ARE EMERGENCY DEPARTMENT TRIAGE NURSES KNOWLEDGEABLE

ABOUT ACUTE CORONARY SYNDROMES RECOGNITION?

By

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Abstract

Background: Acute coronary syndrome (ACS) has been the leading cause of death since 1921 and the volume of ED patients with a chest pain chief complaint equates to six million visits annually. Though a common ED patient presentation, triage accuracy rates are low and time delays in patient care are high despite extensive ACS presentation research and published practice guidelines. *Objective:* Triage nurses must have adequate ACS knowledge to perform prompt recognition and medical response, thereby reducing patient mortality and morbidity. Using the Synergy Model for Patient Care, this study sought to determine if triage nurses within the emergency department have the knowledge to accurately identify patients at risk for ACS. *Methods:* After pilot testing the instrument, an anonymous electronic survey of 12 closed-ended questions was administered to nurses who met sample criteria at two EDs. *Results:* Correct answers ranged from 3 (25.00%) to 10 (83.30%) with a mean, median, and mode of 7 (58.30%) and a confidence interval (α) of ±0.04 (6.96, 7.04). The *SD* for the study is 0.13. No study participants achieved a passing score of 84% or greater accuracy. The independent *t*-test found significance in the participants years of ED experience with their survey results (P = 0.0056). Simple linear regression determined the slope of this relationship to be 1.191 ± 0.4520. *Conclusions:* This research facilitates bridging the gap between existing research and practice guidelines through the provision of improved training for ED triage nurses to enhance ACS recognition and medical response which is essential to optimal outcomes for ACS patients.

The proposal for this study was approved by the Student's Thesis Committee, Department of Nursing, College of Sciences and Health Professions, Albany State University on August 17, 2016.

Accepted by the faculty of the College of Sciences and Health Professions, Albany State University, in partial fulfillment of the requirements for the Master of Science in Nursing Degree.

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Research Committee

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DEDICATION

This thesis work is dedicated to my father, Charles Chapel, who lost his life much too young due to heart disease. His memory drives my efforts to decrease the burden heart disease places on individuals and our community.

This work is also dedicated to my supportive husband and mother who have been a constant source of support and encouragement during the challenges of graduate school, full-time employment, and being the mother of four incredible children. I am truly thankful for having you in my life, and I love you both beyond words.

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List of Abbreviations

Abbreviation	Definition
ACC	American College of Cardiology
ACS	Acute coronary syndrome
AHA	American Heart Association
AMI	Acute myocardial infarction
ECG	Electrocardiogram; electrocardiograph
ED	Emergency department
IRB	Institutional Review Board
PCI	Percutaneous coronary intervention
RN	Registered Nurse

List of Tables and Figures

Definition of Terms

Acute Coronary Syndrome	Any condition brought on by sudden, reduced blood flow to the heart
Atherosclerosis	The buildup substances in and on your artery walls which can restrict blood flow
Electrocardiogram	A record or display of a person's heartbeat
Evidenced-Based Practice Guidelines	Recommendations intended to optimize patient care, from a systematic review of evidence including the benefits and harms
Heart Disease	Narrowed or blocked blood vessels in the heart
Ischemic	Deficient blood being supplied to the heart due to obstruction in the flow of arterial blood
Needs	Circumstances in which something is necessary or that require some course of action
Characteristics	Qualities portrayed by patients
Competencies	Capability and skill one portrays in his/her profession without supervision
Percutaneous Coronary Intervention	Procedure that uses a catheter to place a stent in the heart to open up blood vessels that have been narrowed or occluded
Prerequisite	A thing that is required as a prior condition for something else to happen or exist
Reperfusion	The action of restoring the flow of blood to an organ or tissue
Thrombolytic	Treatment to dissolve dangerous clots in blood vessels

Are triage nurses knowledgeable about acute coronary syndromes recognition in emergency departments?

I. Introduction

This chapter provides an overview regarding why great urgency should be used in the care of time-sensitive acute coronary syndrome (ACS) patients and will include the following ACS related information as it pertains to this research: the background and significance, statement of the problem, purpose, theoretical framework, research questions, scope of the study, and the importance of ACS training specific to emergency department (ED) triage nurses.

Background and Significance

Cardiovascular disease has been the leading cause of death since 1921 and is the cause of death for approximately one out of every four people in the United States (Centers for Disease Control and Prevention [CDC], 2015). It is estimated that annual national costs reach $316.6 billion for this disease (American Heart Association [AHA], 2015). Heart disease is caused by a partial narrowing or fully occluded coronary vessel which prevents oxygen-rich blood from reaching the affected heart muscle. This atherosclerotic process often occurs in multiple coronary vessels simultaneously. The reduced or occluded blood flow to the coronary muscle served by the affected artery or arteries cause the heart muscle to become ischemic and sends pain signals to the brain. These pain signals usually prompt patients to seek treatment at an ED. If the blockage is

not removed and the coronary blood vessel patency restored, resulting in reperfusion, the affected heart muscle can become injured in as little as 20-30 minutes. This is the reason that national efforts are being made to reduce the time to reperfusion for patients.

Despite community awareness and prevention efforts, chest pain remains the second most common complaint upon presentation to the ED, equating to over six million visits annually (Hollander & Chase, 2016). Of the one million patients who are diagnosed annually with an acute myocardial infarction (AMI) or heart attack, 350,000 patients die during the acute phase and their mortality and morbidity are directly linked to the amount of time from the onset of symptoms to the time when the coronary artery is opened through either percutaneous coronary intervention (PCI) or through a clot-busting medication known as a thrombolytic (Hollander & Chase, 2016). Healthy People 2020 recognized this connection in one of their objectives, calling for early identification and treatment of heart attacks, in addition to, an increase in the proportion of heart attack patients who are eligible for and obtain PCI within 90 minutes of hospital arrival (Healthy People 2020, 2016). Currently, only 88.6% of eligible patients receive reperfusion within this timeframe (Healthy People 2020, 2016).

