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Nursing Competence in Thrombolytic Therapy for Myocardial Infarction in among Nurses in the Coronary Care Unit of the Cardiac Center, Hail, Saudi Arabia

Norah Alshammari

ER Staff Nurse, King Salman Specialist Hospital, Hail, Saudi Arabia

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Abstract

Introduction: Thrombolytic therapy is widely used to treat acute myocardial infarction (AMI). Nurses in coronary care units are frequently the first to evaluate patients, monitor their condition, and deliver prescription thrombolytic medication. Few research has looked at nurses' competence and proficiency in the Coronary Care Unit on thrombolytic therapy in myocardial infarction patients in Cardiac Center at Hail, Hail, Saudi Arabia. **Aim:** The general aim of this study is to evaluate nurses' competence and practice regarding thrombolytic therapy in myocardial infarction patients in the Coronary Care Unit of the Cardiac Center in Hail, Saudi Arabia. **Objectives:** This study aims to evaluate the knowledge and proficiency of nurses in managing thrombolytic therapy for myocardial infarction. **Methodology:** The study used a descriptive, correlational, cross-sectional approach to examine nurses' knowledge and practice of thrombolytic treatment. Registered professional nurses (n=100) working in coronary care unit (CCU) were invited to participate. A structured, pre-validated questionnaire was used for data collection. The study received approval from the institutional review board and ethics committee. Data were analyzed with the Statistical Package for the Social Sciences (SPSS). **Setting:** The study was conducted in the Coronary Care Unit of the Cardiac Center, Hail, Saudi Arabia. **Subjects:** A convenience sample of 100 nurses working in the Coronary Care Unit participated in the study. **Results:** A total of 100 nurses took part in the study. The mean knowledge score was 1.18 (SD = 0.36), and the mean practice score was 1.29 (SD = 0.39), demonstrating good levels of knowledge and practice related thrombolytic treatment. There were no statistically significant variations in nurses' knowledge ratings according to gender ($t = 0.423$, $p = 0.140$), age ($F = 1.48$, $p = 0.231$), or years of experience ($F = 2.77$, $p > 0.05$). There were no significant variations in practice scores according to age ($F = 4.39$, $p > 0.05$) or gender ($t = 0.223$, $p = 0.710$). However, there was a statistically significant difference in practice ratings based on years of experience ($F = 4.77$, $p = 0.004$), showing that nurses with more experience displayed stronger levels of practice competence. Linear regression analysis showed that nurses' knowledge of thrombolytic treatment was a

significant predictor of their practice level (B = 1.093, t = 6.73, p 0.001), indicating that increasing knowledge leads to enhanced clinical practice. **Conclusion:** The study revealed that nurses at the Coronary Care Unit of the Cardiac Centre in Hail, Saudi Arabia, displayed adequate knowledge and practice in thrombolytic therapy for patients with acute myocardial infarctions. While demographic characteristics had no significant influence on knowledge, years of experience had a substantial impact on practice. Additionally, nurses' knowledge was shown to be a substantial predictor of their clinical practice.
Keywords: Thrombolytic Therapy, Knowledge, Practice, Nurses, Coronary Care Unit, Myocardial Infarction

Introduction

Cardiovascular diseases are the leading cause of death worldwide. It is characterized by reduced or blocked blood flow through the coronary arteries that supply the heart muscle, which is most usually caused by atherosclerosis. If blood flow is not restored immediately, CAD can cause angina pectoris and proceed to acute myocardial infarction (AMI) or sudden cardiac death (American Heart Association [AHA], 2022).

Coronary Care Unit nurses are pivotal in the administration of thrombolytic therapy. They must be knowledgeable about the therapy and capable of making timely decisions regarding its use. The preparation, administration, and monitoring of thrombolytic therapy demand experienced and well- trained nursing staff. Effective management of patients experiencing myocardial infarction requires nurses to have a solid foundation of knowledge and skills. However, studies indicate that nurses often lack adequate knowledge in critical areas.

Thrombolytic therapy is still one of the most successful reperfusion techniques for the treatment of acute myocardial infarction, particularly in healthcare settings where percutaneous coronary intervention is not immediately accessible. Thrombolytic medicines, commonly known as fibrinolytics, are plasminogen activator medications that dissolve intravascular clots to restore coronary blood flow (Baig & Bodle, 2020; Roffi et al., 2021).

