



International Journal
of Care Scholars
ISSN: 2600-898X

Atypical Presentation of Unstable Angina in A Patient with Multiple Cardiovascular Risk Factors: A Case Report

Faisal Aji Setiawan¹, Siti Nur Illiani Jaafar^{2*} & Fitri Arofiati¹

¹Department of Nursing, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

²Department of Medical Surgical Nursing, Kulliyyah of Nursing, International Islamic University Malaysia, Pahang, Malaysia

ABSTRACT

Article History:

Submitted: 8 October 2025

Revised: 4 March 2026

Accepted: 2 April 2026

Published: 1 June 2026

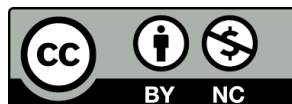
DOI: 10.31436/ijcs.v9i2.520

Corresponding author:

Siti Nur Illiani Jaafar
Department of Medical
Surgical Nursing,
Kulliyyah of Nursing,
International Islamic
University Malaysia,
Pahang, Malaysia
E-mail: illiani@iiu.edu.my

This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0), which permits non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

See:
<https://creativecommons.org/licenses/by-nc/4.0/>



Background: The prevalence of angina attack among cardiovascular disease patient reaching 1.5-1.7% which lead to the mortality worldwide. In certain populations such as the elderly, and individuals with diabetes mellitus, hypertension, or chronic kidney disease, unstable angina may present with atypical symptoms. This case report aims to describe and analyze atypical clinical presentations in a patient with unstable angina who had multiple cardiovascular risk factors, such as diabetes mellitus, hypertension, chronic kidney disease, and a long-term smoking history. Furthermore, this report aims to improve clinicians' understanding of how multiple comorbidities may influence the manifestation of myocardial ischemia symptoms, thereby aiding in a more rapid and accurate diagnosis in cases with atypical presentations.

Case Presentation: This case report utilized a retrospective approach on a single patient diagnosed with unstable angina. Data collection was conducted through interviews and review of the patient's medical records. The case involved a 66-year-old male patient with a 30-year history of active smoking, uncontrolled hypertension, diabetes mellitus, and stage 4 chronic kidney disease. The first symptom observed in this patient was atypical cold sweating at rest followed by chest pain that appeared approximately 20 minutes later. The patient was hospitalized from September 20 to September 25, 2025. On the first day of treatment, the patient experienced sudden episodes of cold sweating. On the second day, cold sweating occurred twice unexpectedly. By the third day, the patient no longer experienced cold sweating.

Conclusion: In conclusion, the atypical symptoms found in this patient, particularly the cold sweats, are likely influenced by various cardiovascular risk factors, including chronic diabetes mellitus, hypertension, chronic kidney disease, and a long-term smoking history. This combination of comorbidities may influence autonomic responses, increasing the likelihood of a clinical presentation atypical of unstable angina.

Keywords: Atypical presentation; Long-term smoking; Unstable angina

INTRODUCTION

Heart disease remains one of the leading causes of death worldwide. In 2022, cardiovascular-related deaths accounted for approximately 32% of global mortality, with unstable angina contributing to about 12% of these cases (1). Unstable angina, as a form of acute coronary syndrome, continues to pose a significant clinical challenge due to its potential for sudden deterioration and high risk of progression to myocardial infarction if not promptly recognized and treated. A survey conducted in the United States during the period of 2019–2023 reported the prevalence of angina to be approximately 1.5–1.7% among adults. Heart disease accounts for about 20% of total cardiovascular cases in individuals over the age of 65 (2). The prevalence of angina is highest in low- and middle-income countries, particularly among elderly populations aged over 50 years, with reported rates ranging from 8% to 39%, depending on the country (3).

The main trigger for unstable angina is often an unhealthy lifestyle, with a history of smoking being a significant risk factor (4). Exposure to the harmful substances contained in cigarettes can cause endothelial dysfunction (5), which accelerates the formation of atherosclerotic plaques and increases the risk of coronary thrombosis. A study demonstrated that a smoking history of more than 20 years is strongly associated with the occurrence of unstable angina, even in individuals without a prior history of coronary heart disease (6). The classic symptoms of unstable angina include chest pain described as a tight, squeezing sensation radiating to the arm (7). If these symptoms are not promptly managed, they can lead to fatal outcomes (8).