Emergency departments are charged with applying evidence-based practice to rapidly identify those patients who have ACS and those whose chest pain is related to non-cardiac causes. The triage nurse is commonly the first medical point of contact within EDs and, therefore, it is crucial that triage nurses are able to identify these emergent patients quickly.

Emergency departments are expected to utilize evidenced-based practice guidelines for ACS patients and triage nurses are responsible for prioritizing patients for medical treatment based on their initial assessment (Knapman & Bonner, 2010).

Statement of the Problem

In the U.S., standardization of triage guidelines is nonexistent; yet, triage nurses in the emergency department are the first health professionals ACS patients meet on arrival and these ED professionals have the responsibility to use advanced clinical decision knowledge to sort patients into their perceived level of urgency based on their severity of illness. They can then initiate treatment which can impact the speed at which ACS patients receive lifesaving intervention. If triage nurses have the knowledge to recognize ACS patients and take immediate action, they are able to directly affect early intervention and care; yet multiple studies show triage level inaccuracies and the inability of the triage nurse to identify patients with emergency symptoms (Hitchcock, Gillespie, Crilly, & Chaboyer, 2013).. The challenge for ED triage nurses is that, in addition to other competing priorities, ACS patients have very broad, complex clinical presentations, making quick recognition of ACS a major problem for ED nurses even though ACS is one of the most time-critical conditions in the ED . In fact, a 2014 study used multivariate logistic analysis to determine that only 16% of acute myocardial infarction (AMI) patients is accurately triaged in the ED (Sittichanbuncha et al., 2015). Another recent study showed low triage accuracy rates of 54% for patients with symptoms suggestive of ACS and determined that neither ED nursing experience nor general experience is a predictor of ACS triage accuracy rates in the ED (Sanders & DeVon, 2016). These

research findings further support the need to have consistent and specific ACS training for nurses that participate in the triaging of emergency department patients since current processes have wide margins of inaccuracy and nursing experience alone does not reduce these inaccuracy margins. In the case of AMI patients, the consequences of the nurses' inaccurate ACS recognition at triage can be muscle damage or potentially even death. Qualifications to perform in the triage role vary greatly among facilities with many ED's having no special training or experience requirements. To date, no research has attempted to determine if ED nurses functioning in the triage role have the knowledge to recognize potential ACS patients which enables them to reduce inaccuracies made in the triage process.

National resources such as the American College of Cardiology (ACC) and the Society of Cardiovascular Patient Care (SCPC) continue to lead efforts to expedite ACS efficiency processes and set national guidelines for ACS care parameters, such as arrival to EKG interpretation of 10 minutes and arrival to reperfusion times of 90 minutes for patients with a ST segment elevation myocardial infarction (STEMI). Studies show that even with these national guidelines established; only two-thirds of ACS patients actually receive an ECG within this time limit. Additionally, little guidance has been provided for training triage nurses in the emergency department to recognize patients with possible ACS. This is a likely cause for the majority of ACS patients not receiving an ECG within the recommended time goal. The SCPC does provide some guidance for ACS training topics for all nurses who care for ACS patients but this resource is not specific to the emergency department or triage nurses, nor does it provide any content. Additional drawbacks to the SCPC guidelines exist and include: they are only available to facilities

who have purchased their toolkit for chest pain accreditation in the amount of $21,000, they are only updated every three years, and they only provide training topics needed by all nurses in the care of ACS patients (www.scpcp.org). This leads to a resource that is incomplete and inaccessible to most emergency departments.

Purpose

The purpose of this nursing research is to identify if emergency department nurses who function in the triage nurse role within the emergency room have the knowledge to promptly and accurately identify patients who are at risk for ACS. Research shows that "education, knowledge, and experience of triage nurses are essential to the triage process" (Hitchcock, Gillespie, Crilly, & Chaboyer, 2013). This research serves to outline the knowledge needed to quickly and accurately identify and treat ACS patients on presentation to the ED. The triage nurses' knowledge affects patient assessments, which leads to more rapid ACS recognition and treatment and ultimately improves the patients' outcomes.

Theoretical Framework

This study uses the framework Synergy Model for Patient Care which was developed by the American Association of Critical-Care Nurses (AACN) in an effort to link clinical practice with outcomes (AACN, n.d.). This theory describes the importance of nursing care that is based on the needs of the patients and implies that, when both the nurses' ACS knowledge and the patient's needs are met, optimal patient outcomes can result. The model includes three components including patient characteristics, nurse