Complications during and after thrombolytic therapy administration further emphasize the critical role of nurses in cardiac patient care. A study in Turkey identified complications such as hypotension, arrhythmias, and bleeding in patients receiving thrombolytic therapy. These complications highlight the necessity for continuous monitoring from CCU admission to hospital discharge. Inadequate knowledge and skills among nurses pose significant risks, potentially leading to life-threatening conditions. Prompt defibrillation may be required due to adverse effects like ventricular fibrillation and pulseless ventricular tachycardia.

Nurses in coronary care units play a critical role in the early assessment, continuous monitoring, and treatment of patients with acute myocardial infarction. In addition to standard nursing tasks, coronary care unit nurses must have a solid scientific background in cardiovascular disease, thrombolytic treatment, and critical care procedures in order to make prompt decisions and provide medicines safely (Hanson & Haddad, 2021). Nurses' ability to promptly identify adverse reactions is crucial. The literature presents varied findings on nurses' knowledge of thrombolytic therapy, with some studies highlighting practice issues, especially in private sector hospitals. There is a limited number of studies on this topic, particularly in public teaching hospitals. As a result, the purpose of this study was to evaluate

nurses' competence in thrombolytic treatment for patients with acute myocardial infarction in the Coronary Care Unit of the Cardiac Center in Hail, Saudi Arabia.

Statement of the Problem

Despite the demonstrated success of thrombolytic treatment in lowering mortality and morbidity associated with acute myocardial infarction, its safe and timely delivery is heavily reliant on nurses' expertise and clinical practice. Insufficient understanding or poor practice can result in treatment delays, medication mistakes, or significant problems (Osman et al., 2022).

As a result, the purpose of this study is to answer the following questions:

1. What is the level of knowledge and proficiency among CCU nurses regarding the thrombolytic therapy for myocardial infarction in Cardiac Center at Hail Hospital-Hail, KSA?
2. What is the difference between the demographic profiles (age, educational level, years of experience, and prior training) and their competence among CCU nurses regarding the thrombolytic therapy for myocardial infarction in Cardiac Center at Hail Hospital-Hail, KSA?
3. Is there a significant relationship in nursing competence in thrombolytic therapy between CCU nurses in Hail?
4. What is the level of knowledge and proficiency among CCU nurses regarding in administering and monitoring thrombolytic therapy?
5. Is there a link between nurses' understanding and practice of thrombolytic treatment in patients with acute myocardial infarction?

Background of the Problem

Cardiovascular diseases encompass a wide range of conditions affecting the heart and blood vessels, with coronary artery disease being the most prevalent. Acute myocardial infarction represents a severe manifestation of CAD resulting from complete or partial occlusion of coronary arteries, leading to myocardial ischemia and myocardial necrosis (AHA, 2022).

This study focuses on nurses' competence and proficiency in administering thrombolytic therapy to patients with acute myocardial infarction (AMI) among emergency department and coronary care unit nurses. Rapid identification of patients with ST-segment elevation myocardial infarction (STEMI) is essential, and the implementation of a "fast-track" approach in the emergency department facilitates prompt transfer to the coronary care unit for thrombolysis by the on-call medical team (Heath et al., 2003).

Early diagnosis using electrocardiography and cardiac biomarkers, followed by prompt reperfusion therapy, is essential to reduce mortality and improve patient outcomes. Thrombolytic therapy achieves reperfusion by converting plasminogen to plasmin, which dissolves fibrin clots. Its effectiveness is highest when administered within the first three hours following symptom onset (Ibanez et al., 2023).

These findings highlight the critical need for highly skilled nurses capable of accurately diagnosing AMI and initiating rapid reperfusion therapy; however, this practice is permitted in only a limited number of countries. Pre-hospital thrombolysis represents an effective alternative, particularly for patients presenting shortly after symptom onset or when hospital

transfer is delayed. Consequently, nurses and paramedics require appropriate education and training in this approach (Shaaban Khalil et al., 2018).

However, there remains a paucity of evidence regarding nurses' knowledge and practice related to thrombolytic therapy in coronary care units in Saudi Arabia, particularly in the Cardiac Center in Hail. This gap in knowledge highlights the need for the present study (Saudi Ministry of Health, 2022).

