

ABSTRACT

EARLY RECOGNITION AND CARE OF ACUTE MYOCARDIAL INFARCTION IN THE EMERGENCY DEPARTMENT

The purpose of this project was to create an educational module to assist emergency department (ED) nurses (RNs) with the rapid recognition and treatment of acute myocardial infarction (AMI). Early intervention is critical since patient care delays are associated with debilitating morbidities and high mortality rates. Despite evidence-based guidelines which emphasize the expeditious management of AMI, the nursing care for these patients is frequently tardy. In response, a two step AMI educational module and theoretical framework, based on suppositions offered by the Social Learning Theory and the Theory of Bureaucratic Caring, were created. Effectiveness of the module was assessed through its presentation to a pilot group of 10 ED RNs and a qualitative retrospective review determined participant approval. Statistical analysis of the module's final test revealed a test item difficulty index of greater than 0.7 which threatened its validity. Recommendations for future module presentations as well as methods to increase complexity are discussed. Overall, a general consensus revealed the module's effectiveness on improving prompt recognition and treatment of AMI.

Mark Stevens
May 2010

EARLY RECOGNITION AND CARE OF ACUTE
MYOCARDIAL INFARCTION IN THE
EMERGENCY DEPARTMENT

by
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A thesis
submitted in partial
fulfillment of the requirements for the degree of
Master of Science in Nursing
in the College of Health and Human Services
California State University, Fresno
May 2010

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ACKNOWLEDGMENTS

I would like to thank Dr. Griffin for her support and encouragement. During these past two years, you have exemplified the role of the expert nurse educator and I thank you.

I would also like to express my appreciation to CJ McCoy, RN for introducing me to the field of emergency cardiology. You have exemplified the role of the expert nurse clinician and I thank you.

Finally, I would like to thank my Canadian family for their constant support. I could not have done it without the long distance phone calls, encouraging emails, and financial support. Thank you.

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Chapter 1

INTRODUCTION

Recent statistics reveal that the estimated annual incidence of acute myocardial infarction (AMI) in the United States is 600,000 new and 320,000 recurrent attacks (American Heart Association [AHA], 2010). Of these, roughly 157,000 or roughly 20% of all AMIs succumb to the disease and die (Shumaker et al., 2009). The American College of Cardiology (ACC) and the American Heart Association (AHA) have led the effort to lower AMI mortality by establishing prompt medical treatment guidelines. Similarly, The Joint Commission (JCAHO) has ameliorated AMI care by incorporating it into its core measure set (JCAHO, 2009). Both groups recognize that early treatment results in better prognoses and lowers death rates. Accordingly, emergency department (ED) care standards have been produced which emphasize the importance of early AMI recognition and intervention. The implementation of these standards, however, is arduously challenging and frequently unfeasible in a busy ED.

Within the United States, coronary heart disease (CHD) has become the primary reason for mortality and it is estimated that 26% of all deaths are attributed to CHD (Annathurai and Ross, 2009; Centers for Disease Control and Prevention [CDC], 2009). These statistics are reflected throughout the state of California and within the central valley counties of Fresno, Kings, Madera, and Tulare, CHD has surpassed all other causes of death (California Department of Public Health, 2009). CHD is multi-faceted but medical research has revealed that AMI is the primary reason for CHD related deaths. Indubitably, the national

proliferation of AMI is significant and its impact on the delivery of healthcare is burdensome.

The American Heart Association (AHA) has estimated that 695,000 patients are admitted to the nation's hospitals with the diagnosis of AMI (2010). Since the majority of these patients present to the ED, the emergency nurse (RN) has the unique opportunity to enhance the care for all AMI patients. The occasionally overcrowded and unsafe working environment of the ED may sometimes complicate this care. However, properly educated RNs will intervene appropriately and assist with the rapid recognition and treatment of AMI.

Background

Community Regional Medical Center (CRMC) was formed when University Medical Center and Fresno Community Hospital merged in April 2007. CRMC is a level one trauma center in downtown Fresno which serves residents of central California and is the only combined burn/trauma unit between the cities of Los Angeles and Sacramento. CRMC is affiliated with the University of California, San Francisco School of Medicine and is involved with the education of all health-care disciplines including nursing.

The ED of CRMC is the "...state's largest and second busiest" (CRMC, n.d.) with 75 licensed beds which increase in number based on surges of patient volume. The ED is forecasted to treat over 100,000 patients this year and averages 280-300 patients per 24 hours (CRMC, n.d.). Since the merge, administration has diligently worked to enhance its reputation and in an effort to improve cardiac care, the hospital has invested extensively into its cardiology program. This has resulted in establishing CRMC as a prehospital AMI destination for emergency medical services.

Nurse staffing has been a challenge for the new ED. On average, 38 licensed nurses provide general nursing care for both emergency and admitted patients holding in the ED. Since the merge, many nurses have left the ED for various reasons and in response, the human resources department quickly hired scores of nurses. The availability of experienced emergency nurses is limited and traveling/agency nurses, many new graduates, and those new to emergency nursing were hired. Positions were filled but the quality of emergency nursing care diminished. The relative lack of experience and knowledge compromised patient care and in regards to emergency cardiology, the national standards set forth by both the ACC/AHA and JCAHO were sporadically met.

Problem Statement

The prompt nursing care of AMI patients is frequently jeopardized in the ED due to a variety of factors. Since the standard of AMI care mandates that medical treatment, preferably percutaneous coronary intervention (PCI), be performed within 90 minutes of arrival to the ED (The Joint Commission, 2009; Krumholz et al., 2008), all initial interventions and a conclusive diagnosis are performed at an extremely rapid pace. Nursing functions during this timeframe include, but are not limited to, electrocardiogram (EKG) tracings, radiography, venipuncture, intravenous establishment, analgesia administration, and treatment of arrhythmias. Compounded with the difficulties associated with ED overcrowding, ambiguous presentations, staff shortages, and overall lack of nursing experience, timely treatment of AMI is challenging.

Significance/Relevance

The purpose of this educational module is to decrease the amount of time required to diagnose and treat AMI by ED RNs. Emergency care has evolved

considerably over the last 30 years and has identified that the quick reversal of cardiac ischemia greatly improves the prognosis. DeLuca discovered that a “...correlation exists between 1-year mortality rates and the length of time from the onset of symptoms to (PCI)... (as stated in Shumaker et al., 2009, p. 118). Another study found that patients who are treated aggressively with early reperfusion are at a lower risk for developing life threatening arrhythmias (Rahimi et al., 2007). Studies like these have been replicated and repeated results have been the primary reason for changes mandated by the ACC/AHA and JCAHO.

The average daily census of CRMC ED visits has steadily increased since 2007. Latest statistics reveal that on average, 311 patients seek emergency care on a daily basis (CRMC, n.d.). Similarly, the incidence of AMI has risen and a recent conversation with the director of cardiology revealed that CRMC has experienced a significant increase in the number of AMIs admitted through the ED (B. Eliason, personal communication, March 4, 2010).

Certainly, CRMC has not been immune to problems experienced by other EDs and AMI care may be slow. RNs are frequently overwhelmed with the volume of patients and safe care is sometimes jeopardized. The hurried environment of the ED is conducive to a task based nursing role and many RNs simply function as robots by quickly carrying out physician orders. The patient is viewed as a summation of needs or incomplete orders that need completion and a holistic patient view is sometimes overlooked. This is dangerous because diagnoses like AMI may be missed. RNs are continuously at the bedside and frequently assess things differently than physicians. Upon consultation with the physician, the plan of care is appropriately changed. Thus, despite good intentions, the hurried RN who simply focuses on tasks may in fact, slow down treatment. To facilitate the role of CRMC ED RNs, the completion of the

educational module will assist in the early recognition and expeditious treatment of the AMI patient.

Definition of Terms

The following terms used during this educational module have been operationalized.

Acute Myocardial Infarction (AMI)

occurs when myocardial cells (heart muscle) die due to prolonged ischemia which, in turn, is caused by obstruction of the heart blood supply.

S T Elevation Myocardial Infarction (STEMI)

a condition when a coronary artery is completely blocked. A chair or tombstone classic EKG pattern promptly identifies AMI (see Figure 1).

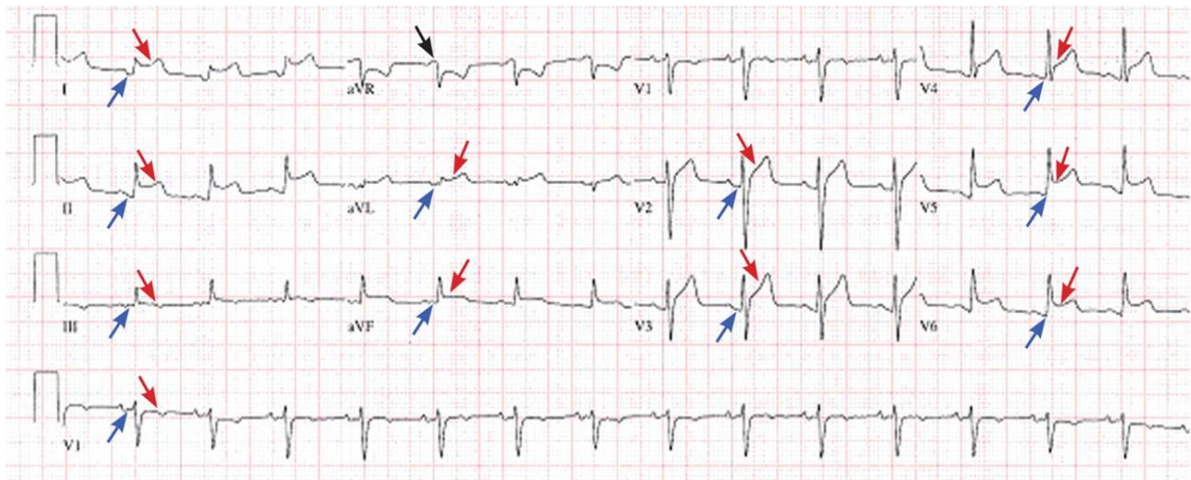


Figure 1. EKG tracing showing elevation of the ST segment in all leads, up-sloping (red arrows) and P-R depression (blue arrows) in all leads. Adapted from Senter, 2009.

Non S T Elevation Myocardial Infarction (NSTEMI)

a condition when a coronary artery is partially blocked but the EKG may show no changes and is non-diagnostic. AMI is identified alternatively through the use of a cardiac marker panel levels, like Troponin (see Figure 2).

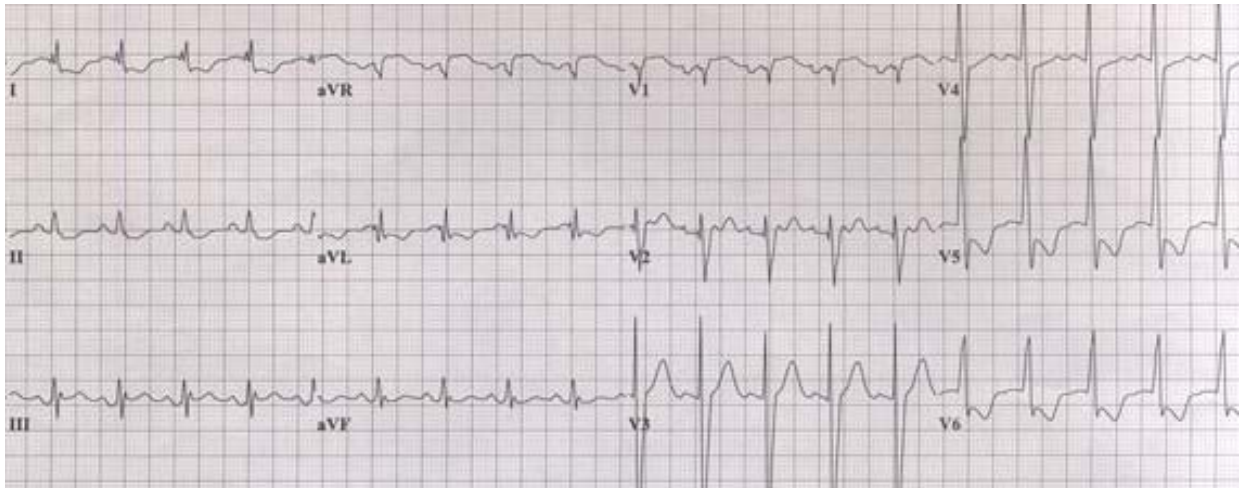


Figure 2. EKG tracing showing the absence of ST elevation (some depression noted) despite the diagnosis of AMI.