knowledge, and outcomes. This theory is applicable because the triage nurse must have the prerequisite ACS knowledge to identify if, during initial ED presentation, the patient's needs are related to ACS and to recognize the need for emergent treatment. Since ACS patients each present to the emergency department with a unique set of characteristics, the triage nurse's ability to incorporate the patient's biological, psychological, social, and spiritual needs enables the triage nurse to sift through the varying clinical presentations of chest pain complaints to promptly identify the ACS connection and the patients' needs. The patient needs incorporate characteristics such as "resiliency, vulnerability, stability, complexity, resource availability, participation in care, participation in decision making, and predictability" (Becker, Kaplow, Muenzen, & Hartigan, 2006, p. 131). The triage nurse's abilities to recognize these patients needs enable him/her to execute immediate treatment, thereby reducing the time from ED arrival to reperfusion of the coronary vessel(s), which is associated with optimal outcomes. When triage nurses have the knowledge to consider the whole patient and varying presentations of ACS, care processes can be implemented quickly which will optimize outcomes. Additionally, recognition of patients' needs quickly on patient arrival reflect nursing characteristics of "clinical judgment, advocacy and moral agency, caring practices, collaboration, systems thinking, response to diversity, clinical inquiry, and facilitator of learning" (Becker, Kaplow, Muenzen, & Hartigan, 2006, p. 132).
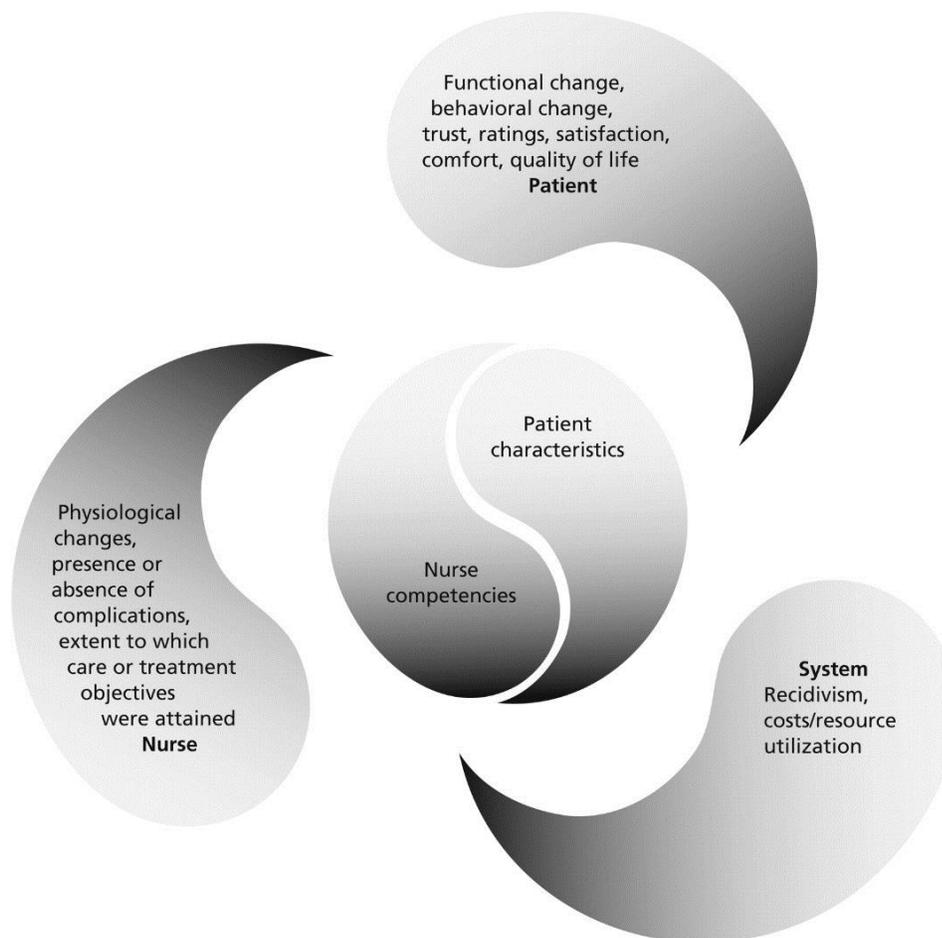
Figure A. The American Association of Critical-Care Nurses Synergy Model for Patient

Care (Becker, Kaplow, Muenzen, & Hartigan, 2006, p. 134)

Research Questions

The study seeks to answer the following questions:

1. Are emergency department triage nurses knowledgeable about acute coronary

    syndrome recognition?

2. Do demographics impact emergency department triage nurses' knowledge of

    acute coronary syndromes recognition?

Scope of the Study

Emergency department triage nurses must have experience regarding published practice guidelines, typical and atypical symptoms of ACS, and vulnerabilities within the triage process to promptly and accurately identify patients who are at risk for ACS. This study will test the ACS presentation knowledge of triage nurses. The sample will include ED nurses who have greater than one year of experience in the ED and who actively work in the triage role. This research serves to identify if a relationship exists between ACS patient presentation knowledge and triage accuracy of ACS patients for improved recognition and medical response.

Summary of the Chapter

The chapter gives the background of the study and the study question that this research seeks to answer. Recognition of patients with symptoms suggestive of ACS continues to be a challenge for triage nurses in the ED. The problem of the study has been outlined stating the importance for triage nurses to have prerequisite knowledge of ACS in their role. The need to determine appropriate triage nurse knowledge together with the patient's needs work alongside the theoretical framework in which this study is based.

II. Literature Review

The purpose of this chapter is to explore, recognize, and describe ED nurses' knowledge of clinical presentation of ACS patients upon seeking treatment at the ED through a literature review from searching scholarly resources published from 2010 to 2016. It similarly explores the evidenced-based practice guidelines available in support of patients suffering from ACS. Anchored on these recognized resources and characteristics, a systematic data collection from ED nurses will be conducted. The move might contribute toward more affirmative triage training for nurses in the ED. This section highlights the need to know the knowledge base for ED triage nurses ACS recognition in relation to ACS triage inaccuracies.

Published Patient Care Guidelines

A review of the literature failed to reveal previous research conducted on the acute coronary syndrome presentation knowledge of emergency department triage nurses. This indicates a gap in the literature and need for further nursing research. In 2016, a retrospective study of 286 patients looked at emergency nurse triage accuracy and found it to be only 54% so 9 variables were evaluated to determine their relationship to accuracy (Sanders & DeVon). Of the 9 variables investigated, only patient race, symptom presentation, and emergency nurse age were predictors of triage accuracy (Sanders & DeVon, 2016). The triage nurses' years of experience in nursing were not a significant

predictor in this study. Additional research did demonstrate that 68% of nurses fail to continue education beyond nursing school; therefore, hospitals are faced with ensuring that triage nurses are educated with the most current ACS patient care guidelines, including those published by the American Heart Association, the American College of Cardiology, and the Society for Cardiovascular Patient Care (Ribeiro de Souza & Silveira Beraldo, 2015). Current guidelines are in agreement that a 12-lead ECG should be obtained and interpreted by a medical provider within 10 minutes of the patient's arrival (Coyne et al., 2014). The triage nurse must be attuned to which patients should require this expedited ECG through his/her assessment since it is a critical diagnostic tool for ACS.