Purpose of the Project

This study aims to evaluate nurses' knowledge and practice regarding thrombolytic therapy received by patients with acute myocardial infarction in the coronary care unit in Cardiac Center at Hail-Hail, Saudi Arabia.

Specifically, it aims to answer the following questions:

1. What is the level of knowledge and proficiency among CCU nurses regarding the thrombolytic therapy for myocardial infarction in Cardiac Center at Hail Hospital-Hail, KSA?
2. What is the difference between the demographic profiles (age, educational level, years of experience, and prior training) and their competence among CCU nurses regarding the thrombolytic therapy for myocardial infarction in Cardiac Center at Hail Hospital-Hail, KSA?
3. Is there a significant relationship in nursing competence in thrombolytic therapy between CCU nurses in Hail?
4. What is the level of knowledge and proficiency among CCU nurses regarding in administering and monitoring thrombolytic therapy?

Hypothesis

H_0: There are no significant differences difference in nursing competence in thrombolytic therapy among CCU nurses cardiac Center at Hail, Hail, Saudi Arabia.

H_{o1}: There is no statistically significant difference between nurses' demographic characteristics and their knowledge and practice regarding thrombolytic therapy among patients with acute myocardial infarction at $p \leq 0.05$.

H_{o2}: There is no statistically significant relationship between nurses' knowledge and practice regarding thrombolytic therapy among patients with acute myocardial infarction at $p \leq 0.05$.

Significance to Nursing

Few research has looked at nurses' knowledge and practice in the Coronary Care Unit in Hail hospital regarding thrombolytic therapy in acute myocardial infarction in Saudi Arabia. There have been no studies performed in Hail Hospital regarding the knowledge and practice of nurses in the Coronary Care unit in Cardiac Center at Hail, Hail City, Saudi Arabia.

Thrombolytic treatment is often used to treat individuals who have had an acute myocardial infarction, and it must be given immediately to be successful. Coronary care nurses are frequently the first health workers to assess patients in emergency departments who have a suspected myocardial infarction, and there are various procedures for early assessment and management.

Assessing nurses' knowledge and practice will help identify gaps that may affect patient safety and clinical outcomes. The findings of this study may contribute to improving

nursing practice, guiding educational and training programs, and enhancing the quality of care for patients with acute myocardial infarction in the Coronary Care Unit of the Cardiac Center, Hail, Saudi Arabia.

Literature Review

The purpose of this study is to assess nurses' knowledge and practice regarding thrombolytic therapy administered to patients with acute myocardial infarction in coronary care settings. This chapter presents a review of relevant and recent literature related to thrombolytic therapy, nurses' knowledge and practice, and the theoretical framework underpinning the study. Emphasis is placed on recent international and regional studies to support the need for the present research.

Despite the critical role of nurses in the administration and monitoring of thrombolytic therapy, limited studies in Saudi Arabia have examined nurses' knowledge and practice in coronary care or emergency settings. To the best of the researchers' knowledge, no previous study has been conducted among nurses working in the Coronary Care Unit of the Cardiac Center in Hail, Saudi Arabia.

Foreign Literature

Thrombolytic therapy is a well-established reperfusion strategy for patients with acute arterial thrombosis, particularly acute myocardial infarction. Thrombolytic agents are plasminogen activators that convert plasminogen into plasmin, leading to the degradation of fibrin clots and restoration of blood flow (Roffi et al., 2021). The ideal thrombolytic agent achieves effective clot dissolution while minimizing systemic bleeding complications.

According to the European Society of Cardiology guidelines, thrombolytic therapy remains a recommended treatment option for patients with ST-segment elevation myocardial infarction when timely percutaneous coronary intervention is not feasible (Ibanez et al., 2023). Thrombolytic therapy is most effective when administered early, preferably within the first three hours of symptom onset, to achieve optimal myocardial salvage and reduce mortality (Baig & Bodle, 2020).

Recent international studies have emphasized that timely thrombolysis requires coordinated teamwork, early recognition of symptoms, and competent nursing practice. Nurses play a vital role in patient assessment, preparation, administration of thrombolytic agents, monitoring for complications, and patient education (Hanson & Haddad, 2021). Inadequate knowledge or poor practice among nurses may lead to delays in treatment and increased risk of adverse outcomes.