Not all patients with unstable angina present with typical symptoms. In certain populations such as the elderly, individuals with diabetes mellitus, hypertension, or chronic kidney disease unstable angina may manifest with atypical symptoms (9). These include cold sweats, nausea, and epigastric pain without clear or classic chest pain. One commonly overlooked symptom in patients with unstable angina is diaphoresis (cold sweats), which arises due to activation of the sympathetic nervous system in response to myocardial ischemia (10). A previous study found that in patients with diabetic neuropathy or impaired pain perception, cold sweating may appear as a primary symptom without accompanying

chest pain (11). This phenomenon is often underestimated by both healthcare providers and patients, who may not associate cold sweats with an acute cardiovascular condition (12).

Failure to recognize atypical signs and symptoms of unstable angina can have serious consequences for patient safety. Healthcare providers may delay diagnosis and postpone the initiation of appropriate therapy that should be administered promptly (13). A study reported that approximately 33% of patients with myocardial infarction presented to the hospital without any chest pain, and this group had a significantly higher mortality rate compared to those with typical symptoms, at 23.3% versus 9.3%, respectively (14). Another potential impact is misdiagnosis, which can result in patients not receiving standard antiplatelet or reperfusion therapies (15). Atypical symptoms may also complicate the triage process, especially in primary care settings or resource-limited areas, thereby increasing the risk of severe complications such as transmural infarction, kidney failure, or sudden cardiac death (16).

This study is important as it illustrates how a long term history of smoking, when combined with comorbidities, can lead to atypical clinical presentations that are at risk of being overlooked. Through this case report, it is hoped that clinical awareness can be improved regarding the significance of evaluating non-specific or atypical symptoms in patients with angina. Furthermore, this report aims to encourage faster and more accurate decision-making in daily clinical practice.

CASE DESCRIPTION

The patient, Mr. MN, is a 66 year old male, a Muslim, who works as a palm oil plantation laborer. He lives with his wife and has five children, none of whom reside in the same household. The patient presented to the hospital on September 20, 2025, with a sudden episode of cold sweating while at rest. Approximately 20 minutes later, he reported pain in the left side of his chest radiating to his left arm.

Medical History

The patient had a similar hospitalization in 2022 for the same complaint. He has a history of type 2 diabetes mellitus and hypertension

for over 10 years, as well as a comorbid diagnosis of stage 4 chronic kidney disease (CKD). Additionally, the patient has a smoking history of more than 30 years, consumes approximately one pack of cigarettes per day, equivalent to around 20 cigarettes, and sometimes even more. He has no allergies to food, weather, medication, or anything else. In addition, none of the family members have a history of heart disease such as the one the patient is currently experiencing.

The patient experienced a sudden episode of cold sweating while at rest. Approximately 20 minutes later, he reported chest pain on the left side, described as a heavy pressure-like sensation. The pain was continuous, sudden in onset, and occurred while the patient was not physically active. He appeared weak, fatigued, and anxious upon presentation. The patient has been an active smoker for over 30 years and has a long-standing history of hypertension and type 2 diabetes mellitus for more than a decade. His medical history reveals a similar episode in 2022, for which he was previously hospitalized. On September 20, 2025, the patient suddenly experienced the same symptoms while resting. He reported sharp, stabbing chest pain radiating to his left shoulder and arm. In addition to the chest discomfort, he described sudden-onset cold sweating accompanied by generalized weakness and fatigue. Due to the recurrence of symptoms, his family brought him to the hospital for further evaluation and inpatient care. The vital signs examination showed the following data: blood pressure at the time of assessment was 160/90 mmHg, pulse rate 98 beats per minute, respiratory rate 19 breaths per minute, and oxygen saturation (SpO₂) 99%. The patient experienced an atypical presentation 10 minutes after finishing smoking.

Etiology, Risk Factors and Pathophysiology

The patient, Mr. MN, is a 66 year old male with a 30-year history of active smoking. He has been diagnosed with long-standing hypertension, type 2 diabetes mellitus, and stage 4 chronic kidney disease (CKD). These comorbidities collectively increase the risk of cardiovascular events and are strongly associated with the development of unstable angina.

