped determine whether demographic factors influence the nurses' knowledge and practice levels regarding thrombolytic therapy.

4. Results

4.1. Demographic profiles of nurses

The data was analyzed using the Statistical Package for the Social Sciences (SPSS.25). The demographic profiles of the nurses are shown in Table 1. It is clear that males (55.4%) outnumber females (44.6) in the labor force. The respondents' ages range from 26 to 35, with 60.7% being between the ages of 26 and 35, followed by more than 35% at 32%. 5.4 and 1.8 percent, respectively, are those aged 20-25 years and less than 20 years. Meanwhile, the majority of nurses (37.5%) have been in the workforce for 6-10 years, followed by those with 11-15 years of experience (33.9%).

Table 1: Demographic profiles of nurses (N=56)

Demographic profiles	Frequency	Percentage
Gender		
Male	31	55.4
Female	25	44.6
Age		
< 20-year-old	1	1.8
20-25 years old	2	5.4
26-35 years old	34	60.7
>35 years old	18	32
Years of experience		
1-5 years	9	16.1
6-10 years	21	37.5
11-15 years	19	33.9
16-20 years	7	12.5

Table 2 shows the Emergency Department nurses' understanding of thrombolytic treatment in acute myocardial infarction. The nurses' knowledge is shown to be average, with an overall weighted mean of 1.29 (SD=.391). It was mentioned that nurses were well-versed in identifying thrombolytic treatment as an arrhythmogenic medication. Table 3

illustrates the staff nurses' thrombolytic treatment practices in acute myocardial infarction. The staff nurses' overall good practice score is 1.18 (SD=.361). The evaluation score on the item "breathing does not affect pain severity" was greatest, while the practice score on the item "explaining the procedure to the patient and obtaining consent" was lowest, at 1.05 (SD=.227).

Table 4 presents a comparison of nurses' demographic information, knowledge, and practices concerning thrombolytic therapy in acute MI. The analysis reveals no significant gender differences in knowledge among nurses (F= 2.247, t-value=0.423, P-value=0.140). Additionally, age (F=1.480, P-value=0.231) and years of experience (F=2.768, P-value>0.051) do not show significant differences in knowledge. Regarding practices, no significant differences were found related to gender (F=1.147, t-value=0.223, P-value>0.710) or age (F=4.390, P-value>0.008). However, a significant difference was observed in practices based on years of experience (F=4.774, P-value<0.004).

Table 5 explores the relationship between nurses' knowledge and their practice. It indicates that the level of practice is influenced by the nurses' knowledge of thrombolytic treatment in acute MI (B=1.093, t-value=6.733, P-value=0.000). This suggests that better knowledge among nurses is associated with more effective practice in managing thrombolytic therapy for acute MI patients.

5. Discussion

According to this study, nurses are well-versed in thrombolytic therapy in the context of acute myocardial infarction, particularly with regard to the answer to the question, "vitamin K is the antidote for a drug overdose, and thrombolytic therapy is arrhythmogenic drugs." These nurses' knowledge can be attributed to the training sessions or seminars they have attended. It is true that understanding myocardial infarction in patients is essential for nurses to provide life-saving care. The findings of this study contrast with those of an earlier study in which nurses were found to have insufficient ratio understanding of coagulation. Furthermore, Mellon et al. (2015) discovered that hospital employees had a low awareness of thrombus and its management despite the fact that the study advised educational programs for hospital workers. This finding suggests that well-educated nurses may accurately and safely assess patients suspected of having a myocardial infarction for thrombolytic therapy. According to Rasouli and Sajadi (2013), educational competency influences nurses' professional competence.

Table 2: Nurse's knowledge of thrombolytic therapy in acute MI in emergency department

Item	Mean	Std. deviation
1. Thrombolytic therapy is arrhythmogenic drugs	1.45	.502
2. Vitamin K is the antidote for a drug overdose	1.41	.496
3. It is recommended to check the clotting time before administering thrombolytic therapy	1.11	.312
4. Complications of urokinase are allergy and bleeding	1.13	.334
5. Streptokinase is a protein synthesized by B-haemolytic streptococci	1.32	.471
Average weighted mean	1.28	.391

0-0.5: No knowledge; 0.6-1.00: Better knowledge; 1:00-2:00: Good knowledge

Table 3: Nurse's practice on thrombolytic therapy in acute myocardial infarction in emergency department

Practice	Mean	Std. deviation
The patient is conscious and coherent	1.09	.288
The patient has symptoms of a severe heart attack for 15 minutes	1.23	.426
The symptoms started less than 12 hours ago	1.27	.447
Breathing does not affect pain severity	1.52	.504
Systolic blood pressure is >80 mmHg and <110 mmHg	1.30	.464
The ECG shows ST elevation of 2 mm or more	1.09	.288
The QRS width is 0.16 seconds (4 small squares)	1.23	.426
The patient is not likely to be pregnant, nor has given birth within the past 2 weeks	1.29	.456
The patient has not had an active peptic ulcer within the last 6 months	1.25	.437
The patient has not had a stroke of any sort within the last 12 months and does not have any permanent disability from a previous stroke	1.29	.456
The patient has no diagnosed bleeding disorder and has had no recent blood loss	1.20	.401
The patient has not had any surgical operation, significant trauma, or head injury	1.16	.371
The patient has not been recently treated for a severe head or brain condition	1.14	.353
The patient is not being treated for liver failure or renal failure	1.20	.401
Measure vital signs	1.16	.371
Perform physical assessment	1.16	.371
Connect the patient to monitor	1.09	.288
Check intravenous access device	1.11	.312
Obtain 12-lead ECG	1.09	.288
Collect blood samples for coagulation and cardiac enzymes	1.11	.312
Check the 5 rights of medication administration	1.07	.260
Explain procedure to the patient and obtain consent	1.05	.227
Average Weighted Mean	1.18	.361

