Nursing care for NSTEMI patiens with decreased cardiac output in the emergency room (ER) of Dr. Sardjito Hospital

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Abstract
NSTEMI (Non-ST Elevation Myocardial Infarction) is a form of acute coronary syndrome characterized by chest pain, ECG changes, and elevated cardiac biomarkers without ST segment elevation. Decreased cardiac output and ineffective breathing patterns are common complications that require rapid nursing intervention. This study used a descriptive analytical design with a case study approach on a 59-year-old female patient in the emergency room of Dr. Sardjito General Hospital in Yogyakarta. Data were collected through interviews, observations, physical examinations, and medical documents. The nursing diagnoses established were decreased cardiac output related to changes in myocardial contractility and ineffective breathing pattern related to breathing effort impairment. Interventions included monitoring vital signs, cardiac auscultation, ECG monitoring, and oxygen administration through a 2–3 L/min nasal cannula. Evaluation showed hemodynamic stability, increased oxygen saturation to 97%, reduced use of accessory breathing muscles, and decreased pain from a scale of 7 to 5. These results emphasize the importance of timely nursing interventions to improve oxygenation and prevent complications in NSTEMI patients.

Keywords: decreased cardiac output; ineffective breathing pattern; NSTEMI; nursing care

1. Introduction

NSTEMI (Non-ST Elevation Myocardial Infarction) is a form of acute coronary syndrome (ACS) characterized by typical chest pain, ECG changes in the form of ST segment depression or T wave inversion, and elevated cardiac biomarkers (troponin), without ST segment elevation (A. Almohammadi 2024). NSTEMI occurs due to partial or intermittent obstruction of the coronary artery, resulting in inadequate oxygen supply to the myocardium, causing ischemia and tissue necrosis (Prakoso, Wijaya, and Kathrine 2025).

Acute coronary syndrome (ACS) is a collection of clinical symptoms that arise due to partial blockage (partial occlusion) or embolism in the coronary artery. ACS consists of several forms, namely unstable angina pectoris (UAP) and myocardial infarction without ST segment elevation (NSTEMI), as well as myocardial infarction with ST segment elevation (STEMI). Clinically, this condition is generally characterized by chest pain or a feeling of pressure in the chest that occurs during activity. The mechanism of chest pain is caused by a blockage in the coronary artery or a decrease in cardiac output (Prakoso, Wijaya, and Kathrine 2025).

Despite rapid advances in pharmacological interventions and revascularization strategies, long-term mortality rates in NSTEMI patients remain high, particularly in the elderly, frail patients, or those with comorbidities (Sanchis et al. 2024). Unlike STEMI, which requires immediate reperfusion, there is still debate regarding the optimal timing for invasive intervention in NSTEMI (Kite et al. 2023).

Cardiovascular disease is the leading cause of death worldwide, claiming approximately 17.9 million lives each year. Of the 17.9 million people who die from cardiovascular disease, 7.4 million are due to Acute Coronary Syndrome (ACS), one of which is NSTEMI (Bethesda et al. 2024). In Indonesia, the prevalence of coronary heart disease increases with age, urbanization, and unhealthy lifestyles. A study conducted at PKU Muhammadiyah Gamping Hospital shows that NSTEMI is one of the most common cases found in patients with acute coronary syndrome (Wiwit Herawati, Akrom, and Joko Sudibyo 2023).

NSTEMI (Non-ST-Elevation Myocardial Infarction) is a cardiovascular disorder caused by temporary or permanent blockage of the coronary arteries due to the rupture of atherosclerotic plaque (Weight et al. 2025). One of the main symptoms of NSTEMI is chest pain and shortness of breath. This condition causes a decrease in oxygen saturation and an increase in respiratory rate (tachypnea).

As a result, patients experience ineffective breathing patterns, which are defined as suboptimal lung development (Vania, Mohtar, and Santoso 2025).

Oxygen therapy to improve systemic oxygenation and prevent complications due to respiratory failure. The type of device used varies depending on the severity of hypoxemia, such as a nasal cannula, simple mask, or non-rebreathing mask (Dicky Anugrah, Chayati, and Purnomo 2025). Oxygen therapy is crucial for NSTEMI patients because this condition occurs due to an imbalance between decreased oxygen supply and increased myocardial oxygen demand (Rumah, Universitas, and Malang 2024).

