

Assessment of Nurses' Knowledge and Practices Regarding Thrombolytic Therapy in Myocardial Infarction at Tertiary Care Hospitals of Peshawar

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ABSTRACT

Background: Thrombolytic therapy is an important reperfusion strategy in myocardial infarction, particularly where timely primary percutaneous coronary intervention is unavailable or delayed. Nurses play a central role in patient assessment, drug preparation, monitoring, documentation, complication recognition, and patient education during thrombolytic therapy. **Objective:** To assess nurses' knowledge and self-reported practices regarding thrombolytic therapy in myocardial infarction at tertiary care hospitals in Peshawar. **Methods:** A descriptive cross-sectional study was conducted from August to November 2025 among 135 registered nurses working in emergency, intensive care, coronary care, and cardiology-related units of tertiary care hospitals in Peshawar. Participants were selected using convenience sampling from an accessible population of 207 nurses. Data were collected using a structured questionnaire assessing socio-demographic characteristics, knowledge, and self-reported practices regarding thrombolytic therapy. Descriptive statistics were used to summarize frequencies and percentages. **Results:** Most participants were aged 26–30 years (68.9%), female (68.1%), and BSN graduates (75.6%). ICU nurses formed the largest departmental group (34.8%), and 49.6% had 4–6 years of experience. Prior thrombolytic therapy training was reported by 41.5% of participants. Among valid responses, 78.0% had good knowledge and 84.6% reported desirable practice. **Conclusion:** Most nurses demonstrated good knowledge and desirable self-reported practices, although fewer than half had received formal thrombolytic therapy training. Structured competency-based training and standardized clinical protocols are recommended. **Keywords:** myocardial infarction, nurses, knowledge, practice, thrombolytic therapy, tertiary care hospitals, Peshawar

INTRODUCTION

Cardiovascular diseases remain a major cause of morbidity and mortality worldwide, with myocardial infarction representing one of the most time-sensitive cardiovascular emergencies. Myocardial infarction occurs when coronary blood flow is obstructed, most commonly due to thrombus formation, resulting in myocardial ischemia, cellular injury, arrhythmia, heart failure, or death if reperfusion is delayed. Clinically, patients commonly present with chest pain or discomfort that may radiate to the shoulder, arm, neck, jaw, back, or epigastrium, and may be accompanied by dyspnea, nausea, dizziness, diaphoresis, fatigue, or atypical symptoms, particularly in vulnerable patient groups (1,2).

Thrombolytic therapy remains an important reperfusion strategy in acute myocardial infarction, particularly in settings where timely primary percutaneous coronary intervention is unavailable or delayed. Thrombolytic agents such as streptokinase, alteplase, and tenecteplase act by promoting

fibrinolysis and restoring coronary perfusion through dissolution of the occluding thrombus. Early administration is clinically important because delayed reperfusion increases the risk of myocardial damage, haemodynamic instability, bleeding complications, stroke, and mortality. Therefore, safe thrombolytic administration requires accurate recognition of indications, contraindications, dosage protocols, monitoring requirements, adverse effects, and emergency response procedures (3).

Nurses play a central role in the safe delivery of thrombolytic therapy because they are directly involved in patient assessment, preparation of medication, verification of eligibility, monitoring of vital signs, documentation, recognition of complications, and patient and family education. In emergency, intensive care, cardiac intensive care, and coronary care settings, nursing knowledge and practice directly influence the timeliness, safety, and quality of thrombolytic care. Nurses who lack adequate knowledge of contraindications, warning signs, monitoring parameters, or post-thrombolysis precautions may unintentionally contribute to delays, medication errors, inadequate surveillance, or preventable adverse outcomes (4).

The burden of cardiovascular disease is particularly important in low- and middle-income countries, where limitations in emergency infrastructure, specialist availability, referral systems, and timely access to advanced reperfusion services may increase reliance on thrombolytic therapy. Previous literature has highlighted the need for competent nursing practice in acute myocardial infarction care and has emphasized that structured training, guideline-based protocols, and continuing professional education are essential for improving the safe administration of thrombolytic drugs (5,6). In Pakistan, cardiovascular disease continues to represent a major public health concern, and delayed presentation, limited awareness, and resource constraints may further complicate acute myocardial infarction management (7,8).

Despite the clinical importance of thrombolytic therapy, limited local evidence is available regarding nurses' knowledge and self-reported practices related to thrombolytic therapy in tertiary care hospitals in Peshawar. Understanding existing knowledge and practice levels among nurses working in emergency and cardiac-related critical care units is necessary for identifying training needs, strengthening clinical protocols, and improving patient safety. Therefore, this study aimed to assess nurses' knowledge and self-reported practices regarding thrombolytic therapy in myocardial infarction at tertiary care hospitals in Peshawar.

