



## Nursing Care Plans and Vital Signs Monitoring in Patients with Myocardial Infarctions

Mamdoh Suwayyid R Alanazi <sup>1</sup>, Taghreed Ghazi J Alanazi <sup>1</sup>, Faizah Matar Aldhafeeri <sup>1</sup>, Ahmed Salem Alenzi <sup>1</sup>, Ibtisam Hamed Aldhafeeri <sup>1</sup>, Abdulaziz Ibrahim Alanazi <sup>1</sup>, Naji Sewaid Rashed Alanazi, Meshal Suwayyid Rashid Alanazi, Rabia Farhan Hilal Al-Anzi <sup>1</sup>, Thamer Muteb M Alkhaldi, Maher Matar M Alanazi <sup>1</sup>, Farhan Ayed F Aldhafeeri <sup>1</sup>, Fawaz Aiyed F Aldhafeeri <sup>1</sup>, Adel Ali K Alanazi <sup>2</sup>, Sami Bader Alanazi<sup>2</sup>

<sup>1</sup>Ksa Ministry of health, Hafr Al-Batin

<sup>2</sup> Ksa Ministry of health, Khafji

### Abstract:

**Background:** Acute Myocardial Infarction (AMI) is a major global health challenge with high morbidity and mortality rates. Effective management of AMI, including nursing interventions, is critical for improving patient outcomes.

**Aim:** This study examines the role of nursing care plans and vital sign monitoring in the management of AMI patients.

**Methods:** A comprehensive review of AMI management strategies, focusing on diagnostic, therapeutic, and nursing care practices, was conducted. Emphasis was placed on nursing interventions such as pain management, oxygen supplementation, and hemodynamic stabilization, along with patient education to improve long-term outcomes.

**Results:** The findings highlight that timely diagnosis and treatment, including reperfusion therapy and pharmacological management, are essential in AMI care. Nurses play a pivotal role in monitoring vital signs, performing daily ECGs, managing medications, and educating patients about lifestyle modifications. Early identification of complications such as arrhythmias, cardiogenic shock, or heart failure is crucial.

**Conclusion:** Nursing care is integral to AMI management, bridging acute care and recovery. Enhanced nurse training, adherence to evidence-based protocols, and comprehensive patient education can significantly improve prognosis and quality of life.

**Keywords:** Acute Myocardial Infarction, Nursing Care Plans, Vital Signs Monitoring, Reperfusion Therapy, Patient Education

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### Introduction:

Acute myocardial infarction (AMI) continues to pose a substantial public health issue and is a leading cause of death in developed nations. The global prevalence of acute myocardial infarction (AMI) is roughly three million individuals, with over one million annual deaths reported in the United States alone. Acute myocardial infarction (AMI) is categorized into two specific types: non-ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction (STEMI). Unstable angina resembles NSTEMI but is characterized by the lack of increased cardiac biomarkers, hence categorizing it as a distinct clinical entity [1][2][3]. The pathogenesis of acute myocardial infarction (AMI) include permanent myocardial injury resulting from extended ischemia and oxygen deficiency. This syndrome impairs both diastolic and systolic heart function, heightening the patient's vulnerability to life-threatening

arrhythmias and other problems. Significant consequences related to acute myocardial infarction encompass heart failure, cardiogenic shock, and mechanical abnormalities such as ventricular septal rupture. Prompt reperfusion therapy is essential for enhancing results, as research indicates that treatment commenced within six hours of symptom onset markedly improves prognosis and diminishes myocardial injury.

The diagnosis of AMI is validated by fulfilling a minimum of two of the following criteria: clinical manifestations of ischemia, newly observed ST-segment alterations or left bundle branch block (LBBB) on the electrocardiogram (ECG), the presence of pathological Q waves, imaging evidence of new regional wall motion abnormalities, or the identification of intracoronary thrombus via angiography or post-mortem analysis. From a nursing standpoint, controlling AMI involves addressing various aspects of patient care. Primary nursing diagnoses encompass acute pain associated with myocardial ischemia, exercise intolerance resulting from diminished cardiac output, and fear or anxiety arising from the life-threatening characteristics of the illness. Further issues encompass the potential for diminished cardiac output, inadequate tissue perfusion, and surplus fluid volume, frequently arising from heart failure or vigorous fluid resuscitation. Moreover, insufficient patient awareness regarding disease management and lifestyle changes highlights the necessity of patient education for attaining sustainable health results. Effective nursing treatments seek to mitigate acute symptoms, stabilize the patient's hemodynamic condition, and facilitate recovery through specific therapies and psychosocial support. Educational initiatives are essential for improving compliance with pharmacological therapies, lifestyle modifications, and the identification of symptoms associated with recurrent ischemia or consequences.