Acute Care Zone

the area of the ED where AMI care is rendered.

“Buddy Time”

the partnering of AMI education module participants with experienced RNs in the acute care zone.

Troponin

a complex found in muscle proteins which is released into the bloodstream after heart muscle damage. Serum levels are detectable at six hours post myocardial damage (Shah, Wang, Masoudi, & Foody, 2006).

Electrocardiogram (EKG)

a non-invasive interpretation of the electrical activity of the heart. It cannot be used alone to diagnose AMI since changes may either be absent or caused by another cardiac condition such as pericarditis and hyperkalemia. It is cheap, quick to perform, and has been called the most useful tool for detecting cardiac syndromes (Gibler et al., 2005).

Percutaneous Coronary Intervention (PCI)

encompasses all invasive procedures used to treat patients with diseased coronary arteries. PCI serves as the treatment of choice for most AMIs.

Theoretical Framework

Many factors influence the nursing care of the AMI patient and the learned behaviors of the RN. It is inadequate to utilize the content of just one theory to explain the intricacy of all involved processes. Therefore, to help guide the understanding of the relationship among the multiple variables, the principles proposed by several learning and nursing theories are discussed.

The *Social Learning Theory*, proposed by Bandura (1977) hypothesizes that central and paramount to learning is a concept labeled self-efficacy or in simpler terms, self-confidence. Bandura theorized that the more confident a person feels about a related behavior, the more likely the person will exhibit that behavior. It has been stated that the most influential source of self-efficacy is that of previous performance accomplishments. Schon, an influential learning theorist, echoed this phenomenon and described it in his book “The Reflective Practitioner” (1984). He identified that reflection is a powerful means of analyzing a situation and identifying if future occurrences will be the same. Extrapolating this theory to the care of AMI, this would mean that with positive results, like the quick

identification of an AMI, the more confident a nurse would feel about his/her interventions. Accordingly, similar interventions would be repeated for future patients, sustaining the delivery of effective nursing care.

According to the *Social Learning Theory*, self-efficacy is enhanced by four factors: successful past performances, vicarious experiences, verbal persuasion, and emotional arousal (Bandura). These factors are summarized in Appendix A and for simplicity, are grouped according to their locus of influence. Intrinsic or innate factors arise from within the student and include personal characteristics such as motivation, past experiences and attitude. Extrinsic or environmental factors, like modeling, coaching, and environmental, are those which are beyond the student's control. A discussion of these factors ensues.

Intrinsic Factors

Intrinsic factors are highly personal and may differ considerably among ED RNs. They reflect prior exposure to a particular set of circumstances and should be carefully addressed when imposing a change of behavior. For example, the junior nurse who has never worked with AMI may be fearful and hesitate at participating in its care. Expecting this RN to change their practice is futile unless an attempt is first made to address his/her fear and/or knowledge deficit. Conversely, an experienced RN may exhibit extreme comfort with AMI care, experience little or no anxiety, and be willing to quickly intervene. Their educational requirements are distinct and any instruction should reflect an accurate understanding of their needs. The ED of CRMC contains all levels of experienced RNs, which the educational module acknowledges.

Closely resembling this supposition is the principle proposed by the *Theory of Reasoned Action* (Fishbein & Ajzen, 1980). It states that the attitude of a

person, a powerful intrinsic factor, must be positive towards a certain behavior prior to implementation. A negative outlook greatly diminishes the motivation for completing a task. For example, an ED RN who subordinately and pessimistically views their role in relation to the physician, will be less likely to assist with the quick diagnosis of AMI. Rather, a healthy and determined outlook on nursing's role improves response times and ultimately, enhances patient care.

As an instructor, working with intrinsic factors may be difficult and their manipulation impossible due to their inherent nature. However, an efficacious teacher recognizes the influence of controlling factors from outside of the student called extrinsic variables. It is through the manipulation of these external stimuli that educators may change and reinforce behaviors.

Extrinsic Factors

Bandura strongly emphasizes the influence of modeling on behavior changes. Vicariously learning through the observation of others permits one to experience a situation prior to implementing the observed behavior. Bandura also highlights the powerful effect of verbal persuasion and coaching. He states that it is through the encouragement and mentoring of others that a particular behavior is most effectively taught. Thus, it is the intent of this educational module to incorporate the guidance of senior RNs, charge RNs, and clinical coordinators to influence the appropriate nursing actions in junior nurses.

When assessing the environment and its influence on nursing practice, the *Theory of Bureaucratic Caring* (Ray, 1989) is an effective means of explaining the interconnectedness of involved external factors. The utilization of this theory permits an examination of stimuli not routinely associated with nursing care and the necessity of their inclusion when implementing changes within a healthcare

organization. Ray divides these into four factors: economic, political, legal, and technological. A description of their influence on AMI care follows.

Economic factors include the cost associated with nursing care. For example, administration may regard patient care practice changes solely from a financial perspective. Cost saving measures may be preferred over best patient care. For example, point of care troponin testing may be expensive and thus, not instituted despite the documentation of its benefits. Political factors include the hierarchy within the hospital and unless nursing is represented at the higher levels of organizational government, the interests of bedside nurses may be overlooked. As an example, problem solving regarding patient care issues can be addressed solely from a medical point of view, without involving the bedside perspective and inviting input from nursing staff. Legal aspects of nursing care include the practice of nursing outside of its scope. ED nurses routinely encounter this conflict; they may know best but unless a physician concurs, their hands are tied. The establishment of evidence-based practice protocols illustrates interventions which prevent this problem. Lastly, technology is an important external factor which affects nursing behaviors. The availability (or absence) of EKG machines and heart monitors is an example of a significant technological factor in the speed of AMI care.

Summary

The theoretical framework was designed as a blueprint to explain the processes involved for effective AMI nursing care. The influence of both internal and external factors on learning are described according to suppositions proposed by the *Social Learning Theory* and the *Theory of Bureaucratic Caring*. At first

glance, the framework seems simple but an examination of its three steps reveals its intricacy.

First, the framework proposes the positive correlation between nursing self-efficacy and patient outcomes. It theorizes that the length of time for AMI identification and intervention is shortened as nursing self-efficacy is improved. Furthermore, it also considers the effect of multiple intrinsic and extrinsic variables which may positively and/or negatively affect self-efficacy.

It is also important to note that intrinsic and extrinsic factors will influence each other. For example, an increase of extrinsic economic factors like the removal of EKG machines from the department due to financial cutbacks may decrease the intrinsic comfort level of the nurse which in turn, may delay patient care. Thus, an educational undertaking such as this proposal should incorporate an examination of all intrinsic and extrinsic factors. By addressing these prior to module implementation, potential problems are avoided and a learning environment is created which more readily accommodates change.

The next step is concerned with patient care. This is where the framework accounts for the appropriateness and timeliness of delivered care. ED RNs must understand, possess the ability, and correctly perform effective nursing interventions.

The last step involves the process of reflection and occurs when RNs retrospectively think about what happened. Reflection strongly supports reinforcement of behaviors and is an effective method of learning. For example, the nursing interventions associated with positive AMI outcomes (early identification and treatment) are more likely to be performed again. Additionally, self-efficacy is enhanced since RNs feel good about positive results. The care cycle is perpetuated and effective nursing interventions are positively reinforced.

The initial care of the AMI patient is multi-interventional and fast paced. There are many processes involved and considering the hectic environment of CRMC's ED, RNs are overwhelmed. The timely completion of required steps may be jeopardized which delays patient care. In response, the AMI theoretical framework is provided as a means of assisting the educator in promoting a nursing environment conducive to the rapid identification and care of AMI in the ED.

Chapter 2

REVIEW OF LITERATURE

The purpose of this educational module is to decrease the amount of time required to diagnose and treat acute myocardial infarction (AMI) by emergency department (ED) nurses (RNs). Despite the existence of national guidelines which mandate the quick care of AMI, delays in recognition and intervention persist. Theoretically, the prompt diagnosis and treatment of AMI is simple; however, in reality, there are factors which grossly inhibit care delivery. An extensive literature review reveals four common themes and results are schematically outlined for ease of explanation.

Knowledge Deficit

The recognition of AMI may be complicated by an RN's lack of knowledge required to assist with accurate diagnoses (see Table 1). An astute emergency RN should be able to appropriately determine the presence of an AMI in sometimes obscure presentations. Thus, nursing staff must have an extensive working knowledge of symptomatology and possess excellent assessment skills. Many RNs lack a basic understanding of AMI and rely on primary care providers for diagnosing – a grossly inappropriate but continued practice in the ED.

Lack of Protocols

Evidence-based-practice (EBP) protocols integrate research, clinical expertise, and patient values when making decisions about the care of individualized patients (Raun, Chulay, Bridges, Vollman, & Arbour, 2008). Many stakeholders, including legislators, the insurance industry, and the public are

Table 1.

Knowledge Deficit and Its Effect on the Delay of AMI Recognition and Care			
Study	Methods	Outcomes Associated With Knowledge Deficit	Relevance
Diercks et al., 2007	Correlational study design comparing ED length of stay with five recommended therapies	Females, diabetics, and non-Caucasians, present with atypical symptoms, have longer ED stays, and are treated less with the recommended therapies. This group has a higher risk of recurrent AMI	The inexperienced and/or uneducated RN may not rapidly recognize AMI which delays care
Senter, 2009	Descriptive study design that reviewed different AMI treatment regimens.	Difficulty with the recognition of AMI in specific populations <ul style="list-style-type: none"> - Older adults - Diabetics - Chronic renal failure - Female 	The inexperienced and/or uneducated RN may not rapidly recognize AMI which delays care
Shumaker et al., 2009	Correlational study design of 293 pts. Assessed if venous sampling by EMS had a shorter length of time to AMI diagnosis than RN drawn blood	The difficulty in recognizing AMI resulted in slow venous draw times. This resulted in a delay of serum cardiac marker results and a delay in AMI care	The inexperienced and/or uneducated RN may not rapidly recognize AMI which delays care
Thiele, Thiele, Pranas, & Schuler, 2008	Review of correlational studies assessing the length of time to intervention after the diagnosis of AMI	Difficulty with the recognition of AMI	The inexperienced and/or uneducated RN may not rapidly recognize AMI which delays care

concerned with best outcomes. Thus, healthcare organizations have placed a heavy emphasis on EBP since its implementation is multi-influential. EBP has become the standard method to produce changes within the healthcare setting for a variety of reasons and its continued presence is primarily due to its delivery of best care practices. Table 2 explains the research related to EBP and AMI care.

Table 2.