In Mr. MN case, the combination of long-term smoking, hypertension, and diabetes mellitus

significantly contributed to vascular endothelial dysfunction. These risk factors increase the permeability of the endothelium to lipoproteins, leading to the accumulation of atherosclerotic plaque within the arterial walls. Chronic smoking accelerates inflammatory processes and further compromises endothelial integrity. Over time, these pathophysiological changes result in the progression and eventual rupture of atherosclerotic plaques, particularly in coronary arteries. Plaque rupture can lead to partial or complete obstruction of coronary blood flow, triggering myocardial ischemia. In Mr. MN presentation, the myocardial ischemia manifested as left-sided chest pain radiating to the left arm, occurring at rest, which is a hallmark of unstable angina. Additionally, he experienced atypical autonomic symptoms such as sudden cold sweating, generalized weakness, pallor, and shortness of breath all of which are consistent with sympathetic nervous system activation in response to cardiac ischemia.

Supporting Examinations

Supporting examinations conducted included radiological examination on September 22, 2025, which showed clinical signs of chest pain and unstable angina (**Figure 1**). The findings revealed no focal lung lesions, a centrally located trachea, no mediastinal widening, sharp costophrenic angles on both sides, and no pneumothorax. The reason this examination was performed is to determine whether the patient has other heart diseases, to monitor the blood vessels, and to assess the condition of the heart. The bones and soft tissues imaged appeared unremarkable, leading to an impression of no significant abnormality.

An electrocardiogram (ECG) performed on September 20, 2025, showed sinus rhythm with a normal P axis, a ventricular rate of 50 to 90 beats per minute, borderline low voltage, extremity leads all below 0.6 mV, and baseline wander in leads V1 and V2 (**Figure 2**). Based on the results of the thorax and ECG examinations, which showed normal conditions in a patient with complaints of angina, it can be concluded that there are no signs of structural abnormalities in the heart or electrical abnormalities in myocardial activity.

Figure 1: Radiological Examination of Thorax

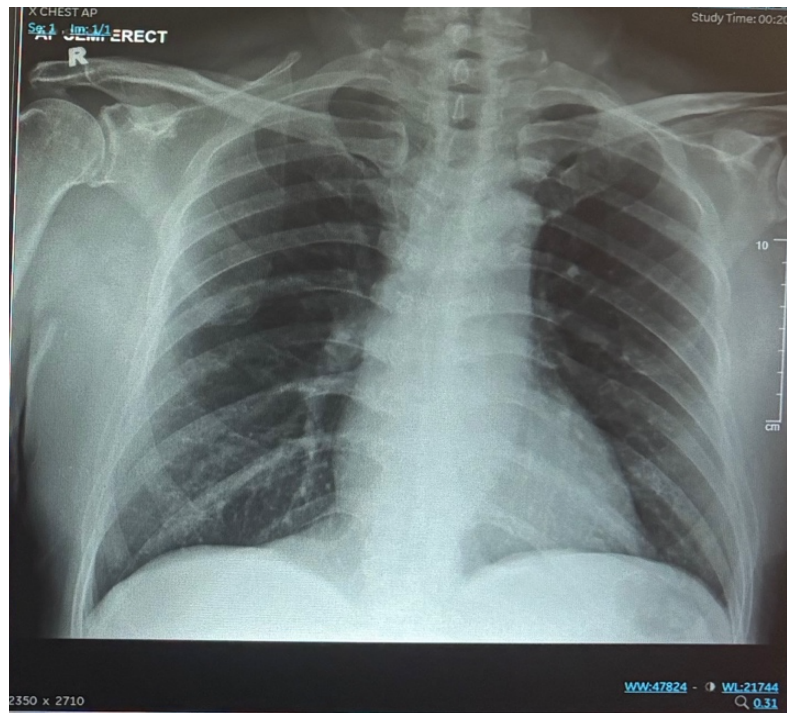
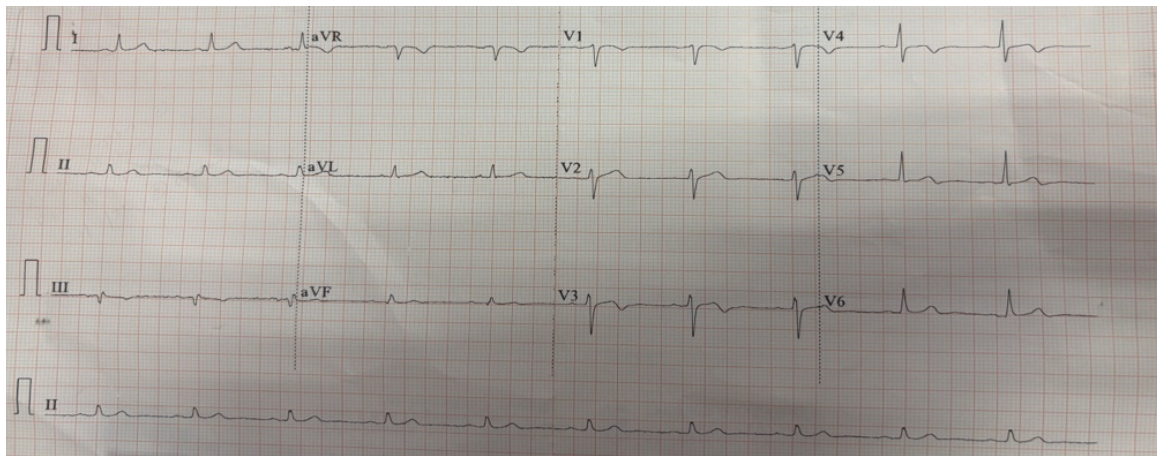


