

# ACCURACY IN ED TRIAGE FOR SYMPTOMS OF ACUTE MYOCARDIAL INFARCTION



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**Introduction:** More than 6 million people present to emergency departments across the United States annually with symptoms of acute myocardial infarction (AMI). Of the 1 million patients with AMI, 350,000 die during the acute phase. Accurate ED triage can reduce mortality and morbidity, yet accuracy rates are low. In this study we explored the relationship between patient and nurse characteristics and accuracy of triage in patients with symptoms of AMI.

**Methods:** This retrospective, descriptive study used patient data from electronic medical records. The sample of 286 patients was primarily white, with a mean age of 61.44 years (standard deviation [SD],  $\pm 13.02$ ), and no history of heart disease. The sample of triage nurses was primarily white and female, with a mean age of 45.46 years (SD,  $\pm 11.72$ ) and 18 years of nursing experience. Nineteen percent of the nurses reported having earned a bachelor's degree.

**Results:** Emergency nurse triage accuracy was 54%. Patient race and presence of chest pain were significant predictors of accuracy. Emergency nurse age was a significant predictor of accuracy in triage, but years of experience in nursing was not a significant predictor.

**Discussion:** Of the 9 variables investigated, only patient race, symptom presentation, and emergency nurse age were significant predictors of triage accuracy. Inconsistency in triage decisions may be due to other conditions not yet explored, such as critical thinking skills and executive functions. This study adds to the body of evidence regarding ED triage of patients with symptoms of AMI. However, further exploration into decisions at triage is warranted to improve accuracy, expedite care, and improve outcomes.

**Key words:** Triage; Accuracy; Gender; Race/ethnicity; AMI; Experience

Accurate decisions at ED triage can reduce mortality and morbidity, yet data indicate that accuracy rates are low.<sup>1,2</sup> More than 6 million patients present to emergency departments across the United States every year with chest pain; 6 million more present with additional symptoms of coronary heart disease such as dizziness, nausea, or shortness of breath.<sup>3</sup> Coronary heart disease is the leading cause of death in the US.<sup>4</sup> Investigating the possible reasons for inaccuracy is necessary to improve care in these populations.

According to the Emergency Severity Index (ESI),<sup>5</sup> patients are assigned a triage level based on the following scale: level 1, resuscitation needed; level 2, emergent; level 3,

urgent but stable and can safely wait in the waiting room; level 4, nonurgent; and level 5, referable to another care provider such as a clinic setting. The American College of Cardiology (ACC) and the American Heart Association (AHA) recommend that certain goals be met for patients presenting to the emergency department with symptoms suggestive of acute myocardial infarction (AMI): obtain an electrocardiogram (ECG) within 10 minutes of arrival; have a patient evaluated by a health care provider within 10 minutes; and initiate thrombolytics within 30 minutes or percutaneous coronary intervention within 90 minutes of arrival.<sup>6</sup> To meet these goals requires that a patient be triaged as level 2 and moved to an area for initiation of care. The time to ECG may be beyond the control of the emergency nurse when staffing is low; however, a decision to allow the patient to wait in the waiting room with a level 3 designation violates the ACC and AHA standards.

Determining the severity of illness and urgency of care required are the main functions of the emergency nurse in the triage role. Triage level designation is a subjective decision based on input from several sources. In preliminary triage decision making, triage is not always straightforward, and diagnostic tests may be limited. Along with data collected during a brief nursing assessment, the nurse elicits other information such as medical history and accompanying signs and symptoms. Nurses in the triage role have the

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responsibility of identifying patients with cardiac emergencies who need prompt care.