Lack of EBP Protocols and Its Effect on the Delay of AMI Recognition and Care

Study	Methods	Outcomes Associated With a Lack of EBP Protocols	Relevance
Robertson-Malt, Chapman, & Ingram, 2006	Correlational study design of inpatient care at a large urban hospital	Evidence-based protocols standardizes pt care, facilitates pt safety, and reduces overall care costs.	Protocols quickly direct pt care towards mutual goals and quick diagnosis
Ahmed et al., 2009	Retrospective correlational study design of transferred AMI pts at a large urban ED	Post establishment of evidence-based protocols, 73% of STEMI pts achieved interventional goal times (as compared to <15% prior to implementation)	Evidence based protocols permit the RN to rapidly administer tests and interventions which enhance quick AMI care
Krumholz et al., 2008	Recommendations based on a multitude of national correlational studies linking factors with AMI care	“the nursing care of cardiovascular patients has improved over the years, however, ...care could be better by incorporating EBP” (p. 2599).	Rapid recognition and care of AMI pts through protocol initiation

Nursing Shortage

RNs are the largest single group of health care providers in the United States, numbering over 2.2 million (Institute for the Future, 2003). According to projections from the United States Bureau of Labor and Statistics, more than 1 million new RNs will be needed by 2012 (American Association of Colleges of Nursing [AACN], 2005). Frequently, ED RNs work short staffed and are required to practice beyond the recommended patient-care ratios. Meeting patient care needs in an already busy environment is difficult but with the lack of available staff, it becomes almost impossible. A summary of literature findings is included in Table 3.

Emergency Department Saturation

There has been an increase in the number of ED visits and recent statistics published by the Centers for Disease Control and Prevention (CDC) reveal that yearly, 119.2 million Americans visit an ED (Pitts, Niska, Xu, & Burt, 2008). The recent economic downturn is one of the reasons for an increase in ED visits. EDs are required to see every patient regardless of insurance so many, who have recently become unemployed and lost insurance coverage, present to the ED for primary care. There has also been a "...documented increase in behavioral problems including familial violence, associated with economic insecurity" (Ogar, 2009, p. 358). The ED is also treating non-urgent conditions due to the shortage of primary care providers. Lastly, emergency care is expensive and to offset expenditures, many hospitals have closed their EDs (McConville & Lee, 2009). This all has produced a considerable strain on the nation's remaining EDs and creates an abundance of conflict for emergency patient care. A summary of literature findings is included in Table 4.

Table 3.

 The Nursing Shortage and Its Effect on the Delay of AMI Recognition and Care

Study	Methods	Outcomes Associated With Nurse Staffing	Relevance
Carlbon & Rubenfeld, 2007	Survey/Questionnaire of 64 ED Directors/Managers in the 25 most populated American cities	Lack of RNs was associated with delayed use of protocols, diagnosis, and treatment	Lack of and/or a shortage of nursing staff inhibits early goal directed therapy
Hoot & Aronsky, 2008	Extensive literature review of > 4000 articles that looked at ED overcrowding Authors assessed the methodologies for appropriateness of inclusion	Frequent cause of overcrowding is a nursing staff shortage Linked to poor outcomes like patient mortality, transport and treatment delays	Lack of and /or a shortage of nursing staff and inhibits prompt patient treatment and increases the incidence of patient death
Kutney-Lee et al., 2009	Correlational study design at 430 hospitals which studied the relationship between nursing and pt satisfaction	Direct correlation between low RN staffing and low pt satisfaction, quality of care, and recommendation of hospitals to others	Lack of and /or a shortage of nursing staff is associated with poor quality of care
Weichenthal & Hendey, 2009	Observational study which determined a correlation between RN-Pt ratios and the quality of delivered nursing care	Increasing RNs, reduces number of patients who leave without being seen and the length of time to antibiotics for pneumonia patients.	An increase of RN staff enhances early recognition and treatment of pt conditions

Table 4.

ED Saturation and Its Effect on the Delay of AMI Recognition and Care

Study	Methods	Outcomes Associated with ED Saturation	Relevance
Diercks et al., 2007	Correlational study design comparing ED length of stay with five recommended therapies	Length of stay (LOS) after admission for NSTEMI pts is on average, 4.3 hrs. 15% of NSTEMI pts stay longer than 8 hrs Increased LOS correlates with a lower occurrence of PCI and medications like aspirin, Beta Blockers, heparin, and plavix, and an increased chance of ED revisit	ED saturation delays pt care and timely diagnosis
Kulstad & Kelley, 2009	Retrospective correlational study design of all pts with chest pain presenting to an ED over a 2 month period	ED overcrowding causes an increase in pt mortality, transport and treatment delays, and an increase of pts who leave without being seen	ED saturation delays pt care, timely diagnosis, and may harm those who choose to leave.
Pitts & Hollander, 2008	Retrospective study of 13, 758 pts complaining of pain who presented to an inner city teaching hospital over a 17 month period	ED crowding was associated with a delay in treatment of pain 60% of pts with pain were delayed at triage	As the ED becomes increasingly busier, the quality of pain care diminishes
McConville & Lee, 2009	Retrospective analysis of all California hospital ED visits from 1997-2006	California ED visits have increased by 8% The number of California EDs has decreased by 12% Fresno county has the highest per-capita ED visit rate	Fresno county ED RNs are caring for a significant increase in number of pts.

Summary

The emergency RN routinely experiences the influence of multiple variables which compromise effective nursing interventions. A literature review exposed several factors which inhibit AMI nursing care but the four most commonly cited reasons are:

1. knowledge deficit of RNs regarding AMI,
2. lack of department protocols,
3. shortage of RNs, and
4. ED saturation.

All four are significant causes in the delay of recognition and treatment of AMI.

An RN who lacks a basic understanding of AMI pathophysiology cannot be expected to appropriately and quickly intervene. Those EDs which solely depend on physician direction of care have considerably longer treatment times than those which have nurse driven protocols. A lack of nursing staff and an increase of patient volume, which in turn, proliferates nursing responsibilities, also increases the length of treatment time. These four factors are a global phenomenon and negatively affect AMI care on a significant level. Considering their relative rate of occurrence, the delay of AMI nursing care should be expected and routinely addressed.

The educational module includes a discussion of these four factors and prepares the ED RN for appropriate management of potential problems. In an environment where a delay in decision making may greatly harm a patient, interventions must be made to assist nurses in achieving best patient care practices. In doing so, the educational module promotes early recognition and prompt treatment of AMI by ED RNs.

Chapter 3

METHODOLOGY

The purpose of this educational module is to decrease the length of time required to diagnose and treat acute myocardial infarction (AMI) by emergency department (ED) nurses (RNs). This is especially important at Community Regional Medical Center (CRMC) since the ED has experienced a dramatic increase in the amount of patient visits. Frequently, the department is overburdened and cannot physically accommodate the needs of additional patients. In response, patients are quickly placed on hallway gurneys, waiting rooms are transformed into treatment rooms, and non-acute care areas are changed into critical care beds. Despite best intentions, conditions are chaotic and patient safety becomes jeopardized. Treatment times are lengthened and effective nursing interventions are delayed.

This is counterintuitive to the mission statement of CRMC which states the hospital strives to "...improve the health status of the community" (CRMC, n.d.). Similarly, one might question the belief proposed by their vision "...to serve the community as the provider, practice location, and employer of choice – establishing Community Medical Centers as a leader in clinical excellence, technological innovation, quality service, superb facilities, and compassionate care" (CRMC, n.d.). Routinely, these mission and vision statements are within reach but not met.

In recognition of these statements, the educational module was designed to promote nursing excellence and enhance patient care in sometimes less than desirable conditions. It is during these times when ED RNs must be most astute

since patient contact may be convoluted and limited. It is the intention of the proposed module to assist nurses during these times of extreme pressure; rapid recognition of AMI is the key factor in this educational process.

Author Information

The author of this project obtained his undergraduate nursing baccalaureate at the University of Ottawa, Canada and has worked in a variety of North American ED settings over the last 14 years. His extensive knowledge of emergency nursing is reflected by the attainment of Certified Emergency Nurse by the Emergency Nursing Association (ENA) and his desire to instruct others motivated the completion of a nursing graduate study. This RN has a widely varied employment history including positions as ED/Intensive Care staff RN, clinical coordinator, clinical educator, CathLab recovery manager, and rapid response team member. His affinity for cardiology nursing in particular, the care of AMIs within the ED, was the catalyst for creation of this project.

Identification of Educational Need

Through personal experience and observation, the author identified that the nursing care of AMI patients was occasionally jeopardized. This is problematic since nursing significantly improves AMI prognosis. Considering the rise of AMI occurrence and the obligatory employment of stringent national care guidelines, it was deemed desirable to address the management of AMI by ED RNs.

To corroborate the author's observation, a simple three item questionnaire (see Appendix B) was anonymously delivered to a group of CRMC ED RNs. A sample of 53 RNs, reflecting a diversity of nursing experience, was randomly chosen. Figure 3 illustrates the percentage of RNs who incorrectly answered the survey questions.

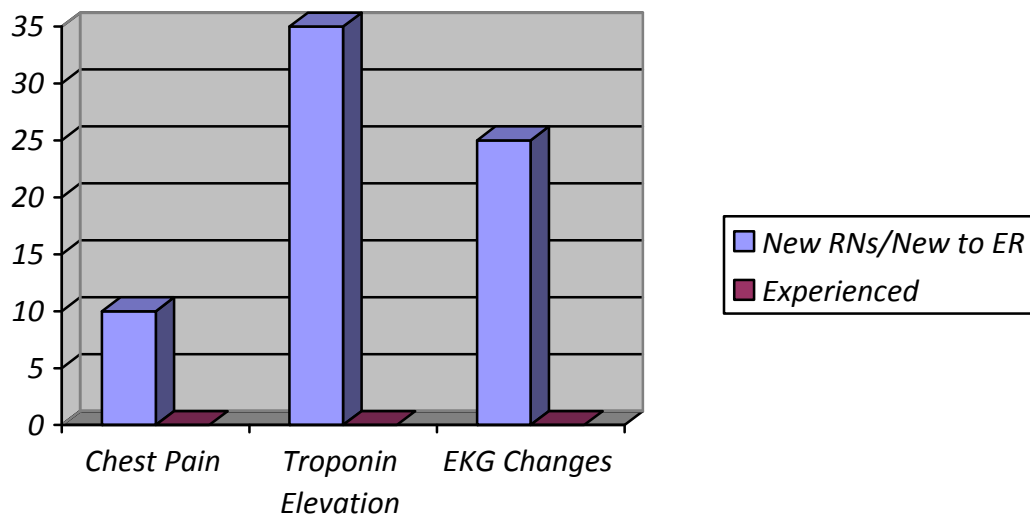


Figure 3. Overall percentage of RNs who incorrectly answered the survey questions

The survey identified that a minor, yet significant number of inexperienced nurses had difficulty in managing AMI. Roughly 10 to 35% of those surveyed incorrectly answered at least one question. Since a large proportion of patients admitted with the diagnosis of “chest pain, rule out myocardial infarction” are temporarily housed in a zone routinely managed by these newer RNs, AMI care was defined as a priority educational need.

Characteristics of the Learner

One cannot list all of the characteristics inherent of efficacious ED RNs. However, there exist several discernable traits which are routinely observed amongst the emergency nursing community. Most are enthusiastic, have high energy levels, are great decision makers, calm under stressful situations, and obstinate. Research has identified that an ED RN is “...intuitive, interested in the abstract,... a risk taker... extroverted, and perceptual” (Lyneham, Parkinson, & Denholm, 2008).