### **Etiology:**

Acute myocardial infarction (AMI) arises primarily from decreased coronary blood flow, leading to an imbalance between myocardial oxygen supply and demand and resulting in cardiac ischemia. This reduction in blood flow is often multifactorial, with atherosclerotic plaque rupture being the most common cause. Plaque rupture triggers thrombosis, significantly impairing coronary perfusion. Other etiologies include coronary artery embolism, which accounts for approximately 2.9% of cases, cocaine-induced ischemia, coronary artery dissection, and coronary vasospasm [4][5]. These diverse mechanisms underscore the complexity of AMI pathophysiology and the need for individualized diagnostic and therapeutic approaches.

### **Risk Factors:**

Atherosclerosis is the primary cause of acute myocardial infarction (AMI), accounting for 70% of fatal incidents associated with occlusion due to atherosclerotic plaques. Thus, mitigating risk factors for atherosclerotic disease is essential for the prevention of acute myocardial infarction (AMI). Modifiable risk factors, responsible for 90% of acute myocardial infarction (AMI) cases in men and 94% in women, encompass cigarette smoking, physical inactivity, hypertension, obesity, and dyslipidemia (elevated cholesterol, low-density lipoprotein [LDL], and triglyceride levels). Non-modifiable risk factors, including age, sex, and family history, significantly influence outcomes but remain unchangeable [6][7]. These results underscore the vital significance of lifestyle changes and pharmacological therapies in reducing AMI risk.

### **Clinical Assessment:**

The clinical assessment of AMI frequently demonstrates variety in patient presentation, rendering a comprehensive history and physical examination imperative. Historical components must concentrate on the onset, characteristics, and accompanying symptoms. Diaphoresis and bilateral arm discomfort are commonly associated with acute myocardial infarction in men. Additional related symptoms comprise lightheadedness, anxiety, cough, a sensation of choking, wheezing, diaphoresis, and arrhythmia. Physical examination results yield essential diagnostic insights. Vital signs may indicate tachycardia, hypotension (in instances of shock), or hypertension. Additional significant findings encompass tachypnea, fever, and dilated neck veins, perhaps indicating right ventricular failure. Pulmonary manifestations, including wheezing and rales, frequently suggest pulmonary edema. Cardiac auscultation may indicate a misplaced

apical impulse, reduced S1, a perceptible S4, or the emergence of new murmurs, including mitral regurgitation. A pronounced holosystolic murmur spreading to the sternum may indicate ventricular septal rupture. Furthermore, an examination of the limbs may disclose edema, cyanosis, or coldness, indicative of systemic hypoperfusion. Asymmetrical pulses in the context of acute myocardial infarction necessitate assessment for aortic dissection. The findings, along with history and symptomatic data, are essential for the prompt identification and management of AMI.

### **Evaluation:**

Timely and precise assessment of patients exhibiting chest pain is essential for detecting acute myocardial infarction (AMI). An electrocardiogram (ECG) must be conducted promptly, especially in patients with uncommon symptoms. Women may display symptoms like abdomen discomfort or dizziness, potentially without any chest pain, whereas older people frequently present with shortness of breath as the predominant complaint. In these instances, ECG testing is essential [8][9][10]. The ECG exhibits good specificity (95%–97%) for the diagnosis of myocardial infarction, although it possesses relatively low sensitivity (about 30%). Improving ECG sensitivity can be accomplished by methods such as right-sided and posterior lead positioning or repeated testing. Initial ischemia alterations, exemplified by "hyperacute T waves," frequently precede ST-segment elevation, indicating advancing cardiac damage. The diagnostic criteria for ST-elevation myocardial infarction (STEMI) consist of ST-elevation exceeding 2 mm in two contiguous leads, corresponding to distinct anatomical regions of the myocardium: inferior (leads II, III, aVF), septal (leads V1, V2), anterior (leads V3, V4), and lateral (leads I, aVL, V5, V6). Reciprocal ST depressions in contrasting myocardial areas further corroborate the diagnosis. Diagnosis becomes complicated in complex instances, such as those involving left bundle branch block (LBBB) or pacemakers. The Sgarbosa criteria facilitate the identification of STEMI in certain situations. Furthermore, solitary ST spikes in aVR may signify left main coronary artery blockage, whereas Wellens' biphasic T waves in leads V2 and V3 frequently forecast an imminent proximal left anterior descending artery occlusion, a prelude to significant anterior wall infarction. Patients with non-ST-elevation myocardial infarction (NSTEMI) may not display the typical ST-elevation abnormalities on an ECG but may show minor alterations such as ST depressions or T-wave inversions. Serial ECGs are advantageous for identifying dynamic alterations in these instances. When preliminary ECG results are inconclusive while clinical suspicion persists, further testing, such as troponin tests, is essential.