Figure 2: Electrocardiogram (ECG) Result



These normal results indicate the absence of cardiac enlargement, congestive heart failure, pulmonary edema, or significant arrhythmias at the time of the examination. Patients with unstable angina undergo several laboratory tests to confirm the diagnosis and rule out acute myocardial infarction. These tests include cardiac biomarkers such as troponin I or troponin T to assess myocardial damage, and a creatine kinase-MB (CK-MB) test for additional support. Additionally, a lipid profile (total cholesterol, LDL, HDL, and triglycerides) is performed to assess risk factors for atherosclerosis, a random blood glucose (HbA1c) test to identify comorbidities such as

diabetes mellitus, and routine blood tests such as hemoglobin, leukocyte count, and platelet count. Kidney function tests (urea and creatinine) are also performed before administering certain therapies. All of these laboratory tests aim to strengthen the clinical evaluation and determine appropriate treatment for patients with unstable angina. The laboratory test results can be seen in **Table 1**.

The conclusion from these laboratory results indicates impaired kidney function (elevated urea and creatinine), electrolyte disturbances in the form of mild hyponatremia and

hyperkalemia. This condition requires further evaluation of kidney function (eGFR, urinalysis), assessment of the cause of anemia,

and correction of electrolyte imbalances, as these may pose a risk to the heart, particularly hyperkalemia.

Table 1: Laboratory Result

Laboratory examination	Result	Unit
Serum Sodium	132	mmol/L
Potassium	5.6	mmol/L
Magnesium Level	0.57	mmol/L
Creatine Kinase Measured	226	U/L
Hematocrit	34.4	%
Red Blood Cell Count	3.62	$10^{12}/L$
Mean Corpuscular Hemoglobin	32.7	pg
Monocyte Count	0.27	$\times 10^9/L$

Diagnosis and Prognosis

The patient was diagnosed with unstable angina with three-vessel disease (3VD). Various supporting examinations were performed to support these findings. An electrocardiogram (ECG) revealed ischemic changes without ST-segment elevation consistent with unstable angina. Cardiac biomarkers such as troponin I or troponin T did not show significant elevations, thus ruling out acute myocardial infarction. To confirm three-vessel disease, coronary angiography was performed, which revealed significant stenosis in three major coronary arteries. Echocardiography was also considered to assess left ventricular function and the presence of wall motion abnormalities. These results confirmed the diagnosis of unstable angina with 3VD and provided the basis for further management and hypersensitive emergency, uncontrolled diabetes mellitus, non-oliguric acute kidney injury (AKI) secondary to hypertension, and chronic kidney disease stage 4 (CKD 4). The prognosis for Mr. MN is considered poor if not treated promptly due to several risk factors, including his age of 66 years, hypertension, diabetes mellitus, chronic kidney failure, and long-term active smoking history. These factors increase his risk of myocardial infarction or even sudden cardiac death. In Mr. MN case, further evaluation such as cardiac catheterization is necessary to assess the degree of vascular obstruction and to determine whether additional interventions, such as angioplasty, are required. The short-term involves pharmacological management with cardiac medications, while the long-term focuses on lifestyle modifications including dietary changes, regular exercise, and smoking cessation.