With this in mind, a judgment may be made about the learner characteristics of involved participants. Since the group will easily become bored if their thinking is not questioned, challenged, and stimulated, the learning atmosphere should be lively. Impulsive ED RNs make quick decisions and the employment of case studies will be most beneficial. ED RNs are critical thinkers and a classroom that employs well designed questions creates a learning environment most acquiescent of the group.

An assessment of the learners' developmental stage is also crucial to assist with instruction. The success of imparting information and its retention is directly related to choosing appropriate teaching methods which reflect the developmental stage. According to Erikson's *Theory of Psychosocial Development* (1950), the individual members of this group fall into the categories of young and middle-age adulthood. At this stage of life, important characteristics of the learner include autonomy, a well developed sense of self, reflection of past experiences, and the ability to critically analyze a situation. A well defined and efficient education plan will reflect these traits.

Goals/Learner Outcomes

The overall goal of this module is to improve the response time of AMI recognition and the initiation of treatment by ED RNs. Patient care is improved and the ED adheres to required national guidelines. Serendipitously, another significant issue plaguing EDs is resolved. Frequently, a cultural division exists between experienced RNs and those new to the ED. Disparaging and condescending jokes are sometimes made about the inexperienced – a globally recognized phenomenon (Bigony, Lipke, Lundberg, McGraw, Pagac, & Rogers, 2009; Hutchinson, Vickers, Wilkes, & Jackson, 2009; Johnston, Phanhtarath, &

Jackson, 2009). This creates a hostile environment, hinders teamwork, and ultimately inhibits nursing excellence. Thus, the global address of AMI care affords each RN the same understanding, regardless of experience, and demolishes the knowledge hierarchy. This creates equality, increases collaboration, and ameliorates mentorship. An analysis of the AMI theoretical framework explains that this positively enhances the influence of extrinsic factors and in doing so, improves patient care.

Learning Objectives

The module has been designed according to the technique proposed by the authors of the *Learner Evaluation Model* (Rankin & Stallings, 2005). They recommend five learning levels which represent a continuum ranging from beginner to expert – closely resembling the stages of clinical competence in Benner's *Novice to Expert Theory* (1984). As students gain knowledge, they advance from one level to the next and as they progress, a corresponding change of attitude is acquired. The learning objectives are outlined in the lesson plan (see Appendix C) and promote the five levels of the *Learner Evaluation Model*. They progress from simple to complex and reveal the expected change of attitude.

Instructional Design

The AMI education module consists of two strategies. First, a lecture that utilizes group discussion and case-presentations is used to encourage active participation. This allows RNs to obtain, deliberate, and reflect on new knowledge without fear of jeopardizing patient care. Healthy conversation commences the process of reinforcing self-efficacy and identifies influencing factors. It is important to note that while lecturing, applicable examples should be given. Adult learners, especially ED RNs, are pragmatic in their learning and

when instructed, everyday occurrences must be used to facilitate learning (Nebraska Institute for the Study of Adult Literacy, n.d.).

Once this first step is completed, participants will work in acute care zones while facilitated by a seasoned RN. This echoes the principles of the *Social Learning Theory* which identifies the importance of coaching and modeling. The length of this “buddy time” will be a minimum of two shifts but individualized according to the comfort of each RN. In doing so, the AMI module is tailored to accommodate individual characteristics and an effective learning environment is promoted.

Content Outline/Instructional Methods

The selection of teaching methods was based on course content, learner characteristics, developmental stages, and the preference of the author. A summary of the AMI educational module content and instructional methods are available in the lesson plan (see Appendix C). The following explains the chosen methodology.

Typically, the requirement to educate large numbers of students, set against the constraints of time, leads many to favor a traditional didactic style of teaching. The lecture format is a familiar and widely accepted method of teaching. Its utilization is cost effective since it easily and quickly transmits large amounts of information to target audiences. Lectures are excellent for delivering information which is not readily available like recently discovered facts or original theories. Since the course content of the AMI educational module is new to a significant number of participants, lecturing is the main method of teaching. A power point presentation is used during the lecture and hard copies are available prior to the start of class (see Appendix D).

Lectures “...often emphasize rote learning (rather) than critical thinking” (Limbach & Waugh, 2005, p. 47). Students may simply memorize the information and regurgitate lecture notes when prompted – a poor indicator of true learning. A lecture will not teach the application of information, develop problem-solving skills, or change attitudes. This is best addressed during a discussion or demonstration so that students may question the instructor and realize how facts fit together (Johnson & Mighten, 2005).

Therefore, group discussion is incorporated into the lesson plan which gives the participants ample opportunity to apply discussed facts. For example, students are given patient scenarios and asked to deliberate potential nursing interventions. However, if the discussion group is too large, healthy dialogue is virtually impossible and learning is threatened. Teachers must limit the number of participants; a recent literature review revealed that the most effective size for group discussion is five to nine participants (Miller, 1956). This has become an educational standard since groups of this size permit active participation by all members. AMI group discussion numbers are limited to five.

Case studies, or problem based learning, are another useful resource for promoting effective learning and are incorporated into the AMI educational module (see Appendix E). They increase attention, enhance motivation, and promote higher order thinking such as analysis, problem solving, and decision making (Davis & Wilcock, 2005). This enhances comprehension, boosts intrinsic and extrinsic factors, and fosters the progression from novice to expert.

Evaluation Methods

All three forms of evaluation are utilized in assessing student comprehension. Formative evaluation is consistently used during the lecture

format of the module. Questions are asked during group discussion to confirm understanding and through group interaction, the instructor can assess overall understanding.

After finishing the didactic portion of the course, a summative evaluation test is administered. The testing blueprint and corresponding 20 item test is included in Appendix F. RNs must achieve a score of 80% and if unsuccessful, must repeat the AMI lesson. Participants will then spend “buddy time” in the ED acute care area for a maximum of two 12-hour shifts. The length of “buddy time” will vary depending on occurrence of AMI and be lengthened accordingly. Daily, preceptors will provide formative feedback according to the designed Preceptor Assessment of the Buddied Nurse (see Appendix G). The check sheet is a simple yes/no answer sheet, with the option to write comments, and corresponds to course learning objectives. This reflects the AMI theoretical framework by allowing participants to consider their provided interventions. Lastly, a yearly confirmative evaluation (per the corporate annual evaluation tool) is provided by the clinical coordinator.

Pilot Group Testing

Ten CRMC ED RNs, with varying levels of ED nursing experience, were randomly chosen to attend the first AMI module presentation. The age range was from 23 to 55 years old and gender diversity of the group included seven females and three males. Education levels were mixed; eight had an associate’s diploma in nursing and two had a baccalaureate. All participants were unpaid. The lecture was given in a hospital classroom and an open horseshoe seating arrangement was utilized to promote healthy conversation. Each participant’s test was reviewed and graded in private to assure confidentiality. An analysis of results, including

descriptive statistics, was done and participants were asked to provide feedback. Finally, a preliminary assessment of the AMI module appropriateness was made.

Summary

In an effort to enhance AMI care, the following tasks were accomplished:

1. The author collaborated with the project chair, CRMC clinical educators, and CRMC ED nursing staff to establish the AMI educational module.
2. A thorough literature review was conducted regarding emergency AMI nursing care.
3. A lesson plan and comprehensive module was developed based on the literature review and needs assessment.
4. The initial project was submitted to the project chair and an ED clinical educator to obtain feedback on content and presentation style.
5. A trial presentation was presented to a small group of ED RNs. Evaluations of the presentation were conducted and incorporated into the final module.
6. The education module was submitted to the Department of Nursing at California State University, Fresno as the final requirements for the graduate program.

Work experience in the ED has allowed the author to identify the difficulty RNs have with achieving the mission and vision statements of CRMC. Routinely, the busy department fails to meet the philosophy of the hospital and AMI emergency care is jeopardized. Furthermore, the length of AMI treatment times is occasionally greater than those demanded by national guidelines. This is unacceptable and to address this problem, the AMI educational module, reflecting the learning characteristics of ED RNS, was created.

Chapter 4

DISCUSSION

The purpose of this project was to create an educational module to assist emergency department (ED) nurses (RNs) with the prompt recognition and delivery of care to acute myocardial infarction (AMI) patients. Research has demonstrated that slow AMI response times are potentially debilitating and sometimes life threatening. Consequently, emergency care has evolved considerably over the last couple of decades and identified that quick identification of AMI is vital for improved patient outcomes. This has resulted in significant reductions of AMI associated morbidity and mortality – echoing the purpose of the project. These new interventions have been incorporated into the module and a discussion of their effectiveness follows.

A subjective evaluation consisting of informal discussions with class participants, ED educators, clinical coordinators, and potential preceptors was completed. It is important to note the subjective nature of this evaluation because at present time, an objective evaluation of rendered AMI care is unfeasible. Participants have not completed “buddy time” and the risk of staffing the ED acute care zone with these unqualified RNs is too dangerous. Therefore, a true quantitative assessment of both the preceptor evaluation tool (see Appendix G) and the overall educational module is currently unattainable. The module assessment, however, includes a prospective evaluation of intended interventions coupled with a retrospective evaluation of completed classroom time.

All participants were eager to assist with the module evaluation since the majority sought an improvement in patient care practices. Also, those with a

leadership role understood the necessity of improving AMI response times due to its effect on government funding and patient satisfaction scores. A discussion of these findings is presented and the major themes are categorically described.

AMI Module Commendations

Those who were asked to participate in the pilot group were excited about the program. Some exclaimed that they had never received a formal education about ED AMI care and predicted successful employment of the AMI module. Participants agreed that objectives closely resembled and were consistent with the mission statement of the corporation. One student exclaimed that since there was only one other AMI receiving hospital in the city, her goal was to improve her nursing care so that CRMC would become the "...leader in clinical excellence" (CRMC). There was an overall appreciation of the simplicity of handouts and that they resembled the power point presentation. A younger RN explained that she was pleased that "large technical terms were explained in everyday language". An older RN felt that the module reflected a nursing approach and not one from a medical model. She felt that emergency nursing education is sometimes dictated solely by the priority physical needs of patients and frequently loses nursing's touch. She thought that the module manifested a nurse driven and directed approach. As stated, ED RNs tend to be pragmatic in their thinking and this surfaced during discussion. The pilot group appreciated the case examples and the number of prepared in advance questions which continued the conversation. Results of the AMI test were favorable with all participants passing. All agreed that the test items were realistic and reflected content covered during the class.

The general consensus of the group was that the educational module was practical and a necessary but long overdue in-service. It was felt that it

simplistically taught the basics of AMI care to newer and inexperienced RNs. This bodes well with the theoretical framework because increasing knowledge will also increase other intrinsic factors like motivation, comfort, and attitude. This increases self-efficacy which in turn increases successful patient outcomes. The module also reaffirmed current nursing practices to seasoned RNs, thereby employing the essential process of reflection and reinforcement. Once again, according to the framework, self-efficacy and successful patient outcomes are improved.

Overall the group was pleased with the relative ease of module completion. It was quick, informative, and relevant – all important to emergency RNs. However, they were forthcoming with various critiques and an explanation of their concerns follows.

AMI Module Criticisms

Despite the praise of the AMI educational module, several issues were identified. Many of the participants were concerned about potential problems, especially during “buddy time”. An examination of these potential problems are addressed first prior to exploring actual problems.

Potential Problems.

Nursing has been labeled a science but the actual delivery of care, an art. It should never be monotonous but reflect the personality of the RN. Consequently, “buddy time” may expose participants to a variance in nursing intervention delivery. For example, not all RNs hang intravenous fluids prior to initiating nitrate therapy and the exact positioning of chest electrodes is varied. Participants must be reassured that the taught standards of AMI care are upheld regardless of unique nursing style.