### **Diagnostic Guidelines:**

Given the limitations of ECG sensitivity for STEMI, cardiac troponins are considered the gold standard for biochemical confirmation of myocardial injury. Troponin elevation supports the diagnosis of NSTEMI when combined with clinical and ECG findings. The HEART score, incorporating clinical history, risk factors, ECG abnormalities, and troponin levels, is widely validated for stratifying patients by risk and guiding further testing or intervention.

### **Laboratory Features:**

A comprehensive laboratory evaluation is vital for the management of AMI. Cardiac troponins should be the primary biomarker ordered to confirm myocardial injury. Additional tests include:

- **Complete Blood Count (CBC):** To identify anemia or leukocytosis, which may influence management.
- **Lipid Profile:** To assess dyslipidemia as a risk factor and guide secondary prevention strategies.
- **Renal Function Tests:** To evaluate baseline kidney function, critical for medication dosing and assessing complications such as contrast-induced nephropathy.
- **Metabolic Panel:** To detect electrolyte imbalances and glucose levels, as these can impact prognosis and treatment decisions. This structured diagnostic approach facilitates early recognition and management of AMI, improving clinical outcomes and reducing the risk of complications.

### **Medical Management:**

The management of acute myocardial infarction (AMI) differs according on the classification of the patient as having ST-elevation myocardial infarction (STEMI) or non-ST-elevation myocardial infarction (NSTEMI). Immediate delivery of chewed aspirin (160–325 mg) is required for all patients. Intravenous access must be swiftly obtained, and oxygen supplementation is warranted if oxygen saturation drops below 91%. Pain therapy may use opioids and sublingual nitroglycerin, provided the patient's blood pressure is constant. [11][12][13]. For individuals with STEMI, urgent reperfusion is fundamental to treatment. The optimal approach is percutaneous coronary intervention (PCI), preferably conducted within 90 minutes of diagnosis. Before PCI, dual antiplatelet medication, comprising aspirin and a P2Y12 inhibitor (e.g., ticagrelor), must be commenced. Intravenous heparin, together with glycoprotein IIb/IIIa inhibitors or direct thrombin inhibitors in certain instances, may be utilized to avert thrombotic problems. If PCI is not accessible within the ideal time limit, intravenous thrombolytic drugs should be used for reperfusion. In patients with NSTEMI who stable and asymptomatic, emergent PCI may are not give significant advantages and is often postponed. Medical therapy with antiplatelet medications is emphasized, with percutaneous coronary intervention (PCI) scheduled within 48 hours to enhance in-hospital outcomes and decrease the length of stay. In instances of refractory ischemia or hemodynamic/electrical instability, prompt PCI is necessary. Prior to discharge, all patients recuperating from an acute myocardial infarction are often assigned a treatment plan that encompasses aspirin, a high-dose statin, a beta-blocker, and maybe an angiotensin-converting enzyme (ACE) inhibitor. For individuals receiving PCI, the procedure must be conducted within 12 hours of the onset of symptoms. Fibrinolytic therapy, if deemed an alternative, must commence within 120 minutes. It is strongly advised that all patients receive parenteral anticoagulation alongside antiplatelet medication.

### **Nursing Management:**

Effective nursing care is essential in the entire management of patients with acute myocardial infarction (AMI). Nurses are required to do daily ECGs to assess heart function and ensure the patient has two large-bore intravenous (IV) lines for drug delivery. Cardiac enzyme levels must be routinely evaluated to assess myocardial injury. The initial treatment is the administration of aspirin and sublingual nitroglycerin (0.4 mg), along with oxygen therapy if the patient's oxygen saturation falls below 94%. Pain management may include the administration of morphine, while heparin medication is frequently commenced as advised for STEMI patients. Nurses must meticulously observe vital signs, daily weight, and urine output to identify early indications of problems. Upon performing cardiac catheterization, the groin site must be examined for hematoma, and the distal pulses in the leg should be palpated to confirm sufficient circulation. Furthermore, a cardiology consultation must be obtained for all patients, and any indications of instability, including arrhythmias or hemodynamic alterations, must be rapidly managed.

### **Indications for Seeking Emergency Intervention**

Patients exhibiting any of the following signs warrant immediate medical intervention:

- Persistent hypotension.
- Nausea and vomiting, particularly if severe or recurrent.
- Ongoing or worsening chest pain.
- Loss of distal leg pulses, indicative of embolization or reduced perfusion.
- Sudden changes in mental status, suggesting cerebral hypoperfusion or embolic events.
- Oxygen desaturation is a refractory to therapy.
- Tachycardia or other significant arrhythmias.
- Acute onset of a loud murmur, potentially signaling mitral regurgitation or ventricular rupture.