Clinical Presentation of ACS Patients

One multi-centered randomized control trial which included 1947 patients from 5 hospitals indicated that:

Triage nurses determine triage urgency in ACS based on physiological data such as chest pain, sweating, and left arm pain. However, many men and women do not experience chest pain and are more likely to experience other symptoms such as shortness of breath, fatigue, and/or nausea. In this study, "chest pain was the most commonly experienced symptom in men and women, reported by 71% of patients. Using logistic regression and adjusting for clinical and demographic variables, women had greater odds of experiencing shortness of breath (50% vs 43%; odds ratio [OR] = 1.32; 95% CI = 1.08–1.62; p = .006) palpitations (5.5% vs 2.8%; OR = 2.17; CI = 1.31–3.62; p = .003) left arm pain (34% vs 30.5%; OR

= 1.27; CI = 1.02–1.58; p = .03) back pain (7.5% vs 4.8%; OR = 1.56; CI = 1.03–2.37; p = .034) neck or jaw pain (21.5% vs 13.8%; OR = 1.84; CI = 1.41–2.40; p = .001) nausea (28% vs 24%; OR = 1.30; CI = 1.03–1.65; p = .024) a sense of dread (13.4% vs 10.5%; OR = 1.47; CI = 1.08–2.00; p = .014) and fatigue (29% vs 21.5%; OR = 1.64; CI = 1.29–2.07; p = .001) than their male counterparts. (O'Donnell, McKee, O'Brien, Mooney, & Moser, 2012, p. 1325).

Another retrospective study including 1270 patients from 15 sites used logistic regression to examine prodromal or acute symptoms of AMI by race, with adjustments for cardiovascular risk factors, and found over 30 presenting symptoms of ACS (McSweeney et al., 2010). Key differences have been noted in the ACS presentation for women versus men that triage nurses should be familiar with since previous ACS symptom patterns have been based on largely male samples. Acutely, women are more likely to present with unusual or profound fatigue with shortness of breath rather than with the chest pain that is often considered to be a required symptom of ACS (McSweeney et al., 2010). Many EDs have care protocols and/or decision algorithms in place for potential ACS patients but they fail to identify patients who do not present with chest pain. McSweeney et al. found in his 2010 research that 28% (N=186) of Hispanic, 38% (N=545) of black, and 42% (N=539) of white women do not report chest pain at presentation. A relationship between an atypical presentation and delayed ACS management has been linked through various research studies (Hitchcock, Gillespie, Crilly, & Chaboyer, 2013). This information calls for triage nurses to consistently be educated and knowledgeable about all potential ACS presentations in order to accurately recognize ACS patients in the triage process.

Vulnerabilities in the ED Triage Nurse Process

In addition to the difficulty for triage nurses in promptly and accurately identifying ACS patients, there are other vulnerabilities to this process with which the triage nurse must contend. In research conducted by Hitchcock, Gillespie, Crilly, & Chaboyer (2013), thematic analysis (including observation, field notes, 31 informal interviews and 14 formal interviews) was used to identify triage vulnerabilities for the prompt recognition of ACS patients to include education, training, triage errors, high turnover of ED patients, inadequate staffing, poor working conditions, patients arriving simultaneously, competing patient priorities, extended time to triage and ED or hospital overcrowding. Additionally, inconsistencies in assigning triage categories to like patients have been identified through review of more than 170 hours of nursing research fieldwork, demonstrating the subjectivity of the triage process (Hitchcock, Gillespie, Crilly, & Chaboyer, 2013).

Summary of the Chapter

Despite an abundance of ACS-related research in recent years, guidelines for training competencies of ED triage nurses are lacking and triage accuracy rates continue to be low with time delays in patient care that are high. For improved ACS patient recognition, triage nurses must have knowledge regarding published practice guidelines, typical and atypical symptoms of ACS, and the vulnerabilities within the triage process as outlined within this chapter. An identified research gap exists in evaluation of the emergency department triage nurses knowledge of ACS recognition. Addressing this lack of research could present a need for triage training requirements and bridge ACS patient

presentation research with published patient care guidelines for improved ACS

recognition and medical response.

III. Research Methodology

The purpose of this chapter is to outline the research design and methodology that the study employed. The chapter will outline participants who took part in the study and the instruments that were employed during the study following IRB approval and implied consent from the sample. This chapter gives a framework on how the study was executed.

Research Design

Quantitative research was conducted via an anonymous electronic survey aimed toward identifying what ACS recognition knowledge triage nurses have. This is non-experimental research in which the researcher never intruded on patient care, nor manipulated the variable, in any way. This design was selected in order to identify problems or justify current practice (Grove, Burns, & Gray, 2013). Results of the research were obtained using descriptive statistics to analyze the relation of demographics to findings using an independent t-test and simple linear regression. Accuracy of the answered questions was evaluated using the mean, median, and mode and through calculation of the standard deviation and confidence interval.

Participants

Participants for this research included registered nurses from two separate EDs in Georgia who have greater than one year of ED experience and who currently work in the triage role. University Hospital **A** has an urban ED with a volume of 80,000 ED patient

visits per year, and 94 registered nurses. It houses its own interventional cardiac cath lab that operates twenty-four hours a day, seven days a week. University Hospital **B** is located in a rural setting with an annual volume of 14,000 ED patient visits and 32 registered nurses. This ED does not have cardiac cath lab capabilities and must transfer all heart attack patients to another facility for a higher level of care. All research participants were willing to voluntarily participate in this research. Out of the total 126 registered nurses within the two emergency departments, 68 did not meet the sample requirements to be included in the research.

Human Subjects and IRB

Prior to conducting any research, the researcher obtained permission from the Institutional Review Board (IRB) at Albany State University, as well as, from the IRB of the two participating facilities. The study was conducted with careful attention to ethical standards of research and the rights of the participants. The convenience sample had the option to provide data for a period of one month.

Implied Consents and Data Management

All participants were provided an email invitation to participate in this study. The email explained the study as well as well as participants' rights. It also explained that participation in this research was voluntary and that there is no risk if they decided to participate or decline to participate. Additionally, participants were able to refrain from answering questions or withdraw from the survey at any time.