0-0.5: Not practice; 0.6-1.00: Better practice; 1:00-2:00: Good practice

In general, the staff nurses' practices regarding thrombolytic therapy in acute myocardial infarction are believed to be good. This result suggests that nurses have been trained in coronary care to assess patients with myocardial infarction, implying that nurses are practicing in a safe environment. The nursing authorities of the hospital usually give more attention to the nurses' education training in order to increase the nurses' practice of MI. Smallwood (2000), on the other hand, identified a lack of

professional features for such a practice as well as a lack of training to educate nurses for this type of enlarged practice. Also, the current study contradicts an earlier study that found a significant percentage (90%) of nurses to have inadequate clotting therapy practices. This study shows that nurses' knowledge of thrombolytic treatment in acute MI predicts the level of practice. Increasing knowledge enables nurses to make informed decisions and eventually practice them. Indeed, the majority of seminars held in most hospitals are aimed at boosting the knowledge of staff nurses. The current finding is comparable to that of Dehghani et al. (2017), who discovered that coronary care nurses' knowledge had a significant impact on practice.

Table 4: Differences between the demographic profiles, knowledge, and practices of nurses on thrombolytic therapy in acute MI

	Mean (SD)	df	F	Value
Gender (Knowledge)				
Male	1.16 ±.374	54	(F= 2.247 [t-value=.423])	.140
Female	1.10± .301			
Age				
<20 years old	7.0±2.00			
20-25 years old	5.6±1.15	3	1.480	.231
26-35 years old	6.26±1.10	52		
>35 years old	6.77±1.00			
Years of experience (Knowledge)				
1-5 years	5.6667±1.00			
6-10 years	6.2857±.956	3	2.768	.051
11-15 years	6.8421±1.16	52		
16-20 years	6.5714±.975			
Gender (Practice)				
Male	1.55±.506	54	(F= 1.147;t-value=.223)	.710
Female	1.48±.510			
Age (Practice)				
<20 years old	1.0952±2.00			
20-25 years old	1.2857±.218	3	4.390	.008
26-35 years old	1.2451±.216	52		
>35 years old	1.0608±.070			
Years of experience (Practice)				
1-5 years	1.3862±.275			
6-10 years	1.1633±.121	3	4.774	.004*
11-15 years	1.1529±.209	52		
16-20 years	1.0816±.052			

*: Significant at 0.05; df: Degrees of freedom; SD: Standard deviation

Table 5: Relationship between knowledge and practice

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	95.0% confidence interval for B	
	B	Std. error	Beta			Lower bound	Upper bound
(Constant)	1.093	.162		6.733	.000	.767	1.418
knowledge	.073	.125	.079	.582	.563	-.178	.323

6. Conclusions

The findings from this study indicate that nurses at King Salman Specialist Hospital in Hail, Saudi Arabia, demonstrate a satisfactory level of knowledge and practice concerning thrombolytic therapy for patients with acute myocardial infarction. The study also found no significant differences in knowledge based on age, gender, or expertise. However, years of experience did have a notable impact on practice, although this was not observed in knowledge. Additionally, the results suggest that nurses' knowledge may predict their practice effectiveness.

A limitation of this study was the small sample size (N = 56), and therefore, the results cannot be generalized to all emergency nurses.

Nurses are critical to enhancing patient care because they spend the majority of their time with patients. As a result, nurses must have health knowledge and practices in order to engage with patients and preserve their health and care.

The study recommends the implementation of an educational program focused on thrombolytic medications for nurses at King Salman Specialist Hospital in Hail, Saudi Arabia, aiming to enhance their understanding and practices related to healthcare. It also advocates for regular performance reviews of nurses involved in administering thrombolytic treatment. Future research could benefit from a broader and more varied pool of nurses from different hospitals and regions, incorporating objective assessments such as performance tests or simulations to corroborate self-reported data. Furthermore, conducting a longitudinal study could be beneficial in observing changes in knowledge and practice over time and evaluating the effectiveness of continuous training and educational initiatives. Additionally, exploring factors that influence knowledge and practice, such as specific training programs or educational backgrounds, might provide more comprehensive insights into improving nursing practices.

Compliance with ethical standards

Ethical consideration

This study's ethical research considerations included the following: Approval of the IRB-affiliated

ethics committee. The researcher explained the study's purpose and objectives to the sample of nurses who would participate in the study. Nurses were informed that they had the option to accept or decline participation and that they may withdraw at any moment. Confidentiality and anonymity were guaranteed. Prior to research participation, each nurse was required to provide written consent following a brief explanation of the study's goal and expected outcomes. The nurses who agree to participate in the study will be asked to complete an informed consent form. Furthermore, each nurse was aware of the significance of his or her collaboration.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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