These scenarios highlight the need for swift clinical action to prevent adverse outcomes and ensure optimal recovery.

### **Outcome Identification and Monitoring:**

The principal objectives of treatment of acute myocardial infarction (AMI) are to enhance respiratory function, relieve chest discomfort, improve tissue perfusion, and restore patients to their pre-event functional state. These results are crucial in directing treatment actions and guaranteeing optimal healing. Efficient oversight is crucial in Advanced Metering Infrastructure administration. Routine evaluations must incorporate electrocardiograms (ECG) to detect ischemia alterations, sequential examination of cardiac enzymes to ascertain myocardial injury, and pulse oximetry to gauge oxygen saturation levels. Vital indicators, such as heart rate and blood pressure, must be meticulously monitored. The severity of chest discomfort must be assessed to evaluate symptom progression and therapy effectiveness. Physical tests, including probing of leg pulses and auscultation of the chest for rales or new murmurs, assist in identifying problems such as pulmonary congestion or valve dysfunction.

### **Coordination of Care**

Managing Acute Myocardial Infarction necessitates a cooperative, interdisciplinary strategy focused on cardiac treatment. The team generally consists of a cardiologist, interventional cardiologist, cardiac surgeon, intensivist, critical care or cardiology nurses, cardiac rehabilitation specialists, physical therapists, pharmacists, and social workers. Timely identification and intervention are essential, as numerous individuals perish from AMI prior to accessing medical care. Educating patients on identifying symptoms and pursuing prompt emergency care is essential. Pharmacists, nurse practitioners, and primary care clinicians are essential in instructing patients on prescription usage, including nitroglycerin, and recommending emergency care if symptoms continue despite proper dosing. Nurses at triage must swiftly notify the care team to enable rapid decisions on reperfusion techniques, including thrombolysis or PCI, based on the clinical context and contraindications. All AMI patients necessitate intensive care unit (ICU) surveillance for the prompt identification of life-threatening complications. Nurses must meticulously monitor irregularities in clinical and laboratory indicators and relay concerns to the team. Premature discharge is inadvisable, as problems may occur up to one week following myocardial infarction. Following stabilization, patients gain from extensive education on mitigating risks associated with coronary artery disease. This include smoking cessation, weight reduction, cholesterol regulation, and management of blood glucose and blood pressure. The nurse practitioner and social worker cooperate to guarantee patients access to home care, cardiac rehabilitation programs, and ancillary services. Pharmacists play a crucial role in enhancing pharmaceutical regimens, instructing patients on dosages, and recognizing possible adverse effects or interactions.

### **Post-Discharge Care:**

Post-discharge, engagement in a structured cardiac rehabilitation program is essential. Emphasis is placed on lifestyle adjustments, including the adoption of a heart-healthy diet, abstinence from alcohol, and compliance with prescribed drugs. Patient education must emphasize the significance of drug adherence to attain optimal results. Pharmacists evaluate medications for interactions and ensure patients comprehend their therapeutic regimen. [14][15][16]Level 2. Notwithstanding advancements in therapy, acute myocardial infarction continues to be linked with considerable mortality. Approximately one-third of patients succumb prior to hospital attendance, and an additional 40%-50% are deceased upon presentation. Within 12 months of the event, an additional 5%-10% may perish, and readmissions occur in around 50% of patients within this timeframe. The prognosis is affected by variables including ejection fraction, age, comorbidities, and revascularization status. Patients who experience early and effective reperfusion while maintaining the left ventricular function get optimal outcomes. In contrast, individuals who do not undergo revascularization exhibit inferior prognoses [17][18][19].

### **Health Teaching and Health Promotion**

From a nursing standpoint, health education and promotion are fundamental in the management and prevention of acute myocardial infarction (AMI) and in enhancing patient outcomes. Nurses are essential in instructing patients and their families on the adoption and maintenance of heart-healthy

behaviors. Dietary education is a primary emphasis. Patients are advised to adhere to a low-sodium, nutrient-rich diet emphasizing fruits, vegetables, whole grains, lean proteins, and healthy fats. Nurses instruct patients on interpreting food labels to circumvent high-sodium meals and underscore the advantages of balanced nutrition in managing blood pressure and lowering cholesterol levels. Nurses cooperate with nutritionists to customize nutritional programs that reflect cultural preferences and personal requirements. Adherence to medication is another crucial element. Nurses deliver comprehensive guidance regarding prescribed medications, encompassing their functions, possible adverse effects, and the significance of compliance. Nurses facilitate the integration of pharmaceuticals into patients' daily routines through effective communication and measures such as medication regimens or pill organizers, hence mitigating the likelihood of recurrence. Promoting physical exercise is crucial for sustaining cardiovascular health. Nurses evaluate patients' fundamental fitness levels and assist them in implementing safe and suitable exercise programs. Participation in cardiac rehabilitation programs is highlighted, since these programs include supervised exercise, information, and counseling customized to individual recovery requirements. Nurses have a crucial role in facilitating the management of risk factors.