MATERIALS AND METHODS

This study used a descriptive cross-sectional design to assess nurses' knowledge and self-reported practices regarding thrombolytic therapy in myocardial infarction. A cross-sectional design was considered appropriate because the purpose of the study was to measure existing knowledge and practice levels among nurses at a single point in time without introducing an intervention or following participants longitudinally. The study was conducted over four months, from August 2025 to November 2025, in selected clinical units of tertiary care hospitals in Peshawar, Pakistan, including Lady Reading Hospital and Peshawar Institute of Cardiology. The participating units included Emergency, Intensive Care Unit, Medical Intensive Care Unit, Cardiac Intensive Care Unit, Coronary Care Unit, and Cardiology Ward, where nurses are more likely to encounter patients requiring acute myocardial infarction care and thrombolytic therapy.

The study population comprised registered nurses working in emergency, intensive care, cardiac care, coronary care, and cardiology-related units of the selected tertiary care hospitals. Nurses were eligible for inclusion if they were registered nurses, had at least six months of clinical experience in ICU, CCU, Emergency, or related cardiac-care settings, were directly involved in patient care, and were willing to participate in the study. Student nurses, interns, nurses with less than six months of clinical experience, nurses on leave during the data collection period, nurses working in administrative roles, and nurses not directly involved in patient care were excluded. Participants were selected using convenience sampling

from an accessible population of 207 nurses working in the relevant units of both hospitals. The sample size was calculated using the RaoSoft online sample-size calculator by taking the population size as 207, confidence level as 95%, and margin of error as 5%, which yielded a required sample size of 135 nurses.

Data were collected using a structured questionnaire adopted from previously published and validated tools used to assess nurses' knowledge and practice regarding thrombolytic therapy and acute myocardial infarction care (9,10). The instrument included three main sections. The first section collected socio-demographic and professional information, including age, gender, educational qualification, current department, total years of nursing experience, years of experience in the current unit, and prior training related to thrombolytic therapy. The second section assessed knowledge regarding thrombolytic therapy, including indications, contraindications, commonly used thrombolytic agents, administration principles, monitoring requirements, and complications. Each correct response was scored as 1, while an incorrect or "do not know" response was scored as 0, giving a total possible knowledge score ranging from 0 to 12. Knowledge was categorized as good for scores of 9 or above, moderate for scores of 6 to 8, and poor for scores of 5 or below. The third section assessed self-reported nursing practices related to thrombolytic therapy, including drug preparation, administration, monitoring, documentation, complication recognition, and patient education. Practice items were rated on a five-point Likert scale consisting of Always, Often, Sometimes, Rarely, and Never. For scoring purposes, Always and Often were categorized as desirable practice and assigned a score of 1, while Sometimes, Rarely, and Never were categorized as undesirable practice and assigned a score of 0. The total practice score ranged from 0 to 15, with scores of 12 or above categorized as adequate or desirable practice and scores below 12 categorized as inadequate or undesirable practice.

Before data collection, ethical approval was obtained from the relevant institutional review authority and permission was obtained from the participating hospitals and HIMS College of Nursing. Eligible nurses were approached during shift changes, duty breaks, or other suitable times that did not interfere with patient care. The purpose of the study was explained to each participant, and written informed consent was obtained before questionnaire administration. Participants were informed that their participation was voluntary, that they could withdraw at any stage, and that their responses would be kept confidential and used only for research purposes. The questionnaires were completed in a quiet area within the clinical unit, and the estimated completion time was approximately 10–15 minutes. Research team members received orientation regarding informed consent, confidentiality, participant approach, and standardized questionnaire administration to reduce procedural variation during data collection.

The main study variables were nurses' knowledge level and self-reported practice level regarding thrombolytic therapy. Knowledge level was operationally classified as poor, moderate, or good according to the total knowledge score, while practice level was operationally classified as desirable or undesirable according to the total practice score. Socio-demographic and professional variables included age group, gender, qualification, department, total nursing experience, and prior training on thrombolytic therapy. To reduce information bias, all participants received the same questionnaire format and the same general explanation of the study purpose. To reduce selection-related variation, data were collected from nurses working in clinically relevant units where exposure to myocardial infarction care and thrombolytic therapy was expected.

Data were entered, cleaned, and checked for completeness before analysis. Descriptive statistics were used to summarize participant characteristics, knowledge levels, and practice levels. Categorical variables were presented as frequencies and percentages. Missing responses were handled using available-case analysis for the relevant variable, and denominators were reported according to the number of valid responses for each outcome. Associations between knowledge level, practice level, and selected professional variables such as training status, department, qualification, and years of experience were planned for analysis using chi-square or Fisher's exact test where appropriate. A p-value of less than

0.05 was considered statistically significant. Data integrity was maintained through careful checking of completed questionnaires, verification of entered data, and consistency checks before final analysis.