All data was collected anonymously and did not include any identifying information. Completed surveys will be maintained in a secure location by the researcher for a period of six months and then destroyed. No compensation was provided for participants in this study.

Instrumentation and Pilot Testing

The research employed an anonymous, electronic survey, through www.surveymonkey.com, as an instrument of attaining data from the participants. The closed-ended questionnaire included 12 closed-ended multiple-choice questions designed in a manner to assist in gathering the data that was later subject to analysis. The convenience sample included criteria that participants must be registered nurses (RNs) who currently work in the emergency department and have great than one year of nursing experience. Exclusion criterion was established for emergency personnel who were not RNs or did not have 1 year of nursing experience. ACS recognition knowledge competency was established by answering eighty-four percent or greater of survey questions accurately. This benchmark is the same used by American Heart Association for competency testing in all life support courses.

The research included survey questions derived from evidence-based practice guidelines and composed of twelve closed-ended questions. The survey was pilot tested, to obtain clarity and validity of the research instrument, with eight registered nurses (n= 8) who have over 140 combined years of experience working in the emergency department and over 130 combined years of experience working in the triage role to

obtain clarity and validity of the research instrument. Nurses participating in the pilot test of the instrument were not part of the research sample.

Research Procedures

Participants were sent an email from the ED director with an invitation to participate in this voluntary research this including implied consent information (Appendix A). Descriptive statistical analysis was conducted through www.surveymonkey.com software and was without a risk of exposure to confidential information. Nominal levels of measurement were used to analyze the data using percentages and frequencies to compare and contrast data. The test that was used for parametric data analysis is the *t*-test since it can test for significant differences between two independent samples (Grove, Burns, & Gray, 2013).

Summary of the Chapter

In order to determine the ACS recognition knowledge, a sample of ER triage nurses were asked to complete an online survey composed of twelve closed-ended question. The convenience sample included criteria that participants must be registered nurses (RNs) who currently work in the emergency department and have great than one year of nursing experience. The survey was available to the sample via Survey Monkey for a time period of one month. Results of the research were obtained using descriptive statistics and to analyze the relation of demographics to findings to evaluate the accuracy of the answered questions. IRB approval and implied consent were obtained for this non-experimental research and no risk of confidential information exposure existed.

IV. Research Findings

The purpose of this study was to explore the ACS recognition knowledge base of registered nurses who work in the triage role within the emergency department. Specifically, the aims of the study were to determine:

1. Are emergency department triage nurses knowledgeable about acute coronary syndromes recognition?

2. Do demographics impact emergency department triage nurses' knowledge of acute coronary syndromes recognition?

In this chapter, the results are elucidated and a description of the sample and variables used in the study are presented. Survey submissions were available during the period of September 15, 2016-October 15, 2016. This chapter includes a description of the sample demographics and a description of the statistical findings.

Description of Demographics

The convenience sample was obtained from two separate EDs and included criteria that the participants must be registered nurses (RNs) who currently work in the emergency department, have great than one year of nursing experience and work in the triage role. Exclusion criterion was established for emergency department personnel who were not RNs or did not have at least year of nursing experience. Of the 58 nurses

that qualified for the study at Hospital **A**, 38 voluntarily completed the survey (65%

return rate), and two nurses left the facility before the study period concluded that were

included in the original 58 adjusting in a population size to 56 (67% return rate).

Hospital **B** had 14 nurses complete the survey of the 28 who qualified for the study,

providing in a 50% return rate. This resulted in a total of 52 completed surveys from the

84 nurses who qualified for the sample resulting in a 62% completion rate.

Characteristics of the sample are presented in Table 4. The sample included 45

females (86.50%) and 7 males (13.50%). The majority (n = 37, 71.20%) of the sample

were nurses who have achieved their bachelor of science degree, followed by 12

(23.10%) who have obtained an associate's degree in nursing, and 3 (5.80%) of the

sample who have a master's degree in nursing. There were no doctorate level prepared

nurses in the sample. The highest group of participants (n=18, 34.60%) had four to

seven years of registered nurse experience with each of the other subgroups being nearly

equal in distribution with an average of 11 (21.70%) of the sample in each of these

subgroups.

Table 1. *Patient Demographics*

Variable	Frequency	Percentage
Hospital		
Hospital **A**	38	80.3%
Hospital **B**	14	19.7%
Gender		
Male	7	13.5%
Female	45	86.5%
Highest Level of Nursing Education		
ADN/Diploma	12	23.1%
BSN	37	71.2%
MSN	3	5.8%
DNP/PhD	0	0.0%

Years of Experience as a Registered Nurse		
1-3 years	11	21.2%
4-7 years	18	34.6%
8-10 years	12	23.1%
>10 years	11	21.2%

Note. *N*=52.

Sample nurses were also asked how many years of emergency department experience they have and the respondents' years of ED experience were as follows: 17 (32.70%) had one to three years, 16 (30.80%) had four to seven years, 7 (13.50%) had eight to ten years, and 12 (23.10%) had more than ten years ED experience.