Consistent surveillance and regulation of blood pressure, blood glucose, and cholesterol levels are underscored. Educational approaches emphasize the role of uncontrolled hypertension, diabetes, and hyperlipidemia in increasing cardiac risks. Patients are urged to participate in regular follow-up appointments and complete requisite laboratory tests to ensure effective management of these parameters. Quitting smoking is an imperative component of cardiovascular health. Nurses utilize motivational interviewing strategies to assist patients in cessation of smoking, offering services include counseling, nicotine replacement therapy, or support groups. Instruction regarding the effects of smoking on cardiovascular health underscores the necessity of stopping. The significance of follow-up care is paramount. Nurses emphasize the necessity of regular consultations with healthcare specialists to assess healing progress and promptly address any issues. These appointments provide opportunity to modify treatment regimens, emphasize lifestyle modifications, and check patient adherence. Through these educational initiatives, nurses enable patients to actively participate in their rehabilitation and long-term cardiovascular health, thereby improving quality of life and diminishing the likelihood of repeated cardiac episodes [20].

### **Risk Management:**

In nursing practice, effective risk management in the care of AMI patients is crucial for preventing complications and improving survival rates. Nurses are often the first to recognize subtle changes in a patient's condition, enabling timely interventions. The first aspect of risk management involves educating patients about the significance of chest pain. Nurses instruct patients to seek immediate medical attention if they experience any chest discomfort, emphasizing that delays can lead to life-threatening outcomes. This education fosters a sense of urgency and helps patients differentiate between benign and critical symptoms. When abnormal vital signs are detected, nurses act promptly to mitigate risks. For example, hypotension, tachycardia, or oxygen desaturation are reported to the cardiologist or attending physician without delay. Early intervention can prevent further deterioration and complications such as cardiogenic shock or arrhythmias. Abnormal laboratory findings, such as elevated cardiac enzymes or electrolyte imbalances, also warrant immediate action. Nurses coordinate closely with physicians to address these abnormalities, ensuring that treatment adjustments are made promptly. This collaborative approach minimizes the risk of adverse events and optimizes patient outcomes. Continuous patient monitoring forms the backbone of nursing risk management. By closely observing vital signs, oxygen saturation, and ECG patterns, nurses can detect early signs of ischemia or arrhythmias. Regular assessments of pain intensity and response to medications provide additional data to guide clinical decisions. Nurses also educate patients about recognizing and responding to complications post-discharge. For instance, patients are taught to identify symptoms of medication side effects, such as excessive bleeding from anticoagulants, and encouraged to report them promptly. Through vigilance, education, and collaboration with the interprofessional team, nurses play a critical role in reducing risks and ensuring the safety of AMI patients during their hospital stay and beyond [20].

**Discharge Planning:**

Effective discharge planning for AMI patients is a key nursing responsibility that ensures continuity of care and reduces the likelihood of readmissions. Nurses develop comprehensive discharge plans tailored to individual needs, addressing lifestyle modifications, medication adherence, and follow-up care. Dietary recommendations are the primary focus of discharge planning. Nurses emphasize the importance of continuing a heart-healthy diet, reinforcing the principles of low-sodium and balanced nutrition discussed during hospitalization. Patients are provided with educational materials and referrals to dietitians as needed. Physical activity is gradually reintroduced as part of the recovery process. Nurses educate patients on the benefits of light activities such as walking, gradually increasing intensity under the guidance of a cardiac rehabilitation program. This structured approach helps restore physical function while reducing the risk of recurrence. Medication adherence is heavily emphasized at discharge. Nurses review all prescribed medications, clarifying dosages, timing, and potential interactions. Clear instructions and written summaries are provided to ensure patients understand their therapeutic regimen. Follow-up care is a critical component of discharge planning. Nurses ensure patients are aware of scheduled appointments and their importance in tracking recovery progress. They also facilitate referrals to specialists such as cardiologists or rehabilitation therapists as needed. Smoking cessation and other risk factor modifications remain priorities. Nurses provide ongoing support and resources to help patients abstain from smoking and manage chronic conditions like hypertension and diabetes effectively. By equipping patients with the knowledge and resources to manage their health post-discharge, nurses contribute to improved outcomes and reduced readmissions [20].