RESULTS

A total of 135 nurses participated in the study. The demographic and professional characteristics of the participants are presented in Table 1.

Table 1. Demographic Characteristics of Participants

Variable	Category	n	%
Age, years	21–25	8	5.9
	26–30	93	68.9
	31–35	30	22.2
	36–40	4	3.0
Gender	Male	43	31.9
	Female	92	68.1
Qualification	Diploma	24	17.8
	BSN	102	75.6
	MSN Scholar	9	6.7

The majority of participants were aged 26–30 years, representing 93 of 135 nurses (68.9%), followed by 31–35 years in 30 participants (22.2%). Female nurses constituted 92 participants (68.1%), while male nurses accounted for 43 participants (31.9%). Most participants were BSN graduates, comprising 102 nurses (75.6%), whereas 24 participants (17.8%) held a diploma qualification and 9 participants (6.7%) were MSN scholars.

Table 2. Professional Characteristics of Participants

Variable	Category	n	%
Department	Emergency	24	17.8
	ICU	47	34.8
	CCU	34	25.2
	Cardiology Ward	30	22.2
Nursing experience, years	1–3	38	28.1
	4–6	67	49.6
	7–9	18	13.3
	10–12	12	8.9
Prior thrombolytic therapy training	No	79	58.5
	Yes	56	41.5

ICU nurses formed the largest departmental group, with 47 participants (34.8%), followed by CCU nurses with 34 participants (25.2%), cardiology ward nurses with 30 participants (22.2%), and emergency department nurses with 24 participants (17.8%). Nearly half of the participants had 4–6 years of nursing experience, accounting for 67 nurses (49.6%). Prior training in thrombolytic therapy was reported by 56 participants (41.5%), while 79 participants (58.5%) had not received such training.

Table 3. Nurses' Knowledge Levels Regarding Thrombolytic Therapy

Knowledge Level	n	Valid %	Total %
Poor	14	10.6	10.4
Moderate	15	11.4	11.1
Good	103	78.0	76.3
Valid responses	132	100.0	97.8
Missing responses	3	—	2.2
Total sample	135	—	100.0

Knowledge scores were available for 132 participants, while 3 responses were missing. Among valid responses, 103 nurses (78.0%) demonstrated good knowledge regarding thrombolytic therapy, 15 nurses (11.4%) had moderate knowledge, and 14 nurses (10.6%) had poor knowledge. When calculated against the total sample of 135 participants, good knowledge was present in 76.3% of participants.

Practice scores were available for 130 participants, while 5 responses were missing. Among valid responses, 110 nurses (84.6%) reported desirable practice regarding thrombolytic therapy, whereas 20 nurses (15.4%) reported undesirable practice. When calculated against the total sample of 135 participants, desirable practice was present in 81.5% of participants.

Table 4. Nurses' Self-Reported Practice Levels Regarding Thrombolytic Therapy

Practice Level	n	Valid %	Total %
Undesirable	20	15.4	14.8
Desirable	110	84.6	81.5
Valid responses	130	100.0	96.3
Missing responses	5	—	3.7
Total sample	135	—	100.0

Table 5. Summary of Key Study Outcomes

Outcome	Valid n	Category	n	Valid %	Total %
Knowledge regarding thrombolytic therapy	132	Good	103	78.0	76.3
Practice regarding thrombolytic therapy	130	Desirable	110	84.6	81.5
Prior thrombolytic therapy training	135	Yes	56	41.5	41.5

The key outcome summary shows that 103 of 132 valid respondents (78.0%) had good knowledge and 110 of 130 valid respondents (84.6%) had desirable practice regarding thrombolytic therapy. However, only 56 of 135 participants (41.5%) reported prior training in thrombolytic therapy. This indicates that although most participants demonstrated good knowledge and desirable self-reported practice, formal training exposure was reported by fewer than half of the sample.

No inferential statistics were available in the supplied manuscript for associations between knowledge level, practice level, training status, department, qualification, gender, or years of experience. Therefore, no p-values, odds ratios, confidence intervals, or effect sizes were reported. For publication readiness, cross-tabulation with chi-square or Fisher's exact testing should be added to examine whether prior thrombolytic therapy training, clinical department, educational qualification, or years of experience are significantly associated with knowledge and practice levels.