## Literature Review

In studies that used designs such as retrospective electronic medical record (EMR) review, written vignettes, computerized visual vignettes, and direct observation of triage to investigate ED triage, accuracy rates from 40% to 70% were found.<sup>2,7-9</sup> Investigating the ability to predict hospital admission is another design used in studies aimed at identifying accurate decision making by emergency nurses.<sup>1</sup> Nursing research has continued to identify inaccuracies in triage decisions.<sup>7,8,10</sup> Urgent cases assigned nonurgent status may place patients at risk for delayed treatment and poor outcomes. Patients may be judged by the triage nurse as not having a medical emergency when one exists. When this situation occurs, the patient is said to be undertriaged, meaning the patient was assigned a lower triage level than is actually warranted.<sup>11</sup> Patients are also sometimes overtriaged—that is, assigned a triage level higher than necessary—which may cause a stable patient to be seen ahead of a patient with an emergent medical need. For persons with AMI, the consequences may be permanent cardiac muscle damage and even death. It is important to note that a possible limitation in studies of triage decisions is that a correct decision is multifaceted. Most patients presenting to the emergency department have not yet received a differential diagnosis at the point of triage. A patient experiencing immediate life-threatening symptoms suggestive of AMI may be deemed correctly triaged when given a level 1 instead of a level 2 designation.<sup>5</sup>

The association of patient characteristics and triage accuracy has been investigated by nurse researchers with varying results. Females were more often triaged incorrectly in numerous studies,<sup>7,8</sup> as were nonwhite patients.<sup>13</sup> Younger patient age has been noted to decrease triage accuracy.<sup>13,14</sup> In a study of cardiac triage decision making, registered nurses (RNs) were found to hold cultural biases and stereotypes. Specific cues utilized in triage decision making included patient demographics, attitudes, perceptions, and cultural beliefs.<sup>15</sup>

Researchers investigating factors that affect patient outcomes identified RN education level and years of experience as significant variables.<sup>16</sup> Benner and Tanner<sup>17</sup> hypothesized that novice RNs are hesitant and slow in assessment of patients in their care and experienced RNs are rapid and fluid in problem solving in patient situations. Although the work of Benner and Tanner<sup>17</sup> emphasized stages of knowledge from novice to expert, it is unclear whether these stages influence emergency nurse triage

accuracy. Results are mixed from studies in which the correlation between experience, education, and accurate decision making in triage has been investigated.<sup>1,2,11</sup>

The AHA depicts classic AMI symptoms as central chest discomfort that may be described as pressure, fullness, squeezing, or pain with radiation to the arms, neck, jaw, back, and abdomen.<sup>6</sup> These symptoms may be accompanied by shortness of breath, nausea, lightheadedness, and sweating.<sup>13</sup> The ED triage decision is made more difficult because patients present with varying symptoms, some of which are considered to be typical of AMI and some atypical. The patient who presents with a classic set of signs and symptoms suggestive of AMI (ie, clutching the chest, short of breath, pale, and diaphoretic) will undoubtedly be immediately recognized by the emergency nurse and result in a level 1 or 2 triage designation.

However, not all patients present with easily recognizable symptoms, and symptom presentation may vary by gender and race/ethnicity.<sup>13,18-20</sup> Previous studies have found the incidence of a classic set of symptoms during an AMI to be as low as 27%.<sup>13,14</sup> Less typical symptoms may have an impact on triage decisions,<sup>21,1</sup> highlighting the complexity of patient assessment and the variations in individuals. In studies of patients with unstable angina and AMI, symptoms of acute coronary syndrome were identified as chest pressure, chest discomfort, chest pain, shoulder pain, arm pain, upper back pain, lightheadedness, shortness of breath, sweating, unusual fatigue, nausea, palpitations, and indigestion.<sup>22</sup> Patients presenting with symptoms that are not classic may present a more difficult challenge for the emergency nurse.

Studies identify limited accuracy in triage level designations and the inability of the emergency nurse to consistently identify patients with symptoms of possible AMI.<sup>7,10-15,1,22,23</sup> Therefore, the purpose of this study was to explore the relationship between patient and RN characteristics and the accuracy of triage in patients with symptoms suggestive of AMI, as well as to identify the patient and nurse characteristics that predict triage accuracy in this patient population.

## Methods

This retrospective, descriptive study used patient data from EMRs. Information from EMRs for a convenience sample of patients presenting for ED care was used in data collection. To obtain the demographic characteristics, emergency nurses who were noted as making the triage decisions in the EMRs included in the study were invited to

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