**Evidence-Based Issues:**

Evidence-based practice (EBP) is fundamental in nursing care for AMI, as it enhances decision-making and patient outcomes. Research underscores the critical importance of early recognition and treatment of MI. Nurses are at the forefront of identifying early signs and symptoms, such as chest pain, dyspnea, or diaphoresis, enabling rapid intervention. Studies consistently show that timely reperfusion therapy, whether through thrombolysis or PCI, significantly improves survival rates and reduces infarct size. Nurses ensure that these interventions are carried out promptly by coordinating with the interprofessional team and adhering to established protocols. Risk factor reduction is another evidence-based strategy that nurses implement to improve outcomes. Interventions such as promoting smoking cessation, controlling blood pressure, and encouraging medication adherence are supported by robust research demonstrating their efficacy in reducing recurrent cardiac events. Nurses also utilize evidence-based tools, such as the HEART score, to stratify risk and guide clinical decisions. This ensures that high-risk patients receive the necessary level of care, including advanced diagnostics or interventions. By integrating EBP into daily practice, nurses enhance the quality of care, contribute to better patient outcomes, and support the broader goals of cardiovascular health promotion [20].

**Vital Signs Monitoring:**

Monitoring vital signs is a critical aspect of nursing care for patients with myocardial infarction (MI). Nurses play a central role in detecting early signs of complications, evaluating treatment effectiveness, and ensuring timely interventions. Through continuous observation, skilled assessment, and interdisciplinary collaboration, nurses help mitigate risks and improve outcomes for MI patients. This discussion explores the significance, techniques, and implications of nurses' involvement in vital signs monitoring for MI patients.

**Importance of Vital Signs Monitoring in MI**

MI, commonly referred to as a heart attack, occurs when blood flow to the myocardium is obstructed, leading to ischemia and subsequent myocardial tissue damage. Vital signs such as heart rate, blood pressure, respiratory rate, oxygen saturation, and temperature provide essential information about a patient's physiological status. These parameters serve as indicators of cardiac function, hemodynamic

stability, and the body's response to ischemic stress. Effective monitoring of these metrics enables nurses to:

1. **Identify complications early:** Changes in vital signs may indicate complications such as arrhythmias, cardiogenic shock, or heart failure. Nurses are often the first to detect these warning signs, prompting swift medical intervention.
2. **Assess treatment efficacy:** Vital signs reflect the patient's response to interventions such as thrombolysis, percutaneous coronary intervention (PCI), or medication administration.
3. **Ensure patient safety:** Continuous monitoring helps nurses detect and prevent adverse events, reducing morbidity and mortality rates in MI patients.

### **Key Vital Signs and Their Relevance in MI Monitoring**

#### **1. Heart Rate and Rhythm**

Heart rate and rhythm monitoring are paramount in MI care. Nurses use telemetry and electrocardiography (ECG) to detect arrhythmias such as ventricular fibrillation, atrial fibrillation, or bradycardia. These irregularities are common post-MI and can lead to life-threatening complications. Tachycardia may indicate pain, hypovolemia, or anxiety, while bradycardia might suggest ischemia affecting the sinoatrial node. Early detection allows for timely interventions, such as the administration of antiarrhythmic drugs or cardioversion.

#### **2. Blood Pressure**

Blood pressure monitoring provides insights into hemodynamic stability. Hypotension can result from cardiogenic shock or excessive vasodilation, while hypertension may exacerbate myocardial workload and worsen ischemia. Nurses frequently measure blood pressure to evaluate the effectiveness of vasopressors, antihypertensive medications, or fluid therapy.

#### **3. Respiratory Rate and Oxygen Saturation**

Respiratory rate and oxygen saturation are indicators of oxygenation and respiratory function. Hypoxemia is common in MI due to impaired cardiac output and pulmonary congestion. Nurses use pulse oximetry to ensure oxygen levels remain within the normal range (>95%) and administer supplemental oxygen or adjust ventilatory support as needed.

#### **4. Temperature**

Fever can occur in MI patients as part of an inflammatory response to myocardial necrosis. Conversely, hypothermia might be observed in cardiogenic shock. Nurses monitor temperature to guide the use of antipyretics or warming measures.