The group also showed concern that participants may not experience actual AMI care during their “buddy time”. Their observational experience is determined primarily by the actual presentation of AMI patients. Therefore, upon the direction of the clinical coordinator, educator, and preceptor, the length of “buddy time” may be extended.

Lastly, much concern was expressed over the financial costs of the educational module. Considering recent staff dismissals, financial cutbacks, and termination of education programs, many questioned the feasibility of such an undertaking. In response, a cost-benefit analysis of the module should be made. Up front direct costs of the module may be expensive but are fixed. This would include the salary of the instructor, those of the RNs chosen to participate, and lecture supplies. Indirect costs like housekeeping would be minimal since the class would be offered within the ED.

The long term cost benefits are significant. Examples include increased patient satisfaction scores, community recognition as a leader in AMI care, and improved patient outcomes. This assists in the generation of revenue as patients, including those with private insurance, request the ED for medical care. The identification of the ED as the AMI provider of choice is financially rewarding.

Therefore, ED management should be contacted prior to module initiation and a thorough analysis of costs be explored. An agreement concerning the module’s continued survival should be made. This will strengthen an important extrinsic factor and as per the *Theory of Bureaucratic Caring* (Ray, 1989), addresses the organizational structure stability necessary for efficient nursing.

Variance of Learner Characteristics

Both experienced and inexperienced participants felt that objectives would be more readily met more if class members were grouped according to nursing experience. It was felt that, amongst the group, there existed a wide variance of knowledge and experience. The younger RNs believed that the older RNs monopolized class time and felt that questions were explained too quickly. Some of the older RNs considered the module content to be basic and learned nothing. One RN stated that “it was simply a review of what I already know.” This resulted in a mixture of learning needs and the group became disjointed.

Providing an education module to a group of nurses with varying learning characteristics such as experience, developmental stage, and culture is challenging. To assist with module efficacy, all participants should be pre-assessed according to the principles recommended by Lichtenthal’s *PEEK* model (1990). This addresses their readiness to learn by examining four key learning concepts. Since all participants are ED RNs, an assumption can be made that *P* – physical ability, and *E* – emotional readiness factors are uniformly similar. Thus, heavy emphasis should be placed on *E* – experience and *K* – knowledge base. This will help adjust the focus of the class and create a more homogenous group of RNs. It is believed that the receptivity of RNs will be most acquiescent. It should be noted that while all individuals have unique learning styles, in order to address a larger group, a general consensus of learning characteristics must be made.

Lack of Experience

A relative lack of experience is the primary issue inhibiting the success of the AMI educational module. Work experience was previously mentioned as a major concern for class effectiveness. However, several of the identified problems

are related to lack of nursing experience and it is felt that a separate discussion of its influence is warranted.

A hasty assumption was made that all module participants possessed a basic understanding of AMI care and ED nursing. This was erroneous since several of the participants were brand new employees and had no ED experience. In management's haste to hire new staff, many RNs have signed on without mandatory emergency education. Some have never taken advanced cardiac life support classes. Some did not understand how to read an electrocardiogram. At one time, these were considered mandatory classes but in an effort to offset the nursing shortage, inexperienced ED RNs are being welcomed with open arms. Clearly, some participants lack the work experience necessary for quality AMI care.

A couple of RNs stated that at most times, they felt too overwhelmed with required nursing interventions and could not deliver efficacious care. ED saturation was identified as a detriment to patient care. This is refuted by the author since ED RNs continuously prioritize their care and reassess interventions, especially during times of increased census. Secondly, current staffing levels meet and frequently are better than those required by California state guidelines. Again, lack of experience and familiarity with the function of an ED RN plays a pivotal role in determining nursing care.

Some RNs agreed that despite the utilization of protocols, their nursing efforts were unappreciated and sometimes refuted by physicians. One participant described feeling as if her "hands were tied because no one will listen to (her)." It was interesting to note that the majority of RNs with this concern were young. Generally speaking, ED RNs are aggressive and routinely challenge physicians. It

is felt that through repeated exposure to AMI cases, this group of RNs will become adamantly confident about their care.

Applicability of Literature Review

It was interesting to note the presence of two inhibitory factors, as explained in chapter 2. Of the four factors listed, only knowledge deficit and ED saturation appeared to influence AMI nursing care at Community Regional Medical Center (CRMC). Evidence based protocols have been instituted over the last couple of years and have decreased the length of time to recognize AMI. Similarly, the nursing shortage has not affected AMI care at CRMC since management has hired sufficient numbers of nursing staff and consistently meets the required state RN-patient ratios.

Despite appropriate staffing levels, there persists a problem with AMI comprehension by RNs. At CRMC, this is the number one reason for the delay of AMI recognition and reflects findings cited in literature. Some CRMC RNs, usually the young and inexperienced, possessed a cardiac knowledge deficit.

The second observed reason for the delay in AMI care at CRMC is the globally experienced phenomenon of ED saturation. Since the creation of CRMC in 2007, the ED visit census has doubled which has created a tremendous amount of stress for the RNs. The resultant increase in workload is often cited as the main reason for a delay in patient care. Again, it was the young and inexperienced who complained most frequently about this issue.

By addressing these two issues, the AMI module has been tailored to meet the needs of CRMC. Other organizations interested in teaching the AMI module should assess their EDs while referencing the cited literature. Each ED

experiences unique problems and unless initially addressed, the effectiveness of the AMI teaching module will be severely limited.

Applicability of Theoretical Framework

The Learning Cycle

A discussion of actual and potential problems within the educational module would be incomplete without referencing the theoretical framework. All addressed issues are easily classified as either intrinsic or extrinsic and their influence on self-efficacy is obviously relevant. The inaugural class identified that intrinsic factors reinforced extrinsic factors and vice versa. For example, knowledge and experience were identified as the most important intrinsic factors. As they increased self-efficacy, extrinsic factors such as coaching and modeling were enhanced. The reverse is also true. As modeling and coaching enhances self-efficacy, knowledge and experience increases. Thus, the process is cyclical and self-perpetuating.

Social learning theorists value the process of modeling and coaching on learning. Since the foundation of the education module is firmly rooted in the principles of this theory, efforts must be made to accommodate this methodology. Future instructors of the module should use caution when separating participants based on experience. Initial classroom teaching could be split but during “buddy time”, the experience of older RNs could be shared with the younger RNs. Self-efficacy is boosted for both groups and again, the cycle is reinforced.

Reflection

The social learning theory emphasizes how the process of reinforcement increases the expectancy that a particular behavior will result in the same outcome.

Experience creates generalizations which are then applied to situations that are perceived as similar or related. These beliefs and attitudes, the so-called expectancies, will affect how a future situation is handled and guide behavior.

The AMI theoretical framework promotes reinforcement as the principal means for learning AMI nursing care. The suppositions of this learning method are utilized when RNs are asked to reflect upon their interventions. This increases self efficacy and enhances the likelihood of exhibiting similar behaviors. For example, prompt treatment of AMI decreases the chance of cardiac arrest. Therefore, as the RN recognizes that she/he made the right decisions after quickly recognizing AMI, she/he will render care in the same fashion when confronted with similar situations. This is a simple, well defined, and quickly accepted process by ED RNs. However, a discussion of the AMI framework is incomplete without the recognition of an important concept omitted during framework creation.

Locus of Control

Locus of control (LOC) refers to one's belief in his or her ability to control life's events. In contrast to self efficacy, which defines the perception of one's ability to act competently, LOC refers to the perception of one's ability to control outcomes. Furthermore, it can be divided into internal and external loci. Those who have a strong internal LOC are convinced that outcomes are related to their behaviors or personal investment. Conversely, those with an external LOC believe that outcomes are not related to their behavior and are attributed to external forces like fate, chance, and karma (Stillman et al., 2010; Strauser, Ketz, & Keirn, 2002).

Individuals with a solid internal LOC are more easily reinforced than those with a strong external LOC (Strauser et al., 2002). Since they believe they can control outcomes, interventions can be learned and implemented to improve patient care. Thus, heavy emphasis should be placed on intrinsic factors when incorporating the framework during AMI instruction. RNs that are convinced patient outcomes are most determined by situational factors and not nursing care have an external LOC. This group requires extra coaching regarding the effectiveness of their abilities and an enhancement of their internal LOC must be encouraged.

Certainly, this does not negate the effect of extrinsic factors since environmental stimuli will always influence behavior and an analysis of these factors must be explored. However, the instructor should highlight the significance of a healthy and strong internal LOC. Once this is incorporated into the module, nursing interventions will become more easily changed and adjusted for the better.

Evaluation of Pilot Group

It was felt that through the randomized selective process, internal and external validity of the AMI module was increased. The representation of a variety of nursing experiences and the incorporation of their responses assisted in the generalization of the module to all ED RNs. Content and face validity were established by asking participants to thoroughly examine the module for practicality and applicability. Validity was solidified through an assessment of subject matter by the participants who routinely provided the care taught and tested in the module. They defined it as relevant, applicable, and agreed that it reflected real life situations of the participants. Module validity is also assessed

during the yearly evaluation provided by the clinical coordinator and it will be interesting to see if yearly evaluations reflect the learned experiences of participants.

A statistical examination of the AMI Test (see Appendix F) revealed its relative simplicity (see Appendix H). The difficulty index was greater than or equal to 0.7 for 95% of the test questions which denotes an easy test. This suggests that the test is unable to distinguish between module participants who comprehend AMI content and those who do not. The discrimination index was 0 for most, indicating that all participants correctly answered the questions. This means that there was no difference between the overall bottom and top scorers. A minority of the questions had a positive discrimination index which denoted reasonable test items. Statistical analysis of multiple choice questions 16-20 echoed prior results. Difficulty and discrimination indices revealed little difference between the bottom and high scorers. Also, most distractors were not chosen which assisted in the creation of an elementary test. The statistical results question the usefulness of this test and challenge its reliability.

An attempt was made to create a simple, yet pertinent test. However, questions arise regarding the reliability of test results to AMI nursing knowledge. To combat this, the test should be made more difficult and the pilot group could be retested. Statistical results of this second test would be compared to the first and an expected improvement in reliability would be measured. Threats to external reliability would be eliminated by increasing test complexity. Until then, the applicability of the test to AMI nursing knowledge is unwarranted.

Recommendations

Prior to module implementation, there are several suggestions which should be incorporated to improve its effectiveness. First, all RNs should be required to have at least six months of ED nursing experience. They must also have completed a 12-lead electrocardiogram and advanced cardiac life support classes. The module is not intended to teach the basics of AMI care but is geared towards the application of this knowledge. Thus, participants must already have an understanding of AMI emergency nursing care.

An interdisciplinary approach should be utilized during teaching. Physicians could be reminded about the purpose of the evidence based practice protocols and perhaps one could be invited to speak on their usefulness. A representative from the cardiology department could explain cardiac testing or lead placement for the electrocardiogram. This creates an atmosphere of cooperation and facilitates teamwork.

An effort should be made to keep RNs informed about their efforts. Too frequently, RNs work to stabilize their patients and remain unaware of outcomes. Disclosing results of nursing interventions may encourage their efforts. For example, angiography photos of coronary arteries before and after occlusion could be posted. A monthly review of treatment times could be made available for those interested. Thank you notes from grateful patients could be displayed in break rooms. A plan like this would not only support the RNs for their hard work but would also show gratitude for a job that is sometimes unacknowledged.