Treatment

This patient was prescribed with Rivaroxaban tablet 15 mg oral once a day, Glucophage 39 mg modified release tablet once a day, Aspirin 100 mg tablet once a day, Glycine 45 mg tablet once a day, Atorvastatin 80 mg tablet once a day, Bisoprolol fumarate 2.5 mg tablet once a day, Clopidogrel 75 mg tablet once a day, Pantoprazole 40 mg tablet once a day, Trimetazidine 35 mg tablet twice a day. The non-pharmacological therapy provided to the patient was cardiac and renal diet management.

Outcome

The patient was treated from September 20 to September 25, 2025. On the first day of treatment, the patient still experienced sudden episodes of cold sweating. On the second day, cold sweating occurred twice suddenly. By the third day of treatment, the patient no longer showed any signs of cold sweating. On the last day of treatment, the patient no longer experienced cardiac complaints, was able to perform activities independently, and had no shortness of breath or fatigue after activity.

DISCUSSION

In this case, the patient is a 66-year-old male, categorized as an elderly individual. A study found that 64.1% of males in this age group experience unstable angina compared to females of the same age, which is supported by lifestyle factors such as smoking (17). Another study showed that the incidence of unstable angina in hospitals is higher in males compared to females (4.1% vs. 2.6%) (11). The patient presented with atypical symptoms, notably sudden cold sweating during rest. Atypical presentations in acute coronary

syndrome, including unstable angina, refer to symptoms that do not correspond to the classic picture of unstable angina, such as retrosternal chest pain radiating to the arm, jaw, or shoulder (3). Research found that atypical symptoms were present in approximately 51.7% of patients with unstable angina, with nausea and cold sweating being common manifestations (13). Cold sweating is an atypical symptom often associated with an acute ischemic response. Absence of diaphoresis (sweating) can delay diagnosis as healthcare providers may rely heavily on classic clinical symptoms. Additionally, a study noted that about 8.4% of patients with unstable angina presented to hospitals without chest pain (18).

Cold sweating or diaphoresis is a common autonomic symptom observed in patients with unstable angina or acute myocardial infarction, typically indicating the body's response to cardiac ischemic stress (10). However, in patients with a long history of smoking, these symptoms may consistently present as persistent excessive sweating. According to physiological theory, cigarette smoke contains nicotine and various toxins that can damage the autonomic nervous system, particularly through mechanisms involving impaired vasodilation and chronic vascular inflammation, resulting in autonomic dysfunction (19). Research demonstrated active smokers have significantly lower cardiac autonomic nerve function compared to non-smokers, which can potentially trigger excessive sweating (16). Furthermore, a study confirmed that smokers with cardiovascular disease often exhibit more atypical symptom patterns, including the absence of autonomic symptoms such as cold sweating, contributing to delayed diagnosis (6). Similar findings were reported in research which found that patients with chronic smoking risk factors had a higher incidence of atypical symptoms, such as minimal chest pain and no diaphoresis, compared to non-smokers (4). This is also supported which identified a correlation between long-term nicotine exposure and cardiovascular autonomic nerve dysfunction (18). Therefore, a long history of smoking not only increases the risk of atherosclerosis and ischemic heart disease but also modifies its clinical manifestations, particularly by reducing the frequency and intensity of cold sweating as an autonomic symptom typically present in acute myocardial infarction or unstable angina. Awareness of these atypical manifestations is crucial to avoid delayed

diagnosis and ensure appropriate management for smoking patients presenting with chest pain (14).

The pathophysiology of the 66-year-old patient, who is a long-term active smoker with a history of hypertension and diabetes mellitus, involves risk factors that cause the vascular endothelium to become more permeable to lipoproteins, which then accumulate and form atherosclerotic plaques. The patient's smoking history accelerates the inflammatory process and worsens endothelial integrity. Over time, these harmful habits lead to the rupture of atherosclerotic plaques on the arterial walls, resulting in impaired blood flow to the myocardium. This causes the patient to experience chest pain radiating to the left arm, which occurs while at rest, accompanied by vegetative symptoms such as cold sweating, weakness, pallor, and shortness of breath.