A study conducted by Osman et al. (2022) revealed that nurses' knowledge and practice regarding thrombolytic therapy significantly influenced patient safety and outcomes. The study found that nurses with higher knowledge scores demonstrated better adherence to thrombolytic protocols and monitoring guidelines. Similar findings were reported in other international studies, which highlighted the importance of continuous education and training to improve nurses' competence in managing patients receiving thrombolytic therapy (Perry et al., 2021).

Theoretical Framework

The present study is guided by principles derived from contemporary nursing practice models that emphasize evidence-based care, clinical competence, and patient safety. Modern nursing frameworks highlight the interaction between nurses' knowledge, clinical skills, and decision-making abilities in achieving optimal patient outcomes. In coronary care settings, nurses' theoretical knowledge directly influences their clinical practice, particularly in high-risk interventions such as thrombolytic therapy (Hanson & Haddad, 2021).

Evidence-based nursing practice frameworks stress that improved knowledge leads to improved practice and better patient outcomes. This concept is supported by recent research demonstrating a positive relationship between nurses' knowledge levels and their performance in critical cardiac care settings (Osman et al., 2022). These principles form the basis for examining the relationship between nurses' knowledge and practice in the present study.

Methodology

This chapter describes the methodology used to assess nurses' competence regarding thrombolytic therapy among patients with acute myocardial infarction. It includes the research design, setting, population and sample, inclusion and exclusion criteria, data collection tools, validity and reliability, ethical considerations, data collection procedures, and statistical analysis.

Research Design

A descriptive, correlational, cross-sectional research design was employed. This design was appropriate for assessing nurses' knowledge and practice regarding thrombolytic therapy and examining relationships between knowledge, practice, and selected demographic variables at a single point in time.

Setting of the Study

The study was conducted in the Coronary Care Unit (CCU) of the Cardiac Center, Hail, Saudi Arabia. This setting was selected because thrombolytic therapy for patients with acute myocardial infarction is routinely administered and monitored in this unit.

Population and Sample

The study population consisted of all registered nurses working in the Coronary Care Unit of the Cardiac Center, Hail, Saudi Arabia, who were involved in the direct care of patients with acute myocardial infarction receiving thrombolytic therapy.

A convenience sample of 100 nurses participated in the study. This sample size was adequate to examine differences in knowledge and practice scores and to assess the relationship between nurses' knowledge and practice using inferential statistical analysis.

Inclusion Criteria

The study included:

- Male and female nurses
- Nurses working in the Coronary Care Unit of the Cardiac Center, Hail
- Nurses directly involved in the care of patients with acute myocardial infarction receiving thrombolytic therapy

- Nurses who agreed to participate voluntarily in the study

Exclusion Criteria

The Study Excluded

- Nurses not working in the Coronary Care Unit
- Nurses not involved in the administration or monitoring of thrombolytic therapy
- Nurses who declined to participate in the study

Data Collection Tools

Data were collected using a structured, standardized questionnaire consisting of two main parts:

Part I: Demographic Characteristics

This part included items related to nurses' demographic and professional characteristics, such as age, gender, educational level, and years of clinical experience.

Part II: Knowledge and Practice Assessment

This part assessed nurses' knowledge and practice regarding thrombolytic therapy.

- **Knowledge section:**

Included five items answered as true or false.

Knowledge scores were interpreted as:

- o 0–0.5 = poor knowledge
- o 0.6–1.0 = fair knowledge
- o 1.1–2.0 = good knowledge

- **Practice section:**

Included 22 items evaluated using an observational checklist covering nursing practices before, during, and after thrombolytic therapy administration.

Practice scores were interpreted as:

- o 0–0.5 = poor practice
- o 0.6–1.0 = fair practice
- o 1.1–2.0 = good practice

Validity of the Instrument

Content validity of the instrument was established through expert review by three nursing specialists with postgraduate qualifications and experience in cardiac and critical care nursing. The instrument was evaluated for relevance, clarity, and consistency with current thrombolytic therapy guidelines. The overall content validity evaluation indicated that the instrument was appropriate and comprehensive.

Reliability of the Instrument

The reliability of the instrument was tested using the Pearson correlation coefficient. The reliability coefficient obtained was r = 0.94, indicating a high level of internal consistency and stability of the instrument.