### **Techniques and Tools for Vital Signs Monitoring**

Nurses employ various methods and technologies for vital signs monitoring, ensuring accurate and timely data collection:

1. **Bedside Monitoring:** Manual assessments using stethoscopes, sphygmomanometers, and thermometers are performed routinely to establish baseline data and detect subtle changes. Auscultation allows nurses to detect additional cardiac sounds, such as murmurs or gallops, which may indicate complications like valvular dysfunction or heart failure.
2. **Continuous Monitoring Systems:** Telemetry systems provide real-time ECG data, enabling continuous rhythm monitoring. Alarms notify nurses of significant deviations from baseline parameters. Multiparameter monitors in intensive care units (ICUs) track heart rate, blood pressure, oxygen saturation, and respiratory rate simultaneously, facilitating rapid responses.
3. **Documentation and Trend Analysis:** Nurses meticulously document vital signs in electronic health records (EHRs). Trend analysis allows for the early detection of patterns indicating deterioration or



improvement. Advanced EHR systems can generate alerts for abnormal values, enhancing nurses' ability to respond promptly.

| Vital sign             | Physiology   | Influencing factors   | Assessment issues  |
|------------------------|--|---|--|
| Temperature            | Controlled by the hypothalamus   | Age<br>Infection<br>Medications                               | Core temperature differs between anatomical sites  |
| Pulse                  | Reflects circulating volume and strength of contractility                        | Intravascular volume<br>Contractility<br>Oxygen demand        | Should be counted for at least 30 seconds.<br>Regularity, strength and equality should also be assessed                          |
| Blood pressure         | Regulated by vasomotor centre in the medulla                                     | Intravascular volume<br>Vascular tone<br>Contractility        | Automated monitors are less reliable than a sphygmomanometer   |
| Respiratory rate       | Controlled by the respiratory centres in the medulla and pons                    | Hypercapnia<br>Hypoxaemia<br>Acidosis                         | Indications for measuring: to establish a baseline; critical illness, a change in oxygenation, to evaluate response to treatment |
| SpO2                   | Reflects the peripheral saturation of haemoglobin by O2                          | Cardiac output<br>Hemoglobin level<br>Fraction of inspired O2 | Does not reflect respiratory function overall  |
| Pain                   | Detected by peripheral nerve fibers; interpreted by thalamus and cerebral cortex | Patient's perception  | Often under-assessed and treated in hospital   |
| Level of consciousness | Controlled by reticular activating system in the brain stem                      | Cerebral perfusion  | Influenced by intra-cranial and extra-cranial factors  |
| Urine output           | Produced by kidneys  | Renal perfusion<br>Cardiac Output                             | Does not directly reflect renal function   |

**Figure 1:** Main vital signs.

**Nurses' Role in Interdisciplinary Collaboration** Monitoring vital signs is not an isolated task but a collaborative effort involving the entire healthcare team. Nurses communicate findings to physicians, cardiologists, and other specialists, ensuring informed decision-making. For example:

- Abnormal ECG findings may prompt discussions about the need for antiarrhythmic therapy or advanced imaging.
- Persistent hypotension may lead to adjustments in fluid therapy or inotropic support.
- Oxygen desaturation might necessitate consultations with respiratory therapists to optimize ventilatory support.

Nurses also collaborate with pharmacists to adjust medication regimens based on vital sign trends, such as titrating beta-blockers or diuretics.

### Challenges in Vital Signs Monitoring

Despite its critical importance, vital signs monitoring in MI patients poses several challenges:

1. **Patient Variability:** Individual factors such as age, comorbidities, and medication use can influence baseline vital signs, making interpretation more complex. Nurses must consider these variables to avoid over- or underestimating clinical severity.
2. **Technological Limitations:** False alarms from monitoring devices can lead to alarm fatigue, reducing nurses' responsiveness to genuine emergencies. Equipment malfunctions or inaccuracies may compromise data reliability.
3. **Workload and Staffing:** High patient-to-nurse ratios can limit the frequency and thoroughness of vital sign assessments. Nurses must prioritize care effectively to ensure critical patients receive adequate attention.

### Evidence-Based Practice in Vital Signs Monitoring

Research underscores the value of systematic and continuous monitoring in improving MI outcomes. Evidence-based protocols guide nurses in interpreting vital signs and implementing interventions. Key recommendations include:

1. **Adopting Early Warning Systems (EWS):** EWS algorithms use vital sign data to predict clinical deterioration, enabling proactive management.
2. **Utilizing Standardized Protocols:** Guidelines from organizations such as the American Heart Association (AHA) emphasize timely assessments and interventions based on vital signs.
3. **Incorporating Technology:** Innovations such as wearable monitors and artificial intelligence (AI) enhance monitoring accuracy and predictive capabilities.