Chronic smoking is a major factor in the development of cardiovascular diseases, including unstable angina. Smoking can have a negative impact on the autonomic nervous system, which regulates the body's response to stress, including the cold sweat response (4). Nicotine and toxic substances in cigarette smoke can cause autonomic nerve dysfunction through microvascular damage and chronic inflammation, thereby reducing the body's sensitivity and response to pain stimuli or cardiac stress (14). As a result, patients with a long history of smoking may present atypical symptoms, including cold sweats. Studies have shown that active smokers exhibit significant autonomic response impairment compared to non-smokers, which may contribute to clinical variations such as the absence of diaphoresis during ischemic events. Therefore, a history of smoking should be considered when evaluating patients with atypical symptoms to avoid delayed diagnosis (6).

The patient received treatment with oral Rivaroxaban 15 mg tablets, Glimepiride 39 mg modified-release tablets, Aspirin 100 mg tablets, Glycine 45 mg tablets, Atorvastatin 80 mg tablets, Bisoprolol fumarate 2.5 mg tablets, Clopidogrel 75 mg tablets, Pantoprazole 40 mg tablets, and Trimetazidine 35 mg tablets. The use of these medications in patients with unstable angina and cardiometabolic comorbidities can improve clinical manifestations, including cold sweat symptoms. Bisoprolol, a selective β_1 beta-

blocker, works by reducing sympathetic nervous system activity and heart rate, which can decrease the autonomic response to ischemic stress that typically causes diaphoresis. A study demonstrated that beta-blocker use can suppress autonomic signs such as cold sweats in patients with heart disease, with the side effect of reducing autonomic clinical manifestations (16). Furthermore, patients taking gliclazide, a sulfonylurea drug used in the management of diabetes mellitus, are known to be at risk of developing hypoglycemia. Hypoglycemia can trigger autonomic symptoms such as sweating, palpitations, and tremors. However, in chronic or recurrent hypoglycemia, desensitization of the sympathetic response can occur, leading to a decrease or the appearance of atypical autonomic manifestations. In this case, the patient had a history of uncontrolled diabetes mellitus and had been taking gliclazide prior to hospital admission. This condition may contribute to the altered autonomic response, potentially explaining the absence or reduction of typical symptoms such as sweating despite myocardial ischemia. Therefore, the use of gliclazide and the possibility of hypoglycemia unawareness may help deepen our understanding of the atypical clinical presentation found in this patient (10).

Antiplatelet drugs such as Aspirin and Clopidogrel, as well as the anticoagulant Rivaroxaban, do not directly affect autonomic symptoms; however, their role in reducing the incidence of cardiac ischemia can decrease the frequency of severe ischemic episodes that trigger diaphoresis responses (20). Membrane stabilizers like Trimetazidine can also reduce the oxygen demand of the heart and alleviate ischemic stress, which in turn decreases sympathetic nerve stimulation and reduces the likelihood of cold sweat occurrence. Therefore, this pharmacotherapy combination may contribute to reducing the intensity or even the absence of cold sweat symptoms in patients with unstable angina, particularly those with a history of diabetes and cardiovascular comorbidities (13).

CONCLUSION

In this case, the patient was a 66-year-old man with a history of comorbidities and active smoking for 30 years. The first symptom of unstable angina observed in the patient was an atypical presentation, characterized by cold sweats at rest, followed by chest pain 20 minutes later. This atypical symptom in this

patient was associated with a long-term smoking history, which may increase the likelihood of atypical presentations, including cold sweats. The implications for the patient depend on his condition.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to International Islamic University Malaysia and Universitas Muhammadiyah Yogyakarta for facilitating and supporting this research.

AUTHOR CONTRIBUTIONS

FAS: Responsible for the research concept, data collection, data analysis, and manuscript preparation.

SNIJ: Supervised the study, critically revised the manuscript, and validated the data

FA: Supervised the study, critically revised the manuscript, and validated the data

REFERENCES

1. Agho AV, Disu V, Figueroa AS, Wiredu B, Okorigba EM, Olanite M, et al. Prevalence of angina pectoris: an analysis of the National Health Interview Survey (NHIS) database. *Cureus*. 2025;17(4).
2. World Heart Federation. Use heart to act now on angina [Internet]. Geneva: World Heart Federation; [cited 2025 Sep 23]. Available from: <https://world-heart-federation.org/>
3. Dakota I, Munawar M, Pranata R, Raffaello WM, Sukmawan R. Diagnostic prediction model in subjects with low-risk unstable angina pectoris/non-ST segment elevation myocardial infarction. *Eur Rev Med Pharmacol Sci*. 2021 Aug;25(16):5145-52.
4. Paiva L, Vieira MJ, Baptista R, Ferreira MJ, Gonçalves L. Unstable angina: risk stratification for significant coronary artery disease in the era of high-