Figure B. *Years of ED Nurse Experience*

Years of ED Nurse Experience

■ 1-3 years ■ 4-7 years ■ 8-10 years ■ > 10 years
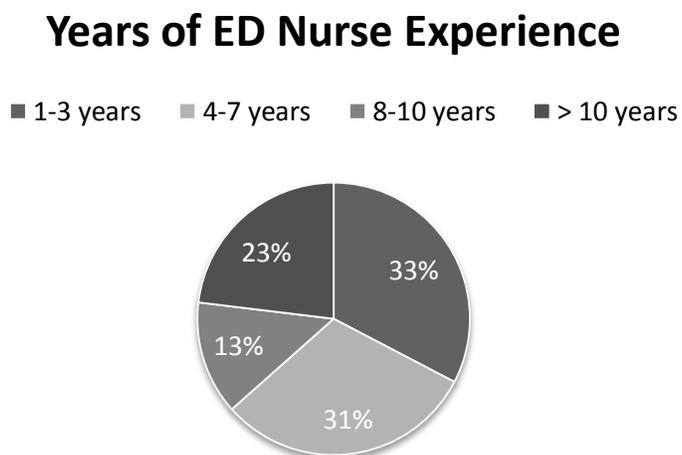
Description of Statistical Findings

Descriptive statistics for survey response analysis were used to determine the pass rate for completed surveys. The previously established ACS recognition knowledge competency benchmark of eighty-four percent or greater of answer accuracy was used as the basis to determine the nurses knowledge of ACS recognition. Correct answers ranged from 3 (25.00%) to 10 (83.30%) with a mean, median, and mode of 7 (58.30%)

and a confidence interval (α) of ±0.04 (6.96, 7.04). The *SD* for the study is 0.13. No

study participants achieved a passing score which is highly significant.

Table 2. *Characteristics of Survey Results*

Variable	*N*	Range	*M*	*SD*	(α)
Correct Survey Answers	12	3 - 10 (25% – 83.3%)	7 (58.30%)	0.13	±0.04

The independent *t*-test was used for parametric analysis of the data to determine if

significant difference exists between the participants' demographics and their results on

the survey. No statistical significance was found when comparing the participants'

gender, location of employment, level of nursing degree, or years for RN experience

with their survey score. When analyzing the participants years of ED experience with

their survey results, the two-tailed P value equals 0.0056. By conventional criteria, this

difference is considered to be very statistically significant. Simple linear regression was

then used to explain the linear relationship between the participants' years of ED

experience and their score on the survey questions. Using the method of least squares to

determine the line of best fit, the slope was determined to be 1.191 ± 0.4520.

Figure C. *Linear Regression Slope Showing the Relationship Between the*

Participant's Years of ED Experience with Higher Scores on Survey Questions
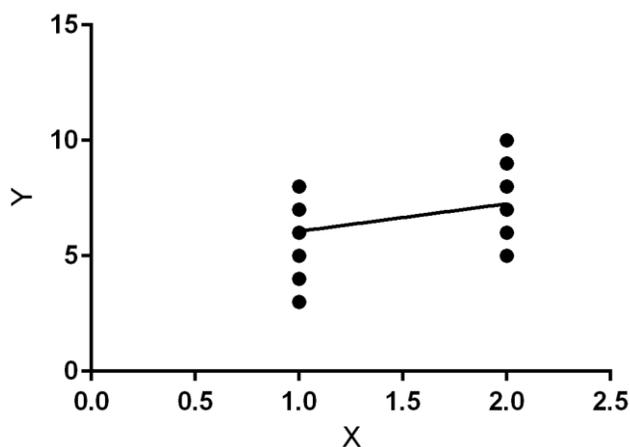
The most correctly answered question (95.70%) on the survey included a question asking nurses to identify reasons to delay reperfusion therapy for STEMI patients and their correct answer demonstrated that nearly all participants understand that reperfusion therapy should not be delayed for STEMIs.

Two questions within the survey noted to have the highest incident of incorrect answers include:

1. In patients diagnosed with ACS, the initial ECG most often has findings consistent with: (a) No diagnosis. This question had a total sample accuracy rate of 21.70%.

2. An ACS patient's severity of pain is most related to: (e) None of the above. This question had a total sample accuracy rate of 19.60%.

Table 3. *Correct Answer Frequency Distribution*

Correct Answer Frequency Distribution		
Total Questions Correct	**Frequency**	**Sample Percentage**
3	2	3.8%
4	2	3.8%
5	4	7.6%
6	12	23.0%
7	16	30.7%
8	9	17.3%
9	5	9.6%
10	2	3.8%

Note. *N*=52.

Summary of the Chapter

This nursing research obtained survey results from ER nurses (n = 52) at two EDs. Information about the participants gender, nursing degree, location of employment,

years of nursing experience, and years of ED experience was also obtained. Use of the
independent *t*-test found significance in the years of ED experience and knowledge level.
Further data analysis using simple linear regression indicated we can conclude that the
years of ED experience for triage nurses predicted higher survey scores. Most significant
to this research study is that none of the participants achieved a passing score of 84% or
greater.

V. Discussion and Conclusions

In this study, the researched sought to determine if emergency department triage

nurses are knowledgeable about ACS recognition. This chapter includes a discussion of

the findings, connection to nursing theory and the literature, implications for nursing

practice, suggestions for future nursing practice and conclusions.

Discussion of the Findings

Research question one asked are emergency department triage nurses

knowledgeable about acute coronary syndrome recognition. Of the participants (n = 52)

who completed the ACS survey, no one achieved a passing rate of 84% or greater. This

ACS knowledge is crucial for triage nurses in order for chest pain patients to the

prioritized in the triage process and for potential ACS patients to receive prompt medical

evaluation and treatment. Thus, a passing rate of 0% is very concerning.

Research question two asked do demographics impact emergency department

triage nurses' knowledge of acute coronary syndromes recognition. Of the five

demographic variables investigated in this study, only years of RN experience were

significant in predicting higher scores on the ACS survey questions. This was an

unexpected finding since Sanders & DeVon (2016) determined in their research (N=286)

that neither ED nursing experience nor general experience is a predictor of ACS triage

accuracy rates in the ED. This result may be explained by the high correlations between ED experience and the occurrences in having patients with varying ACS presentations at triage. The participants' gender, nursing degree, location of employment, and years' experience as an RN showed no significance to the outcome of correct survey questions. The variance among correct answers within the survey was of interest. There were low accuracy rates among participants when asked about the common findings on the initial ECG for patients diagnosed with ACS (21.70%) and the patients perceived level of pain on presentation (19.60%) in relation to a potential ACS etiology for the patients ED presentation. This is highly significant since triage nurses need to understand that patients experiencing a myocardial infarction are most likely to have a non-diagnostic ECG at triage. If the triage nurse mistakenly believes that the ECG for those experiencing a myocardial infarction are most likely to show a STEMI on the initial ECG, this could lead the triage nurse to believe the patient's etiology is not one of ACS. This error could present the triage nurse from ensuring that the ED medical provider promptly evaluates the patients for expedited care. Likewise, if the triage nurse believes that a patient's perception of pain is related to the potential size of the infarct then patients who present in no pain or with only mild pain complaints are likely to have delay in care due to a knowledge deficit of the triage nurse.