### Implications for Nursing Practice and Patient Outcomes

The integration of skilled nursing care and advanced monitoring technologies has transformed MI management. Nurses' vigilance and expertise in vital signs monitoring lead to:

1. **Reduced Mortality Rates:** Early detection of complications allows for life-saving interventions, such as defibrillation or medication adjustments.
2. **Improved Patient Satisfaction:** Comprehensive monitoring reassures patients and families, fostering trust in the care team.
3. **Enhanced Recovery and Rehabilitation:** Timely identification of hemodynamic or respiratory instability ensures optimal recovery conditions, enabling smoother transitions to rehabilitation.

Nurses' role in vital signs monitoring is indispensable in the care of MI patients. By leveraging their clinical expertise, utilizing advanced monitoring tools, and collaborating with interdisciplinary teams, nurses contribute significantly to early complication detection, treatment optimization, and improved patient outcomes. Addressing challenges through evidence-based practices and technological integration further enhances the quality of care. Ultimately, nurses' commitment to vigilant monitoring underscores their vital contribution to the management of myocardial infarction, ensuring patient safety and promoting recovery.

## Conclusion:

The management of acute myocardial infarction (AMI) remains a critical focus of contemporary healthcare due to its high prevalence and potential for severe complications. Nursing care is fundamental in addressing the acute and long-term needs of AMI patients. This involves not only immediate interventions, such as pain relief, oxygen therapy, and administration of medications, but also vigilant monitoring of vital signs and cardiac biomarkers to detect complications early. Nurses are instrumental in stabilizing patients hemodynamically and coordinating care with multidisciplinary teams, including cardiology and emergency medicine. Education plays a vital role in AMI care, as patient awareness of symptoms, risk factors, and lifestyle modifications is essential for reducing recurrence and improving long-term outcomes. Effective patient education must cover the importance of medication adherence, dietary adjustments, regular physical activity, and smoking cessation. Nurses also support patients emotionally, addressing fear and anxiety associated with life-threatening events, thereby contributing to holistic recovery. Emerging evidence underscores the importance of evidence-based nursing interventions, such as the use of dual antiplatelet therapy, beta-blockers, and statins, which enhance recovery when implemented within structured care plans. The utilization of technology, including electronic health records and telemetry, further optimizes monitoring and decision-making. Ultimately, the integration of comprehensive nursing care with medical management enhances the prognosis of AMI patients. Future efforts should focus on continuous nursing education, adoption of advanced diagnostic tools, and the development of protocols tailored to diverse patient populations. This multidisciplinary approach ensures not only survival but also an improved quality of life for AMI patients.

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لتمريضية ومراقبة العلامات الحيوية في المرضى المصابين باحتشاء عضلة القلب

#### المخلص:

، بما في ذلك AMI تحدياً صحياً عالمياً كبيراً مع معدلات عالية من المراضة والوفيات. يعتبر الإدارة الفعالة للـ (AMI) يعد احتشاء عضلة القلب الحاد: الخلفية، التدخلات التمريضية، أمراً بالغ الأهمية لتحسين نتائج المرضى.

AMI. تهدف هذه الدراسة إلى فحص دور خطط الرعاية التمريضية ومراقبة العلامات الحيوية في إدارة المرضى الذين يعانون من: الهدف

، مع التركيز على الممارسات التشخيصية والعلاجية والتمريضية. تم التركيز على التدخلات التمريضية مثل AMI تم إجراء مراجعة شاملة لاستراتيجيات إدارة: الطرق، إدارة الألم، التزويد بالأوكسجين، والاستقرار الهيموديناميكي، إلى جانب توعية المرضى لتحسين النتائج طويلة المدى.

النتائج: تُظهر النتائج أن التشخيص والعلاج في الوقت المناسب، بما في ذلك العلاج بإعادة التروية والإدارة الدوائية، أمران أساسيان في رعاية AMI. يلعب الممرضون دوراً محورياً في مراقبة العلامات الحيوية، إجراء تخطيط القلب الكهربائي اليومي، إدارة الأدوية، وتوعية المرضى بتعديلات نمط الحياة. يُعد التعرف المبكر على المضاعفات مثل اضطرابات النظم، الصدمة القلبية، أو فشل القلب أمراً بالغ الأهمية.

الخاتمة :تعد الرعاية التمريضية جزءاً لا يتجزأ من إدارة AMI ، حيث تربط بين الرعاية الحادة والتعافي. يمكن للتدريب المحسن للممرضين، والالتزام بالبروتوكولات المعتمدة على الأدلة، والتعليم الشامل للمرضى أن يحسن بشكل كبير التوقعات وجودة الحياة.

الكلمات المفتاحية :احتشاء عضلة القلب الحاد، خطط الرعاية التمريضية، مراقبة العلامات الحيوية، العلاج بإعادة التروية، توعية المرضى