- sensitivity cardiac troponin. *Glob Heart*. 2024;19(1).
5. Perona M, Cooklin A, Thorpe C, O'Meara P, Rahman MA. Symptomology, outcomes and risk factors of acute coronary syndrome presentations without cardiac chest pain: a scoping review. *Eur Cardiol Rev*. 2024;19.
6. Aminuddin A, Cheong SS, Roos NAC, Ugusman A. Smoking and unstable plaque in acute coronary syndrome: a systematic review of the role of matrix metalloproteinases. *Int J Med Sci*. 2023;20(4):482-92.
7. Almaghrabi ZA, Saati HS. Patient satisfaction on the holistic care approach rendered by nurses in the oncology ward. *Egypt J Hosp Med*. 2022;89(1):6041-50.
8. Manual of Medicine. Atypical presentations of acute coronary syndrome (ACS) [Internet]. [cited 2025 Sep 23]. Available from: <https://manualofmedicine.com/>
9. Teragawa H, Uchimura Y, Oshita C, Hashimoto Y, Nomura S. Factors contributing to coronary microvascular dysfunction in patients with angina and non-obstructive coronary artery disease. *J Cardiovasc Dev Dis*. 2024;11(7).
10. Ma Z, Shoemaker M, Puleo P, Antonie MK, Vefalin H, Manda Y, et al. Non-chest pain symptoms and likelihood of coronary occlusion in emergency department patients with ST segment elevation undergoing emergent coronary angiography. *Coron Artery Dis*. 2024;35(7):598-606.
11. Negrea MO, Zdrenghea D, Teodoru M, Neamtu B, Cipăian CR, Pop D. Gender particularities and prevalence of atypical clinical presentation in non-ST elevation acute coronary syndrome. *J Cardiovasc Dev Dis*. 2022 Mar;9(3).
12. Quashie NT, D'Este C, Agrawal S, Naidoo N, Kowal P. Prevalence of angina and comorbid conditions among older adults in six low- and middle-income countries: evidence from SAGE Wave 1. *Int J Cardiol*. 2019 Jun;285:140-6.
13. Xu M, Li HW, Chen H, Guo CY. Sex and age differences in patients with unstable angina pectoris: a single-center retrospective study. *Am J Med Sci*. 2020 Sep;360(3):268-78.
14. Makhoul N, Avivi I, Lanciano SB, Kaptsenel EH, Palacci H, Chaiat C, et al. Effects of cigarette smoking on cardiac autonomic responses: a cross-sectional study. *Int J Environ Res Public Health*. 2020 Nov;17(22).
15. Kwok CS, Holroyd E, Bennett S, Satchithananda D, Borovac JA, Will M, et al. Characteristics and outcomes of patients with acute coronary syndrome who present with atypical symptoms: a systematic review, pooled analysis and meta-analysis. *Coron Artery Dis*. 2025 May;36(3):240-51.
16. Palatini P, Faria-Neto JR, Santos RD. The clinical value of β -blockers in patients with stable angina. *Curr Med Res Opin*. 2024;40(sup1):33-41.
17. AIMbaidin LR, Qasaimeh R, Qasaimeh R, Al-Ali H, Al-Abidalrazag M, Atieh S, et al. Typical and atypical presentations of myocardial infarction: symptoms and associated risk factors. *Qatar Med J*. 2025;2025(2):41.
18. El Haque IT, Gunawan A, Hidayat N, Zuvita ED. Nursing care for unstable angina pectoris with the intervention of foot massage techniques to reduce pain scale. *J Vocat Nurs Sci*. 2021;3(2):47-56.
19. Joseph NM, Ramamoorthy L, Satheesh S. Atypical manifestations of women presenting with myocardial infarction at tertiary health care center: an analytical study. *J Midlife Health*. 2021;12(3):219-24.
20. Wu C, Zhang Z, Su S, Xu H, Song L, Wu Y, et al. Role of heavy sweating for ST-segment elevation myocardial infarction: analysis of the China Acute Myocardial Infarction registry. *BMC Cardiovasc Disord*. 2025;25(1):385.