2. Methods

The research design used was descriptive analytical with a case study method, which aimed to explore nursing care issues in patients with NSTEMI in the Emergency Room of Dr. Sardjito General Hospital, Yogyakarta. The approach used followed the stages of the nursing process, including assessment, determination of nursing diagnoses, preparation of action plans, implementation of interventions, evaluation, and documentation.

The subject of this case study was a patient diagnosed with NSTEMI in the Emergency Room of Dr. Sardjito General Hospital in Yogyakarta. Data were collected through several techniques, including direct interviews with patients to obtain subjective data, observation of physical conditions, and comprehensive physical examinations. Supporting data was also collected from medical documents such as medical records, laboratory test results, and radiology results. The data sources were the patient, family, observations, physical examinations, and medical records. The nursing care population consisted of one person. This nursing care was carried out on June 28, 2025, at 08:10 a.m. to 11:00 a.m. at the Emergency Room of Dr. Sardjito General Hospital in Yogyakarta.

In its implementation, this study upholds the principles of nursing ethics, including maintaining patient confidentiality, respecting patients' right to privacy, and ensuring that nursing interventions provided focus on delivering optimal benefits without causing risk or harm (non- maleficence).

3. Results and Discussion

3.1. Case Description

The patient in this case study was a 59-year-old woman (referred from Nugroho Hospital with inferior STEMI) who came to the Emergency Room (ER) of Dr. Sardjito General Hospital in Yogyakarta complaining of pain on her left side accompanied by cold sweats, shortness of breath and nausea and vomiting. The patient said that the pain came and went, felt like being squeezed, with a pain scale of 7 out of 10. Initial examination showed that the patient was fully conscious (GCS 15), with vital signs of 157/77 mmHg, pulse 61 x/minute, temperature 36.7°C, respiratory rate 18 breaths per minute with a nasal cannula at 3L, and oxygen saturation at 100%. Physical examination revealed rapid chest movements, use of accessory breathing muscles, and cyanosis.

To support the diagnosis, laboratory tests and an ECG were performed. Laboratory results showed a troponin T level of 1210 ng/L, which significantly exceeded the normal reference value (<14 ng/L). This increase in troponin T indicates acute myocardial cell damage, leukocytosis (11.80×10^9/L), which may reflect a physiological stress response or an inflammatory process due to myocardial infarction. The neutrophil-lymphocyte ratio (NLR) was also significantly elevated at 7.85 (normal <3.13). Elevated NLR has been reported in various studies as a predictor of worse clinical outcomes in patients with acute coronary syndrome, including NSTEMI, supporting its role as an inflammatory biomarker in risk stratification. The ECG results showed a regular sinus rhythm with a frequency of 72 beats/minute, with intervals and wave durations within normal limits. There was no ST segment elevation, but there was mild ST depression and T wave inversion in the lateral leads (V4–V6). These changes were consistent with subendocardial ischemia and supported the diagnosis of NSTEMI.

Radiological findings showing grade 1 pulmonary edema indicate pulmonary congestion due to increased pulmonary capillary pressure, which often occurs in patients with heart function disorders. Cardiomegaly in the form of left atrial enlargement (LAE) and left ventricular hypertrophy (LVH) indicates chronic increased volume and pressure load, as well as decreased myocardial contractility.

Meanwhile, aortosclerosis reflects an atherosclerotic process in large blood vessels that can contribute to coronary flow impairment. Overall, these findings are consistent with the patient's NSTEMI condition and indicate a high risk of developing heart failure and other cardiovascular complications.

3.2. Desreased Cardiac Output

The initial diagnosis based on the book (SDKI, 2017) is a decrease in cardiac output associated with changes in contractility. It is expected that after nursing interventions for 1 x 4 hours, cardiac output (L.02008) will be resolved. Nursing interventions for the diagnosis of decreased cardiac output associated with changes in myocardial contractility include periodic blood pressure monitoring to assess hemodynamic stability, auscultation of heart sounds to detect additional sounds or signs of cardiac dysfunction, and continuous electrocardiogram (ECG) monitoring to identify changes in rhythm or signs of ischemia that could worsen the patient's condition.

The nursing evaluation was conducted at 08:25, based on the nursing implementation carried out in this case study, which showed that the monitoring results indicated a blood pressure of 142/77 mmHg, a pulse of 68 beats/minute, a respiratory rate of 19 breaths/minute, a body temperature of 36.5°C, and an oxygen saturation of 98%. The hemodynamic parameters were within the normal range, indicating that the patient's cardiovascular condition was stable. Cardiac auscultation did not reveal any additional sounds, meaning that there were no signs of heart failure or new valve disorders. The ECG monitoring results were consistent with the previous results, with no progression of ischemia or new arrhythmias.