As previously mentioned, the AMI test should be more difficult. A well designed test with improved statistical analyses would decrease the threats to validity and reliability. Until then, the module does not accurately reflect real world nursing and testing results are insignificant.

Conclusion

AMI must be quickly addressed and the proposed educational module was created to expedite AMI recognition and treatment by ED RNs. The use of reflection, as illustrated in the newly created AMI theoretical framework, was promoted as the most useful mechanism in learning AMI care. A pilot group was formed from voluntary participants and a summation of their observations was made. Participants were satisfied with the module and a list of several positive features was identified. Problems were also recognized and classified into the following three categories: (a) potential problems, (b) variance of learner characteristics, and (c) lack of experience. Lack of experience was determined as the primary cause for poor AMI care which reflects recent research findings. Suggestions for interventions required to improve care delivery were listed and incorporated into the AMI module. A redesigned AMI test is proposed to accurately assess participants' true understanding of AMI nursing care. Finally, suggestions for other EDs, considering a similar AMI educational offering, were included

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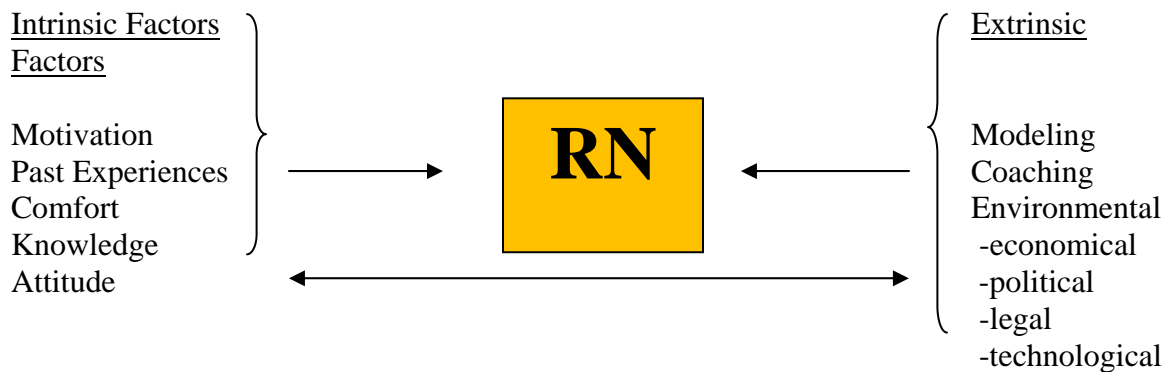
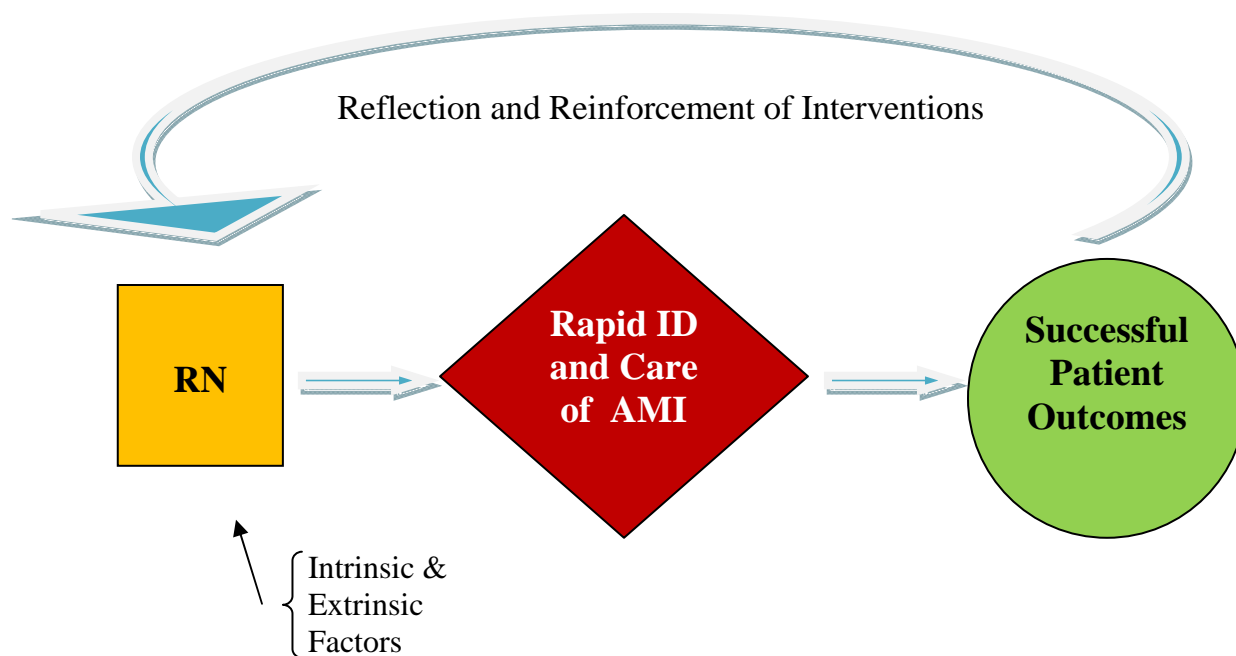
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APPENDICES

APPENDIX A
AMI IDENTIFICATION AND CARE – THEORETICAL
FRAMEWORK



Property of M. Stevens (2010)

APPENDIX B
QUESTIONNAIRE OF AMI CARE

Quick survey of Acute Myocardial Infarction (AMI) Care

- | | | |
|--|---|---|
| 1. Do all AMI patients have some type of chest pain? | Y | N |
| 2. Do all AMI patients have an elevated troponin level? | Y | N |
| 3. Do all AMI patients have EKG changes (like ST elevation)? | Y | N |

APPENDIX C
LESSON PLAN

Primary Objectives And Enabling Objectives	Content Outline	Method(s) Of Instruction	Time Allotted (in minutes)	Resource Materials	Method(s) Of Evaluation
Define effective AMI care <i>- Analyze the factors which inhibit and/or facilitate AMI care</i> <i>- Justify the necessity of competent AMI care</i>	Introduction What is AMI care? Purpose of rapid recognition & treatment Examples	Lecture Discussion Ask for examples	15 minutes	Power Point Pre-made examples	Through discussion/active participation
Commit to providing effective AMI care <i>- Follow CRMC's philosophy of delivering compassionate, culturally sensitive, and holistic care</i> <i>- Adhere to CRMC's care policy and procedure</i>	Policy & Procedure "Nursing Care"	Lecture Discussion Ask students what they think	10 minutes	Hand outs (philosophy, P & P)	Through discussion Evaluation by clinical coordinator (summative – yearly evaluation)

Primary Objectives And Enabling Objectives	Content Outline	Method(s) Of Instruction	Time Allotted (in minutes)	Resource Materials	Method(s) Of Evaluation
<p>Understand the process of AMI care at CRMC</p> <p><i>-Differentiate the difference between STEMI and NSTEMI</i></p> <p><i>- Assess patients accurately</i></p> <p><i>- Recognize the signs and symptoms of STEMI and NSTEMI</i></p>	Outline of AMI Care	<p>Lecture</p> <p>Role Play</p> <p>1:1 buddy time</p>	<p>45 minutes</p> <p>Max 2 12-hr “buddy shifts”</p>	<p>ESI handout</p> <p>Power Point</p> <p>Give examples prepared in advance</p>	<p>Through discussion</p> <p>Post-test</p> <p>Formative evaluation by preceptor (use evaluation tool)</p>
<p>Demonstrate effective care of all patient populations presenting to CRMC ED</p> <p><i>- Attend CRMC’s AMI inservice</i></p> <p><i>- Function successfully as a member of the care team</i></p>	The various roles of involved staff	<p>Lecture</p> <p>Discussion</p> <p>1:1 buddy time</p>	10 minutes	Power Point	Formative evaluation by preceptor (use evaluation tool)

Primary Objectives And Enabling Objectives	Content Outline	Method(s) Of Instruction	Time Allotted (in minutes)	Resource Materials	Method(s) Of Evaluation
Maintain an awareness of diverse patient cultures <i>- Complete the yearly corporate cultural competency</i> <i>- Attend the mandatory age-related department in-service</i>	Potential health behaviors of most common cultures presenting to ED	Lecture Self Directed	10 minutes (30 min of own time)	Power Point Hand out Yearly corporate competencies	Formative, summative, & confirmative evaluation by preceptor & clinical coordinator (use evaluation tool) Corporate competency evaluation

Primary Objectives And Enabling Objectives	Content Outline	Method(s) Of Instruction	Time Allotted (in minutes)	Resource Materials	Method(s) Of Evaluation
<p>Determine appropriate interventions immediately required for unstable patients</p> <p><i>- Identify high risk situations</i> <i>- Pinpoint pt. conditions which are deemed high priority</i> <i>- Summarize the urgent steps initiated for stabilization</i></p>	Emergency conditions	Lecture Discussion 1:1 buddy time	10 minutes	Power Point	Evaluation by preceptor & clinical coordinator (use evaluation tool)
<p>Handle complex patients with competence</p> <p><i>- Reprioritize pts as necessary</i> <i>- Utilize those in charge when confronted with unfamiliar circumstances</i></p>	Emergency interventions	Lecture Discussion 1:1 buddy time	10 minutes	Power Point Triage supply list	Post-test Evaluation by preceptor & clinical coordinator (use evaluation tool)

Primary Objectives And Enabling Objectives	Content Outline	Method(s) Of Instruction	Time Allotted (in minutes)	Resource Materials	Method(s) Of Evaluation
Accept the responsibility for critical patients <i>- Serve as a role model for other RNs in the dept.</i> <i>- Encourage other RNs to accept acute care assignments</i>	Value of competent care	Lecture Discussion	10 minutes	Give examples	Evaluation by clinical coordinator (per hospital evaluation tool)
Precept new nurses <i>- Display a willingness to precept</i> <i>- Attend corporate preceptor inservice</i> <i>- Design an effective learning experience in collaboration with educator and new RN</i>	Clinical Orientation	Lecture Discussion	5 minutes	Clinical career ladder	Evaluation by clinical coordinator (per hospital evaluation tool)

APPENDIX D
AMI POWER POINT PRESENTATION

Rapid Recognition and Care of AMI in the ED

An Educational Module for CRMC

by

Mark Stevens RN BScN CEN



What is AMI?

- Myocardial cells (heart muscle) death due to prolonged ischemia (lack of oxygen)
- Caused by obstruction of the heart blood supply



AMI is the leading cause of death in the US and in most industrialized nations
920, 000 AMIs/year in the US
157, 000 die

Causes

may occur as a result of: 1) an increase in metabolic demand, 2) decreased delivery of oxygen, and/or 3) a combination of 1 and 2

- Thrombus
- Coronary Artery Stenosis
- Vasospasm
- Low cardiac output (like in hypovolemia or shock)

Risk factors

- Increased blood cholesterol levels – increases the number of circulating fat particles
- Diabetes – increases the risk of atherosclerotic vascular changes and increases the risk of increased blood cholesterol
- Hypertension
- Smoking – damages the vessels' walls
- Male
- Family History

Importance of Rapid Recognition

- The earlier the recognition of AMI, the better the prognosis
- AHA and JCAHO recommendations – 90 minutes



Time
is
Muscle

Early treatment results in better prognosis

The goal of AMI treatment is rapid restoration of normal coronary blood flow and maximum salvage of functional myocardium.