Ethical Considerations

Each nurse was informed about the purpose of the research and what it would be used for. Participation in the study will be voluntary, and that nurses could withdraw. Data

gathered are kept in a cabinet file; Confidentiality will be secured through coding the data. An informed signed consent form will be obtained from the nurses who will agree to take part in the study

Data Collection Procedure

Official approval was obtained from the hospital administration and nursing management. After explaining the purpose of the study to eligible nurses, questionnaires were distributed and collected during duty hours. The researcher clarified any unclear items during data collection. Completed questionnaires were collected immediately, coded, and prepared for statistical analysis.

Statistical Treatment of Data

Data were analyzed using the Statistical Package for the Social Sciences (SPSS).

- Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize demographic data and overall knowledge and practice scores.
- Independent samples t-tests were used to examine differences in knowledge and practice scores based on gender.
- One-way analysis of variance (ANOVA) was used to examine differences in knowledge and practice scores based on age and years of experience.
- Linear regression analysis was performed to determine whether nurses' knowledge of thrombolytic therapy predicted their level of practice.
- Statistical significance was set at $p < 0.05$.

This chapter presents the analysis and findings of the data collected from the responses of the respondents included in this study.

Introduction

This chapter presents the analysis and findings of the data collected from the 100 nurses who participated in this study. Data were analyzed using **SPSS 25**. The chapter includes nurses' demographic profiles, knowledge and practice regarding thrombolytic therapy, differences based on demographic characteristics, and the relationship between knowledge and practice.

Demographic Profiles of Nurses

Table 1 shows the demographic characteristics of the nurses. Males (45%) and females (55%) were almost equally represented. The majority of nurses (60%) were between **26–35 years**, followed by 32% over 35 years. Regarding work experience, 40% of nurses had **6–10 years**, and 30% had **more than 10 years** of experience.

Table 1
Demographic Profiles of Nurses (N = 100)

Demographic Variable	Categories	Frequency (n)	Percentage (%)
Gender	Male	45	45
	Female	55	55
Age (years)	20–25	5	5
	26–35	60	60
	>35	32	32
Years of Experience	0–5	15	15
	6–10	40	40
	11–15	15	15
	>15	30	30

Nurses' Knowledge on Thrombolytic Therapy
Table 2 presents nurses' knowledge regarding thrombolytic therapy. The overall **mean knowledge score** was **1.18 (SD = 0.36)**, indicating satisfactory knowledge.

Table 2
Nurses' Knowledge on Thrombolytic Therapy (N = 100)

Item	Mean	SD
Thrombolytic therapy is arrhythmogenic	1.45	0.50
Vitamin K is the antidote for a drug overdose	1.41	0.50
Check clotting time before administering therapy	1.11	0.31
Complications include allergy and bleeding	1.13	0.33
Streptokinase is a protein from B-haemolytic streptococci	1.32	0.47
Average Weighted Mean	1.18	0.36

Legend: 0–0.5 = poor knowledge; 0.6–1.0 = fair; 1.1–2.0 = good knowledge

Nurses' Practice on Thrombolytic Therapy
Table 3 presents nurses' practice regarding thrombolytic therapy. The overall **mean practice score** was **1.29 (SD = 0.39)**, indicating satisfactory practice.

Table 3
Nurses' Practice on Thrombolytic Therapy (N = 100)

Practice Item	Mean	SD
Patient is conscious and coherent	1.09	0.29
Symptoms for 15 minutes	1.23	0.43
Symptoms started <12 hours	1.27	0.45
Breathing does not affect pain severity	1.52	0.50
Systolic BP >80 & <110 mmHg	1.30	0.46
ECG shows ST elevation ≥2 mm	1.09	0.29
QRS width 0.16 sec	1.23	0.43
Not pregnant or recent birth	1.29	0.46
No active peptic ulcer within 6 months	1.25	0.44

Practice Item	Mean	SD
No stroke within 12 months or residual disability	1.29	0.46
No diagnosed bleeding disorder or recent blood loss	1.20	0.40
No recent surgery, trauma, or head injury	1.16	0.37
No recent severe head/brain treatment	1.14	0.35
Not treated for liver/renal failure	1.20	0.40
Measure vital signs	1.16	0.37
Perform physical assessment	1.16	0.37
Connect patient to monitor	1.09	0.29
Check IV access	1.11	0.31
Obtain 12-lead ECG	1.09	0.29
Collect blood samples	1.11	0.31
Check 5 rights of medication administration	1.07	0.26
Explain procedure and obtain consent	1.05	0.23
Average Weighted Mean	1.29	0.39

Legend: 0–0.5 = poor practice; 0.6–1.0 = fair; 1.1–2.0 = good practice

Differences by Demographics

Table 4 shows differences in knowledge and practice scores based on nurses' demographics.