Connection to Nursing Theory

This study uses the Synergy Model of Patient Care by the AACN due to its connection between the patients' needs and the nurses' knowledge in order to provide the best outcomes for patients. The three components of this are patient characteristics, nurse knowledge, and outcomes and are included in this research (AACN, n.d.). The survey

provides varying ACS patient characteristics and relies on the nurses' knowledge of those characteristics in order to correctly answer the question. The Synergy Model of Patient Care is supported in this research through the understanding that triage nurses must be knowledgeable about the varying ACS characteristics on presentation in order to meet the needs of the patient for expedited care to restore blood flow to the occluded coronary vessel(s). This theory accurately fits the needs of both the patient and the nurse in this research.

In clinical practice, this knowledge translates into the triage nurse being aware that the presenting patient potentially has ACS and he/she thereby initiates a care pathway or protocol to expedite the patient's care. This provides the patient with the best possible outcomes for their condition. When triage nurses have the knowledge to consider the whole patient and varying presentations of ACS, care processes can be implemented quickly which will optimize patient outcomes.

Implications for Nursing Practice

Since no participating nurses successfully received a passing score on this survey, it is imperative that these nurses received education that extends beyond ED protocols, care paths, triage acuity levels, and ECG acquisition to include additional ACS recognition material such as presented in this study. Delay in ACS recognition can be detrimental to patient, family, and facility causing an increase in morbidity, mortality and cost to the health care system. ED department administration should be informed about the study results and their importance on the recognition of ACS patients at triage to gain support for mandatory training for the sample.

Numerous studies have identified overall ED wait times that are lengthy and fall outside of practice guidelines to ensure proper care and best results (Ribeiro de Souza & Silveira Beraldo, 2015). This is not surprising when this sample demonstrated a 0% passing rate on this ACS recognition quiz and potential ACS recognition is necessary for prompt medical evaluation and care. Of note are the two questions with the lowest accuracy rates and their implications on prompt care for the ACS patient. If the triage nurse believes the initial ECG for ACS patients most often displays a STEMI then this can mislead triage nurses to believe that the patients without a STEMI is not at a high risk for ACS and can wait for medical evaluation and care instead of expediting their care for optimal outcomes. Likewise, if the triage nurse believes the presenting patient's pain is a predictor of the severity of a heart attack, they are likely to delay the care of a patient who does not exhibit severe chest pain. This can lead to a delay in recognition treatment to restore reperfusion which can result in cardiac tissue necrosis and patient death.

Previous research demonstrates that the initial ECG for an ACS patient is most often nondiagnostic and that a patient's pain severity has no relation to the severity of the heart attack so it should not be used a predictor of ACS recognition in the triage process (Hollander & Chase, 2016). This research showed that most often the triage nurse is not knowledgeable about these initial findings. When the triage nurse's knowledge is not consistent with the patients' presenting characteristics, a delay in care can evolve and reduce outcomes for these patients. The implication is that triage nurses need additional education regarding ACS recognition in order to prevent unnecessary delays in cardiac tissue reperfusion.

Suggestions for Future Nursing Research

Chest pain is a common ED patient presentation yet triage accuracy rates are low and time delays in patient care are high despite extensive ACS presentation research and published practice guidelines. Suggestions for future nursing research including repeating the design with a larger sample from a different population, alternative methodology, a refined measurement tool and/or intervention studies with triage nurse training (Grove, Burns, & Gray, 2013). This quantitative research using a closed-ended questionnaire was also limited in there is did not allow participants to clarify questions or free text in answers since they were limited to only the options given in each question.

Limitations

The data presented in this report are subject to multiple limitations. Strengths of this design include a sample obtained from two separate EDs including one which provides primary percutaneous coronary intervention (PCI) for ACS patients and the other who transfers patients for PCI. Additionally, only nurses who were selected as a candidate for the sample were provided a link to complete the survey which was anonymously obtained. Weaknesses include a small sample size and a setting of two hospitals under one health care system in Georgia which limits the credibility of findings and restricts the population to which findings can be generalized. This study potentially excluded nurses who qualified to be in the sample if the department director did not include them on the invitation emails. Accuracy of the study relies on the participant's proper understanding of the survey questions and leaves the possibility of an incorrect answer on the survey when the nurse understood the ACS recognition concept in question. Other variables not identified in this study may have an impact on the accuracy

of the answered survey questions. These variables were not addressed in the study and should be variables of interest for future research.

Conclusion

The data provided in this report indicates the need for prompt and effective ACS training for emergency department nurses. Provision of prompt ACS recognition by ED triage nurses is essential to optimal outcomes for ACS patients. If potential ACS is not promptly recognized in patients by triage nurses in the emergency department, then expedited medical response and protocol activation will not occur which could lead to unnecessary patient death.

ED leadership should ensure that triage nurses receive ACS recognition education such as presented in this survey as part of the training competencies for ED nurses to function in the triage role. Such education can improve the quality of ACS recognition knowledge by the ED triage nurses which in turn will lead to more prompt recognition of ACS patients characteristics.

Significant results of this study including the inability for any of the participating nurses to achieve a passing score validated the researcher's proposed logical links among the purpose, framework, questions, variables, and measurement methods.

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Appendix A

Implied Consent to participate in a Research Study
ALBANY STATE UNIVERSITY
WHAT ACUTE CORONARY SYNDROME EDUCATION DO EMERGENCY
NURSES THINK SHOULD BE INCLUDED IN TRIAGE COMPETENCIES?