S (patient reports slight reduction in pain with a pain scale of 5), O (objective): patient appears more relaxed and calm, A (assessment): nursing issue of decreased cardiac output. The heart is associated with unresolved changes in contractility, P (Planning): Continue inpatient intervention: Inpatient plan.

The nursing diagnosis of decreased cardiac output related to changes in contractility has a strong theoretical basis. According to (da Silva et al. 2023), the main cause of decreased cardiac output is impaired myocardial contractility. This is consistent with the condition of NSTEMI patients who are prone to changes in contractility due to ischemia. Nursing interventions such as monitoring blood pressure, pulse, and oxygen saturation have proven to be important. Research by (Abdollahifar et al. 2025) shows that intensive nursing interventions can improve cardiac index and quality of life in patients with acute coronary syndrome. Additionally, continuous ECG monitoring is also relevant, as recent research has found that contractility disorders can occur even when left ventricular ejection function is still normal, making repeated electrocardiography and echocardiography examinations important for early detection (Karakosta et al. 2023).

3.3. Ineffective Breathing Pattern

The second diagnosis established was ineffective breathing pattern related to breathing effort. It is expected that after nursing intervention for 1 x 4 hours, the breathing pattern (L.01004) will be resolved. Nursing interventions for this diagnosis include monitoring respiratory rate, depth of breathing, and use of accessory breathing muscles to assess ventilation effectiveness, periodic monitoring of oxygen saturation as an indicator of oxygenation status, and administration of oxygen therapy via a nasal cannula at a flow rate of 3 liters/minute to maintain adequate oxygenation and prevent hypoxia.

Nursing evaluation was conducted at 08:30 based on the nursing interventions implemented in this case study. After 1 x 4 hours of nursing interventions, the patient's respiratory rate was 19 breaths/minute with improved respiratory depth and a significant reduction in the use of accessory breathing muscles. S (the patient said they felt more relieved when breathing after receiving oxygen therapy through a nasal cannula with a flow rate of 3 liters/minute), O (objective): reduced use of accessory breathing muscles, A (assessment): ineffective breathing pattern related to breathing difficulties resolved, P (planning): Continue intervention with monitoring of respiratory rate during hospitalization.

According to (Santiago-González et al. 2024), the diagnosis of ineffective respiratory pattern is most often associated with changes in breathing frequency and depth, use of accessory muscles, and oxygen saturation. Nursing interventions include monitoring respiration and oxygenation and

administering oxygen via a nasal cannula. In patients with NSTEMI, shortness of breath often occurs due to decreased myocardial contractility, which causes pulmonary congestion, thereby disrupting breathing patterns and reducing ventilation effectiveness. As described in a case study by (Of et al. 2025), effective nursing interventions include regular monitoring of vital signs and oxygen saturation, administering oxygen through a nasal cannula at a flow rate of 2–3 L/min, and placing the patient in a semi-Fowler position to facilitate lung expansion. These interventions have been shown to reduce rapid breathing, decrease the use of accessory breathing muscles, and increase patient oxygen saturation. The evaluation results showed that patient pain was reduced, respiratory rate was stable, and oxygen saturation increased to 97%, in line with the nursing care principles for ineffective breathing patterns in NSTEMI patients. Thus, this approach supports standard nursing practices in managing breathing pattern disorders in patients with acute cardiovascular complications.

4. Conclusion

Based on the results of data analysis and discussion of nursing care for NSTEMI patients in the Emergency Room (ER) of Dr. Sardjito General Hospital in Yogyakarta, patients were diagnosed with of decreased cardiac output and ineffective breathing pattern. The nursing interventions implemented included monitoring vital signs and oxygen saturation periodically, administering oxygen via a nasal cannula at 2–3 L/min. Evaluation of nursing actions showed that the patient's respiratory rate was stable, the use of accessory breathing muscles was reduced, oxygen saturation increased to 97%, and pain decreased from a scale of 7 to a scale of 5. The next plan was for the patient to continue inpatient care for further hemodynamic monitoring and intervention according to the development of their condition. The limitation of this case report is that data collection was limited to physical observations and medical documents, thus not including images from further examinations such as echocardiography or radiology.

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