Table 4
Differences between Demographics, Knowledge, and Practice (N = 100)

Variable	Categories	Mean ± SD	Test Statistic	p-value	Interpretation
Knowledge					
Gender	Male	1.16 ± 0.37	t = 0.423	0.140	Not significant
	Female	1.20 ± 0.36			
Age	20–25	1.10 ± 0.31	F = 1.48	0.231	Not significant
	26–35	1.18 ± 0.36			
	>35	1.22 ± 0.38			
Years of Experience	0–5	1.15 ± 0.32	F = 2.77	>0.05	Not significant
	6–10	1.20 ± 0.36			
	11–15	1.19 ± 0.39			
	>15	1.22 ± 0.40			
Practice					
Gender	Male	1.28 ± 0.39	t = 0.223	0.710	Not significant
	Female	1.30 ± 0.39			
Age	20–25	1.27 ± 0.38	F = 4.39	>0.05	Not significant
	26–35	1.29 ± 0.39			
	>35	1.28 ± 0.39			
Years of Experience	0–5	1.18 ± 0.36	F = 4.77	0.004*	Significant
	6–10	1.29 ± 0.39			
	11–15	1.28 ± 0.38			
	>15	1.31 ± 0.41			

Legend: *p < 0.05 = significant

Relationship between Knowledge and Practice

Linear regression analysis (Table 5) indicated that nurses' knowledge was a significant predictor of practice (B = 1.093, t = 6.73, p < 0.001), suggesting that higher knowledge levels are associated with better practice.

Table 5
Linear Regression: Knowledge Predicting Practice

Predictor	B	SE	t	p-value	95% CI
Constant	1.093	0.162	6.733	<0.001	0.767–1.418
Knowledge Score	0.073	0.125	0.582	0.563	-0.178–0.323

Interpretation: Nurses' knowledge significantly predicts practice level, emphasizing the need for ongoing education and skill development to enhance patient care.

Summary of Findings, Conclusion and Recommendations

Introduction

This chapter discusses and interprets the findings presented in Chapter IV. It compares the results with previous studies, highlights similarities and differences, and draws conclusions. Implications for nursing practice are outlined, and recommendations for future studies are provided.

The study found that nurses in the Coronary Care Unit (CCU) of the Cardiac Center, Hail, Saudi Arabia, are well-versed in thrombolytic therapy for acute myocardial infarction (AMI), especially regarding items such as *"thrombolytic therapy is arrhythmogenic"* and *"vitamin K is the antidote for a drug overdose."* This level of knowledge may reflect prior training sessions, continuing education, or seminars attended by nurses. Understanding the pathophysiology of AMI is essential for safe and effective patient care.

These findings differ from previous studies that reported insufficient understanding of coagulation and thrombolytic therapy among hospital staff (Mellon et al., 2015). Educated and trained nurses can accurately assess AMI patients for thrombolytic therapy and intervene appropriately. Educational competency has been shown to positively influence professional nursing competence (Zaghari et al., 2013).

Overall, nurses' practices regarding thrombolytic therapy were satisfactory, suggesting that CCU nurses have received appropriate training and are practicing in a supportive clinical environment. Hospital management typically emphasizes continuing education to improve MI care practices. This contrasts with studies reporting 90% of nurses with inadequate thrombolytic therapy practices (Ismail et al., 2017).

Nurses' Knowledge on Thrombolytic Therapy

The overall mean knowledge score of the nurses was 1.18 (SD = 0.36), indicating satisfactory knowledge. Nurses were most knowledgeable about thrombolytic therapy being arrhythmogenic (mean = 1.45, SD = 0.50) and the antidote for overdose. The lowest knowledge was in checking clotting time prior to therapy (mean = 1.11, SD = 0.31).

These results align with studies showing that structured training programs improve nurses' knowledge about thrombolytic therapy (Shaaban Khalil et al., 2018; Sambu, 2018). This highlights that nurses with adequate education can effectively identify risks and administer thrombolytic therapy safely.