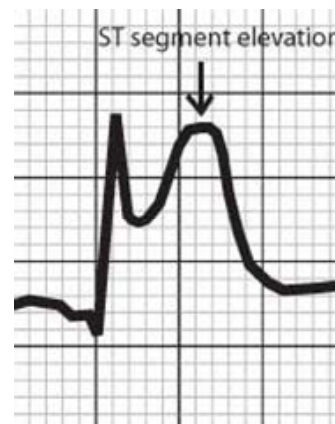
Percutaneous Coronary Intervention (PCI) is the treatment of choice and has been found to be more effective than fibrinolytic therapy.

- PCI consists of diagnostic angiography combined with angioplasty and/or stenting

- The standard is to initiate PCI within 90 mins of arrival to the ED. This is measured from the time of arrival to the inflation of the angiocatheter balloon.

How to Recognize AMI

- Signs and Symptoms
- Protocols



Signs and Symptoms

Chest Pain – variety of presentations, may state “pressure, sharp, squeezing” to thorax

Radiation – of chest pain into the jaw/teeth, shoulder, arm, and/or back

Shortness of Breath – from mild to severe

Epigastric Discomfort – may complain of “indigestion” with/without nausea/vomiting

Diaphoresis

Syncope/near syncope

Palpitations

Impairment of cognitive functions

Diabetics may not have the typical chest pain

Women present differently and may simply complain of fatigue, anorexia, and just “not feeling right”

Some cultures may present with no complaints of pain or may not verbalize their discomfort.

EKG changes – ST segments may become elevated looking like a chair or a tombstone.

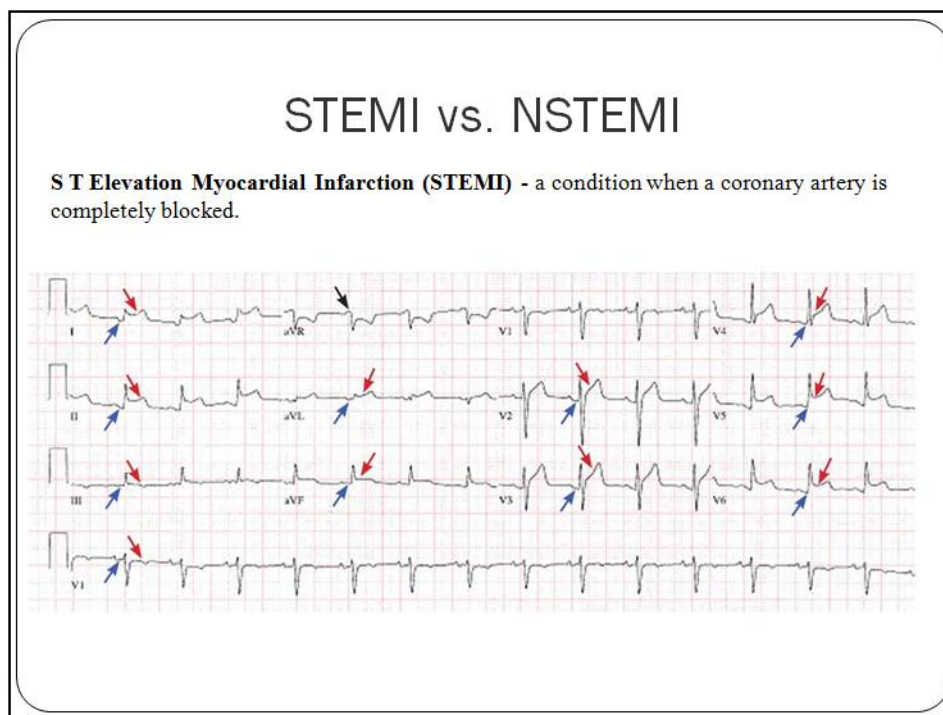
However, not all AMIs have this formation like with a Left Bundle Branch Block (LBB) or NSTEMI – see next slides

- Check the pre-hospital EKG and incorporate it into the plan of care

- Run EKG strips every 4 hours and watch for changes. Changes may be subtle so even the slightest change must be reported

Prior history/experiences of the patient may be an indicator.

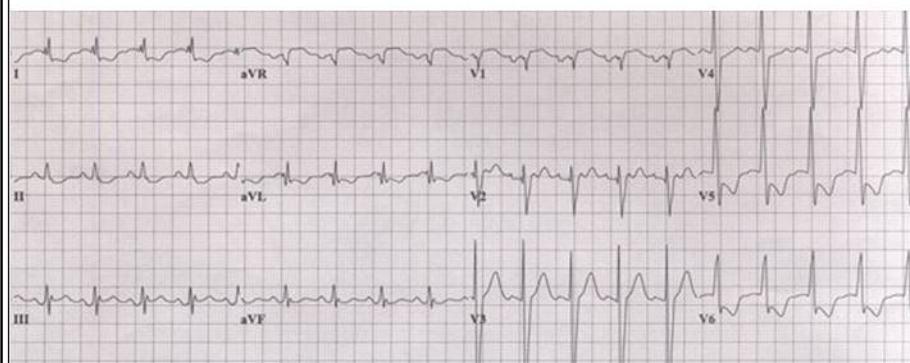
Above all, LISTEN to your patient



EKG tracing showing elevation of the ST segment in all leads, up-sloping (red arrows) and P-R depression (blue arrows) in all leads. Adapted from Senter, 2009. A chair or tombstone classic EKG pattern promptly identifies AMI.

STEMI vs. NSTEMI

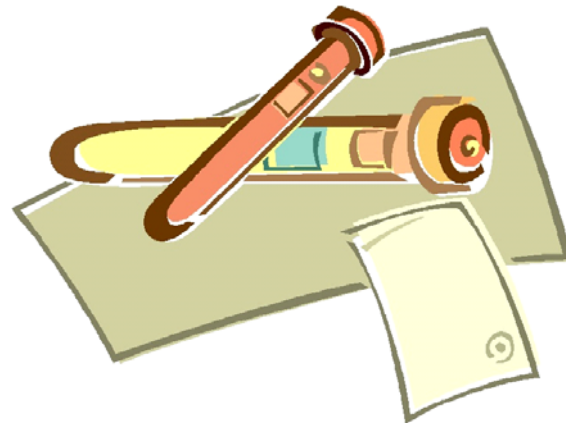
Non ST Elevation Myocardial Infarction (NSTEMI) - a condition when a coronary artery is partially blocked but the EKG may show no changes and are non-diagnostic.



EKG tracing showing the absence of ST elevation (some depression noted) despite the diagnosis of AMI.

Diagnostic Tools

- Cardiac Marker Tests
 - Serum Troponin
 - Serum CK MB
- Echo



Cardiac Marker Tests

There are enzymes located within the myocardial cell walls that are released when the wall is damaged (infarction). These enzymes circulate throughout the bloodstream and their levels can be measured.

Serum Troponin

- Newest of the cardiac marker tests
- Exist within the heart muscle cells is a good representation of cardiac injury
- Normal levels are 0.0 – 0.4 ng/ml (depending on the type of test used)
- May take up to 6 hours to start rising after onset of injury
- Peaks at 10-24 hours and returns to baseline within 5 – 10 days
- Maybe raised due to conditions like renal failure and not always reflective of AMI

Serum CK (Creatinine Kinase)

- In heart, brain, and skeletal muscles and a rise may indicate damage to any 3
- Normal is 30-200 U/L
- Usually the first to rise (within minutes/hours after onset of injury)
- Peaks at 24 hours and returns to baseline within 2 – 3 days.

CK MB (Myoglobin)

- Enzyme found only in cardiac muscles so test is specific for heart
- Normal is 0.0-8.8 ng/ml
- May choose to look at the CK index (CKMB/total CK)
- Normal is 0-4%

Echocardiography

- Noninvasive ultrasound which compares areas of the heart that are contracting normally with those that are not.
- Helpful in diagnosing areas of the heart affected by an AMI
- Does not differentiate heart damage resulting from an old or new MI

Now what?

- Contact the Physician
 - ED or admitting physician?
- Contact the Reperfusion RN
- PCI



Nursing Interventions

If the patient is admitted and holding in the ED, immediately contact the admitting physician.

If there is a delay with contacting the physician or a lack of concern, contact the Reperfusion RN.

The ED physician may also be contacted for further assistance.

The goal is early PCI.

If the physician chooses this intervention, the following must be initiated:

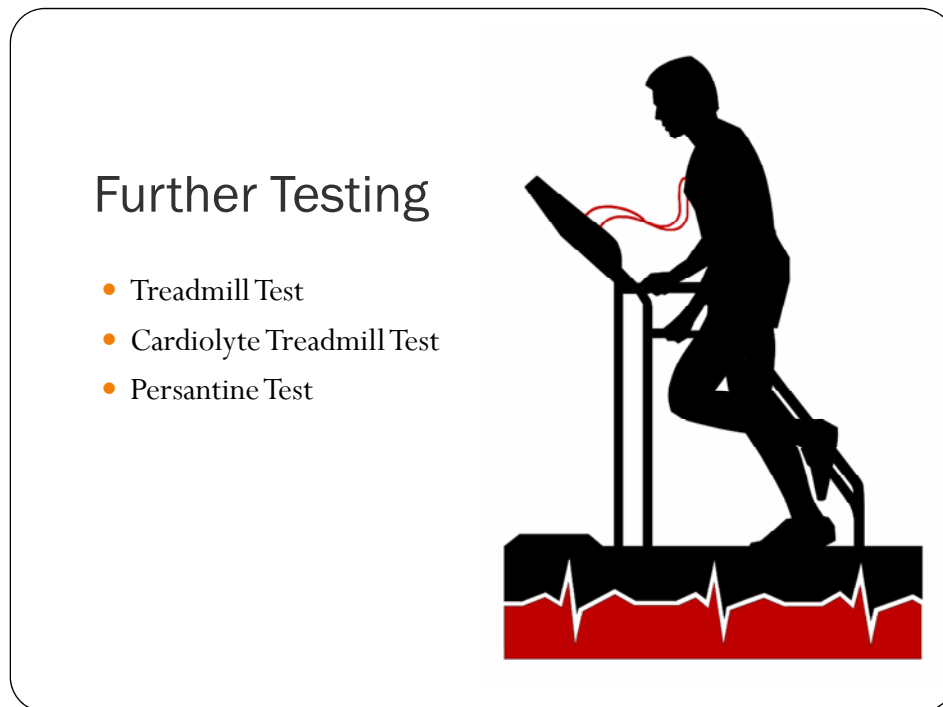
1. Contact the Reperfusion RN for assistance.
2. Keep the pt. NPO.
3. Fully undress the pt, including undergarments
4. Contact the cardiac catheterization laboratory (usually done by the physician and/or Reperfusion RN).
5. Ensure 2 large bore IVs are patent.
6. Informed consent is obtained by the cardiologist and NOT the ED RN.
7. Contact the team leader of your zone to inform of intended procedure.

The admitting physician may also wish for further testing prior to implementing PCI.

These include: Treadmill testing

Cardiolite Treadmill testing

Persantine testing



Further Testing

- Treadmill Test
- Cardiolyte Treadmill Test
- Persantine Test

Further Testing

Occasionally, the admitting physician will order the following tests to help in the diagnosis of AMI.

Treadmill Test

The patient is attached to EKG monitors and is walked on the treadmill. The effect of increased exercise and myocardial oxygen demand is measured as per changes on the EKG.

- Patient must be able to walk.
- Patient must have some type of walking footwear.
- Patient should be NPO a couple of hours prior to the test or had a light breakfast.
- Informed consent is obtained by the cardiologist

Cardiolyte Treadmill Test

- Same procedure as a treadmill test
- Cardiolyte is injected at peak exertion and then radiographic scans are done of the heart
- Persantine Test
- Same procedure as a treadmill test
- Done when the patient cannot walk on the treadmill
- Persantine is peripherally injected which makes the heart work – increases the force of contraction (simulates walking)
- Must be NPO 4-6 hours prior to the test.