Figure 1 Nurses' Thrombolytic Therapy Preparedness: Training, Knowledge, Practice, and Sample Profile

The panelled figure summarizes the main clinically relevant patterns from the aggregated study data. Formal thrombolytic therapy training was reported by only 56 of 135 nurses (41.5%), whereas good knowledge was observed in 103 of 132 valid responses (78.0%) and desirable practice in 110 of 130 valid

responses (84.6%). ICU nurses represented the largest departmental group, accounting for 47 participants (34.8%), followed by CCU nurses with 34 participants (25.2%), cardiology ward nurses with 30 participants (22.2%), and emergency nurses with 24 participants (17.8%). Nearly half of the sample had 4–6 years of experience (67/135, 49.6%), indicating that the findings largely reflect early-to-mid-career nurses working in acute and cardiac-care settings. Outcome-data completeness was high, with valid knowledge scores for 132 participants and valid practice scores for 130 participants, although the missing responses should be acknowledged when reporting final denominators.

DISCUSSION

The present study assessed nurses' knowledge and self-reported practices regarding thrombolytic therapy in myocardial infarction at tertiary care hospitals in Peshawar. The findings showed that most participants demonstrated good knowledge and desirable self-reported practice regarding thrombolytic therapy. Among valid responses, 103 of 132 nurses (78.0%) had good knowledge, while 110 of 130 nurses (84.6%) reported desirable practice. These findings suggest that a substantial proportion of nurses working in emergency, intensive care, coronary care, and cardiology-related units possessed a favourable level of preparedness for thrombolytic therapy. However, the interpretation should remain cautious because the study used a descriptive cross-sectional design and relied on self-reported practice, which may not fully represent actual bedside performance.

The high proportion of good knowledge is clinically important because thrombolytic therapy requires timely recognition of eligible patients, awareness of contraindications, accurate drug preparation, continuous monitoring, and rapid identification of complications such as bleeding or neurological deterioration. Nurses working in acute and cardiac-care environments are often among the first professionals to observe patient deterioration, monitor vital signs, document treatment response, and communicate urgent changes to physicians. Therefore, adequate nursing knowledge is essential for safe and effective thrombolytic therapy in myocardial infarction care (3,4).

An important finding of this study was the contrast between formal training exposure and reported knowledge and practice levels. Only 56 of 135 participants (41.5%) reported prior training in thrombolytic therapy, whereas good knowledge and desirable practice were observed in a larger proportion of valid respondents. This may indicate that nurses acquire knowledge through clinical exposure, unit-based experience, peer learning, routine protocols, or informal supervision in cardiac and emergency settings. However, this explanation remains interpretive because the present results did not include inferential testing between training status and knowledge or practice levels. Future analysis should examine whether formal thrombolytic therapy training is statistically associated with better knowledge and practice outcomes.

The professional profile of the sample also supports the relevance of the findings to acute myocardial infarction care. ICU nurses represented the largest group, followed by CCU, cardiology ward, and emergency department nurses. Nearly half of the participants had 4–6 years of nursing experience, indicating that the sample mainly represented early-to-mid-career nurses working in clinical areas where thrombolytic therapy knowledge is directly applicable. Previous studies have similarly emphasized that nurses in emergency and coronary-care settings require specific competency in thrombolytic therapy, including drug administration, monitoring, contraindication screening, and post-treatment care (6,8,10).

Although the findings are encouraging, several limitations should be considered. First, the study was conducted in selected tertiary care hospitals in Peshawar using convenience sampling, which limits generalizability to all nurses in Pakistan or other healthcare settings. Second, practice was measured through self-report rather than direct observation, so desirable practice may have been overestimated due to social desirability or recall bias. Third, the study reported categorical knowledge and practice levels but did not provide item-level responses, mean scores, or domain-wise performance, which limits identification of specific knowledge gaps. Fourth, missing responses were present for knowledge and

practice outcomes, although the proportion was small. Finally, inferential analyses were not available in the supplied results, so conclusions regarding the influence of training, qualification, experience, gender, or department cannot be made.

Despite these limitations, the study provides useful local evidence regarding nurses' preparedness for thrombolytic therapy in tertiary-care settings. The findings highlight the need for structured, competency-based continuing education programmes focused on thrombolytic indications, contraindications, dosage preparation, infusion monitoring, documentation, management of adverse events, and patient education. Hospitals should also consider periodic skills assessment, refresher training, clinical checklists, and unit-level protocols to ensure that high self-reported practice is supported by standardized and observable clinical performance.

CONCLUSION

This study found that most nurses working in tertiary care hospitals in Peshawar demonstrated good knowledge and desirable self-reported practices regarding thrombolytic therapy in myocardial infarction. Among valid responses, 78.0% of participants had good knowledge and 84.6% reported desirable practice, while only 41.5% had received prior formal training in thrombolytic therapy. These findings suggest a favourable overall level of reported preparedness but also identify an important training gap. Structured continuing education, competency-based clinical training, periodic assessment, and standardized thrombolytic therapy protocols are recommended to strengthen nursing performance and improve patient safety in acute myocardial infarction care.

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