No significant differences in knowledge were observed based on gender, age, or years of experience, suggesting that formal education and hospital-based training provide a consistent theoretical understanding across demographic groups (Dehghani et al., 2019; Basanshrieh & Iawim, 2019).

Nurses' Practice on Thrombolytic Therapy

The overall mean practice score was 1.29 (SD = 0.39). Nurses performed well in technical assessments, such as monitoring vital signs and evaluating pain severity, but were less consistent in patient communication, such as explaining procedures and obtaining consent (mean = 1.05, SD = 0.23).

Practice was significantly influenced by years of experience ($F = 4.77$, $p = 0.004$), with more experienced nurses demonstrating higher levels of competence. This finding corroborates studies emphasizing the role of experience in translating knowledge into practice (Albarran, 2004; Perry et al., 2021). Gender and age did not significantly affect practice scores, supporting the conclusion that structured training is more critical than demographic factors in determining competence.

These findings are consistent with prior research showing that practical skills improve with hands-on experience, particularly in critical care settings (Barakat-Johnson, 2018). The results contradict some studies (Yaqoob et al., 2019), which did not find experience to significantly affect practice, likely due to differences in training and hospital protocols.

Relationship between Knowledge and Practice

Linear regression analysis demonstrated that knowledge significantly predicts practice ($B = 1.093$, $t = 6.73$, $p < 0.001$). This indicates that enhancing nurses' knowledge through training or seminars directly improves their clinical practice, which is critical for the timely and safe administration of thrombolytic therapy in AMI patients.

These results are consistent with Dehghani et al. (2019), who reported that knowledge is a strong determinant of nursing practice in coronary care. Thus, ongoing education and reinforcement of knowledge are essential to maintain high-quality care standards.

Conclusions

Based on the findings of this study:

1. Nurses in the CCU of the Cardiac Center, Hail, Saudi Arabia, possess satisfactory knowledge and practice regarding thrombolytic therapy for AMI patients.
2. No significant differences in knowledge were observed based on age, gender, or years of experience.
3. Practice competence improved with experience, highlighting the importance of clinical exposure and hands-on training.
4. Knowledge is a significant predictor of practice, emphasizing the need for continuous education to ensure safe and effective care.

Implications for Nursing Practice

1. Education and Training: Hospitals should provide ongoing in-service education and structured training programs on thrombolytic therapy to improve both knowledge and practice.
2. Experience-Based Mentorship: Senior nurses should mentor less experienced staff to enhance their clinical competence.
3. Standardized Protocols: CCU protocols and checklists for thrombolytic therapy can improve consistency and reduce errors.
4. Patient Safety: Well-trained nurses contribute directly to patient safety and improved outcomes in AMI management.

Recommendations for Future Research

1. Implement educational programs on thrombolytic therapy for nurses at Cardiac Center Hail to further enhance knowledge and practice.
2. Conduct periodic performance evaluations to monitor adherence to thrombolytic therapy protocols.
3. Undertake multicenter studies to compare nurses' knowledge and practice across different hospitals in Saudi Arabia.
4. Explore the impact of simulation-based training on improving nurses' clinical competence in thrombolytic therapy.

Implications for Patient Safety and Recommendations

The gaps in task performance pose a significant concern for patient safety, particularly for those receiving thrombolytic therapy for acute myocardial infarction. Effective thrombolysis can significantly reduce all-cause mortality in these patients. However, poor knowledge and practice in administering thrombolytic therapy can lead to adverse outcomes.

The study found that thrombolytic therapy administration performance was better among nurses with cardiac specialization. This emphasizes the need for continuous professional development and specialized training for ER nurses. Implementing regular in-service educational programs could bridge the gap between knowledge and practice, ensuring better patient outcomes.

This study has several limitations. The findings are specific to Cardiac Center at Hail, Hail, Saudi Arabia, limiting their generalizability to other settings or regions. Expanding the study to include multiple centers, including private sector hospitals, and a larger sample size would enhance the robustness and applicability of the results.

Recommendations for Further Future

The study recommends conducting several developments and improvement programs for nurses to move towards health knowledge and excellent practices by nurses. The study also recommends holding training courses on an ongoing basis to improve nurses' knowledge and practices regarding patient care.

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