Dear Participant,

I am currently a Family Nurse Practitioner student at Albany State University located in Albany, Georgia and I will be conducting a nursing research study. I would like to invite you to participate in this study which aims to determine triage nurses' knowledge of acute coronary syndrome recognition. You were selected as a possible participant by your director because you are an emergency room nurse with greater than one year of experience whom currently works in the triage role. This research project is being conducted by University Health Care System and participation will be available for one month.

The data collection for this research will result from a 12 question survey with only closed ended responses. You will receive an email directing you to survey monkey where the questionnaire will be ready for you to complete. Your honest response to each question is appreciated. Please be informed that your participation is voluntary and you are welcome to withdraw from this study at any time. No personal demographics will be collected during this research and survey responses will not be linked to you in any way. Every effort will be made to ensure that your identity is protected in the study.

Thank you in advance for taking time out from your busy schedule to participate in this study.
Please feel free to contact me if you have any questions.

Regards,
Jennifer Weeks
jenniferweeks@uh.org
706-228-2580

Please read further details regarding this research below before you make your decision to participate in this study.

Background Information and Purpose
The purpose of this study is to improve acute coronary symptom recognition in the emergency department and, perhaps, to expand the education provided in triage nurses competencies to facilitate enhanced ACS knowledge.

Procedures
If you decide to participate, you will be asked to complete the online survey which is completely anonymous so no one will be able to identify a specific individual's form. It is

important that we have as many people as possible complete and submit this survey to compile an accurate representation to better serve you.

Risks
There are no foreseeable risks associated with participation in this study.

Benefits
The questions on this survey were developed by reviewing the research on acute coronary syndromes presentations. It is our hope that the information we gain will help us to improve our current competencies for triage nurses in the emergency department.

Confidentiality
Your information will be confidential and no answers that could identify a specific individual will be used.

Research Results
Results of the survey will be made available to all staff within the emergency department following the conclusion of the study.

Voluntary Participation/Withdrawal
Participation is voluntary. Your decision whether or not to participate will not affect your current or future relations with University Health Care System. We ask you to please remember this information is confidential and is designed to help us serve you better. If you decide to participate, you are free to withdraw at any time without penalty.

Acceptance to Participate
We are including a link to the online survey at the bottom of this email. Your completion of the survey indicates that you are at least 18 years of age, are a licensed nurse, have at least one year of experience in emergency medicine, and you consent to participation in the study.

Appendix B

Research Instrument

All questions will be asked anonymously via www.surveymonkey.com.

What hospital do you currently work for?
- a. University Hospital, Augusta, GA
- b. University Hospital McDuffie, Thomson, GA

What is your gender?
- a. Male
- b. Female

What is the highest level of nursing education you have completed?
- a. ADN/Diploma
- b. BSN
- c. MSN
- d. DNP/PhD

How many years of experience do you have as a registered nurse?
- a. 1-3
- b. 4-7
- c. 8-10
- d. >10

How many years of experience do you have working in the emergency department?
- a. 1-3
- b. 4-7
- c. 8-10
- d. >10

1. Supplemental oxygen should be administered to:
   - a. All high risk patients
   - b. Any chest pain patient with COPD
   - c. Chest pain patients with intermittent angina
   - d. Only chest pain patients with ST segment elevation
   - e. None of the above *CORRECT*
2. In patients diagnosed with ACS, the initial ECG most often has findings consistent with::
   - a. No diagnosis *CORRECT*
   - b. ST segment elevation
   - c. Atrial fibrillation
   - d. Congestive heart failure
   - e. None of the above
3. In ACS patients, ischemic pain usually has:
   - a. An acute onset
   - b. A gradual onset
   - c. Associated symptoms such as nausea, vomiting, and/or diaphoresis.
   - d. A and C *CORRECT*
   - e. None of the above
4. In ACS patients, ischemic pain is usually described as:
   - a. Localized to a specific area that patients can easily point to

      b. Diffuse and difficult to describe *CORRECT*
      c. Sharp or knife-like
      d. All of the above
      e. None of the above

5. What percentage of AMI patients present to the ED with symptoms associated with ACS but deny chest pain?
      a. 1%
      b. 15%
      c. 33% *CORRECT*
      d. 66%
      e. None of the above

6. A 32-year-old man presents to the emergency department with chest pain. He needs a 12 lead ECG in:
      a. 5 minutes *CORRECT*
      b. 10 minutes
      c. 20 minutes
      d. 60 minutes
      e. This patient does not need an expedited 12 lead EKG.

7. A 57-year-old female presents to the emergency department with abdominal pain and vomiting. She needs a 12 lead ECG in:
      a. 5 minutes *CORRECT*
      b. 10 minutes
      c. 20 minutes
      d. 60 minutes
      e. This patient does not need an expedited 12 lead EKG.

8. With STEMI patients, reperfusion therapy should be delayed for:
      a. Chest x-Ray results
      b. Aspirin administration
      c. Cardiac biomarker measurement results
      d. All of the above
      e. None of the above *CORRECT*

9. What patients are likely to have atypical presentations?
      a. Females
      b. Diabetics
      c. Geriatrics
      d. All of the above *CORRECT*
      e. None of the above

10. An ACS patient's severity of pain is related to:
      a. The size of the infarct
      b. The presence chest pain and diaphoresis
      c. An assignment of a higher triage acuity score
      d. All of the above
      e. None of the above *CORRECT*

11. What is the goal for the time from STEMI patient's arrival at the ED to the inflation of the balloon in the cardiac cath lab is:
      a. 30 minutes
      b. 60 minutes

      c.   90 minutes *CORRECT*

      d.   120 minutes

      e.   None of the above

12. Women with ACS are likely to present with:

      a.   Profound fatigue *CORRECT*

      b.   Brief pain lastly 2-5 minutes

      c.   Pain that is relieved by rest

      d.   All of the above

      e.   None of the above