No caffeine, no decaf coffee, no chocolate 24 hours preceding the test

APPENDIX E
EXAMPLES OF AMI CASE STUDIES

Examples of AMI Case Studies

1. You are the RN assigned to care for a 60 year old female who arrives to the ED via ambulance complaining of palpitations. VS = 90/40, 170, 24, 95%, 37.
2. You are the RN triaging a 25 year old male who admits to smoking crack earlier in the evening. He complains of unremitting retrosternal chest pain. VS 120/80, 90, 28, 97%, 36.9.
3. You receive a 39 year old female who arrives to the ED via ambulance who complains of “not feeling right” VS 145/90, 108, 18, 100%, 36.7.
4. The triage nurse brings you a 77 year old male who complains of dizziness that started last night. VS 130/78, 65, 14, 94%, 37.2.
5. Your patient is admitted to telemetry with a diagnosis of Chest Pain. He states that he has a strange feeling in his throat. After giving him NTG SL, he still does not feel better.
6. Your patient has slowly become tachycardic during your shift.
7. Your patient asks for some type of “ulcer medicine” because her stomach is upset after eating lunch.

APPENDIX F

AMI TEST

Testing Blueprint – Rapid Recognition and Care of AMI

Objective	K	C	App	Ana	Total # Questions
1. Define effective AMI emergency care at CRMC	0	0	1	0	1
2. Commit to providing effective AMI care	0	0	0	0	0
3. Understand the process of AMI	2	4	0	4	10
4. Demonstrate effective AMI care of all patient populations	1	1	1	1	4
5. Maintain an awareness of diverse cultural presentations	0	0	0	0	0
6. Determine appropriate interventions for unstable patients	0	1	2	0	3
7. Handle complex patients competently	0	0	2	0	2
8. Accepts the responsibility for critical patients like AMI	0	0	0	0	0
9. Precept new nurses	0	0	0	0	0

Legend: K - Knowledge
C - Comprehension
App - Application
Ana - Analysis

Total Number of Questions: 20
Total Number of Points: 20

Rapid Recognition and Treatment of AMI Test

Instructions:

1. The purpose of this test is to assess your understanding of information presented during the AMI class.
2. You will be given 30 minutes to complete the test.
3. You may mark on your tests.
4. There are 4 pages and 20 questions included in this packet.
5. The value of each question is identified in each section.
6. If you have questions during the test, please raise your hand.
7. Do not walk about the classroom.
8. All cell phones and pagers must be silenced.
9. After completing the test, please give the packet to your instructor.
10. Once finished, quietly exit the room.
11. Your grade will be immediately available.

The following section consists of 5 True/False questions. Please circle either T or F.

Each question is worth 1 point.

1. EKG tracings always show S-T elevation during an AMI. T F
2. Physician assessments must be completed prior to EKG tracing. T F
3. Serum troponin levels may be elevated during a sepsis episode T F
4. AMI patients must be treated with PCI within 120 minutes. T F
5. Patients must be NPO for 12 hours prior to treadmill testing. T F

The following section consists of 10 short answer questions. For each sentence in Column A, choose the appropriate word from Column B. Each word may only be used once. Each question is worth 1 point.

Column A	Column B
6. AMI may result from _____.	A. Reperfusion
7. _____ increases the risk of AMI.	B. PR Interval
8. _____ is the treatment of choice for AMI.	C. Indigestion
9. JCAHO and AHA recommend PCI within 90 minutes of _____.	D. Thrombus
10. EKG readings with a new _____ require further assessment.	E. TPA
11. It may take up to _____ for serum troponin levels to rise after AMI onset.	F. 90 minutes
12. The _____ RN will assist with EKG reading.	G. Charge
13. _____ may closely mimic AMI symptoms.	H. Peanuts
14. An allergy to _____ may be a contraindication for PCI.	I. QRS complex
15. Widening of the _____ may indicate AMI.	J. Diabetes
	K. PCI
	L. Left BBB
	M. EKG
	N. Arrival to ED
	O. QT interval
	P. Admit
	Q. Stroke
	R. Shell fish
	S. Chest Pain Onset
	T. Streptokinase
	U. 6 hours
	V. Bees
	W. Q wave

**The following section consists of 5 questions with the possibility of multiple answers. Please circle the correct answer.
Each question is worth 1 point. Answers must include all correct responses.**

16. The following may be assessed during an AMI:

- 1) Retrosternal chest pain
- 2) Epigastric discomfort
- 3) Shortness of breath
- 4) Strong palpitations

- A. 1
- B. 1, 2
- C. 1, 3
- D. 1, 2, 3, 4

17. Which of the following are risk factors associated with AMI?

- 1) Hypertension
- 2) Smoking
- 3) Caucasian
- 4) Female

- A. 1
- B. 1, 2
- C. 1, 3
- D. 1, 2, 3, 4

18. Which of the following are causes of AMI?

- 1) Coronary artery thrombus
- 2) Coronary artery stenosis
- 3) Coronary artery vasospasm
- 4) Alteration in cardiac output

- A. 1
- B. 1, 2
- C. 1, 3
- D. 1, 2, 3, 4

19. ST segment elevation indicates:

- 1) Infarction
- 2) Ischemia
- 3) Edema
- 4) Sepsis

- A. 1
- B. 1, 2
- C. 1, 3
- D. 1, 2, 3, 4

20. The following are standard cardiac marker tests which indicate AMI

- 1) CKMB
- 2) Lipase
- 3) Troponin
- 4) Amylase

- A. 1
- B. 1, 2
- C. 1, 3
- D. 1, 2, 3, 4

APPENDIX G
PRECEPTOR EVALUATION TOOL

Preceptor Evaluation Tool

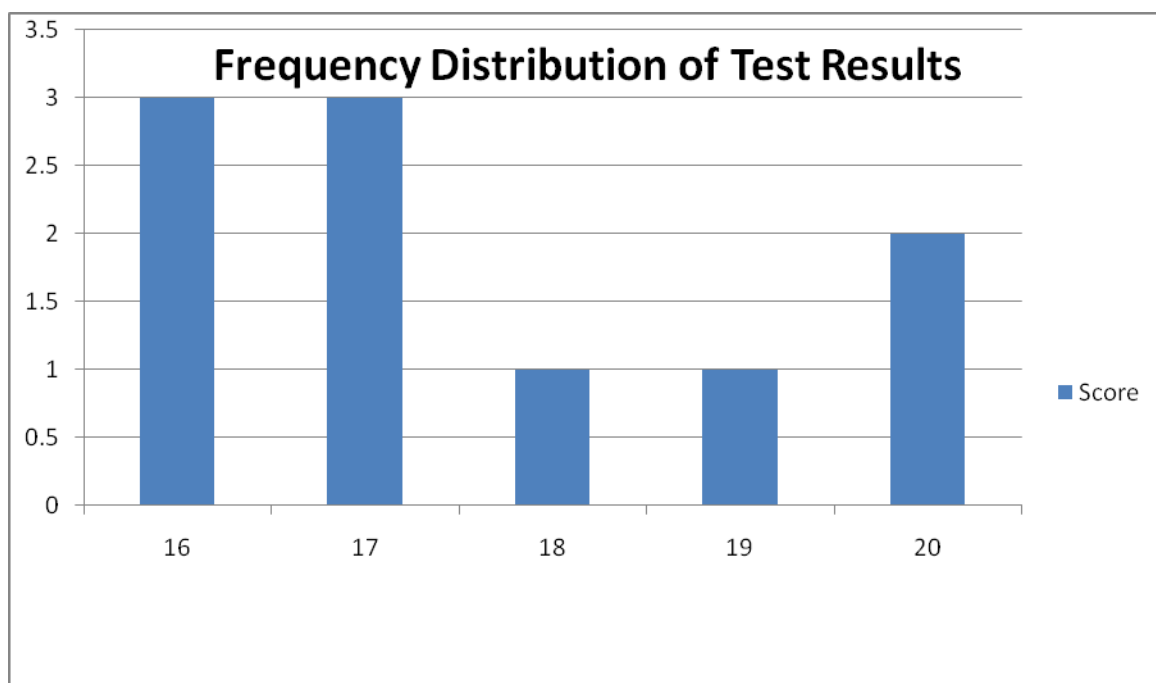
- | | | |
|--|---|---|
| 1. RN is able to define effective AMI emergency care?
- Defines factors which inhibit/facilitate nursing care
- Justifies necessity of competent AMI care
Comments _____ | Y | N |
| 2. Commits to providing effective AMI care?
- Follows corporate philosophy
- Adheres to corporate policy and procedures
Comments _____ | Y | N |
| 3. Understands the process of AMI care?
- Differentiates between STEMI and NSTEMI
- Assesses patients accurately
- Recognizes the signs and symptoms of STEMI and NSTEMI patients
Comments _____ | Y | N |
| 4. Demonstrates effective AMI care of all patient populations?
- Attends CRMC's AMI inservice
- Functions successfully as a member of the care team
Comments _____ | Y | N |
| 5. Maintains an awareness of diverse cultural presentations?
- Completes corporate yearly competency
- Attends mandatory department yearly in-service
- Values the beliefs, customs, & wishes of different cultures
Comments _____ | Y | N |
| 6. Determines appropriate interventions for unstable patients?
- Identifies high risk situations
- Pinpoints high priority patients
- Summarizes urgent steps for patient stabilization
Comments _____ | Y | N |
| 7. Handles complex patients competently.
- Reprioritizes patients as necessary
- Utilizes those in charge as needed
Comments _____ | Y | N |

8. Accepts the responsibility for critical patients like AMI Y N
- Serves as a role model for other RNs in the department
- Encourages other RNs to accept ED acute care assignments
Comments _____
9. Precepts new nurses Y N
- Displays a willingness to precept
- Attends corporate preceptor inservice
- Designs an effective educational experience in collaboration with educator and new RN
Comments _____

APPENDIX H
RAPID RECOGNITION AND TREATMENT OF AMI TEST
ANALYSIS

AMI Test Analysis

Number of Items	20
Number of Test Takers	10
Mean	17.6 = 88%
Median	17
Low Score	16
High Score	20
Standard Deviation	1.49



Detailed AMI Test Item Analysis

Item	Difficulty Index	Discrimination Index
1	0.9	0.2
2	1	0
3	0.8	0
4	1	0
5	0.5	0.6
6	0.8	0
7	0.7	0.6
8	1	0
9	1	0
10	0.7	0
11	1	0
12	1	0
13	0.9	0.2
14	1	0
15	1	0

Item	Difficulty Index	Discrimination Index	Distractor	Response	Bottom Half	Top Half	Item Difficulty Index
16	0.8	0	A	1	1	0	-0.8
			B	1	0	1	0.8
			C	0	0	0	0
			D	8	4	4	0
17	0.7	0.6	A	1	1	0	-0.2
			B	7	2	5	-0.4
			C	2	2	0	-0.6
			D	0	0	0	0
18	1	0	A	0	0	0	0
			B	0	0	0	0
			C	0	0	0	0
			D	10	5	5	0
19	0.8	0.4	A	8	3	5	-0.4
			B	1	1	0	-0.2
			C	1	1	0	-0.2
			D	0	0	0	0
20	1	0	A	0	0	0	0
			B	0	0	0	0
			C	10	5	5	0
			D	0	0	0	0

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