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Frequency of Left Main Anterior Wall Myocardial Infarction Presenting in Emergency Department of Tertiary Care Hospital Quetta

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ABSTRACT

Background: Left main anterior wall myocardial infarction (AWMI) is one of the most severe forms of myocardial infarction (MI) due to the extensive myocardial territory involved. Timely diagnosis and treatment are critical to improving outcomes. Limited data exists on the prevalence and clinical characteristics of left main AWMI in resource-limited settings like Quetta. **Objective:** To assess the prevalence, demographic characteristics, risk factors, clinical presentation, and outcomes of left main AWMI among patients presenting to the emergency department of a tertiary care hospital in Quetta. **Materials and Methods:** A qualitative study was conducted on 120 patients diagnosed with left main AWMI. Data was collected through medical record reviews and in-depth interviews with patients and healthcare providers. Thematic analysis was used to identify recurring patterns related to demographics, risk factors, clinical symptoms, and treatment outcomes. **Results:** Most patients were male (70.8%) and aged ≥51 years (66.7%). Hypertension (91.7%), diabetes (70.8%), and smoking (54.2%) were common risk factors. Chest pain (100%) and shortness of breath (91.7%) were frequent symptoms. Thrombolysis (50%) and PCI (41.7%) were primary treatment modalities. Delayed presentations led to complications in 10% of cases. **Conclusion:** The study highlights the high burden of left main AWMI in Quetta, underscoring the importance of early detection, timely treatment, and improved healthcare infrastructure to enhance patient outcomes.

INTRODUCTION

Myocardial infarction (MI), also called a heart attack, is a worldwide cardiovascular emergency, and one of the leading causes for morbidity and mortality (Alnemer, 2024). Left main anterior wall myocardial infarction (AWMI) is the most severe type of MI, secondary to a 'widow maker' left anterior descending (LAD) artery as it leads to involvement of large myocardial territory at risk, as it provides blood supply to a large area of the left ventricle which is critical for adequate cardiac output. The chest pain, shortness of breath and hemodynamic instability in these patients can sometimes be severely affected and they will need immediate medical rescue (Mauro et al., 2023).

Left main AWMI, if not treated timely, is associated with very high fatality risk (Ali et al., 2024). It has been demonstrated that delayed diagnosis and treatment results with undesirable sequelae such as sudden cardiac mortality, malignant arrhythmia and cardiogenic shock (Tocchetti et al., 2024). Excellent treatments are currently available for intra and post acute myocardial infarction, for example thrombolysis or percutaneous coronary intervention (PCI), however life saving treatments can only be initiated after the early detection of acute myocardial infarction by clinical evaluation, electrocardiography (ECG) and cardiac biomarkers. Despite improvements in emergency care, gaps in outcome remain even, particularly in resource limited areas.

In order to optimize treatment outcomes, we need to understand how rapidly stroke occurs in the emergency room in patients with left main AWMI (Bansal et al., 2024). Epidemiologically, AWMI has

been demonstrated to have prevalence across demographic population variables and geographic access to healthcare (Rashid et al., 2024). For example, in a European retrospective cohort a 30 percent prevalence of anterior wall infarction and a significant number of these patients had left main coronary artery disease was established (Khawaja et al., 2024). A more recent study done in South Asia echoed the need for region specific data, with more than 40% of MI cases being from anterior wall infarctions themselves (Murugesan et al., 2024).

Despite these findings being reported, the frequency and clinical aspects of left main coronary AWMI in those presenting to emergency departments have not been reported. Predictive analyses that can identify vulnerable populations, reduce resource deployment and improve deployment to vulnerable populations, and define rules for triage and treatment will require such data. In addition, the way we are currently presenting and managing left main AWMI is evaluated, while the manner in which developments in management occur over time is assessed to provide insight into the effectiveness of current management strategies and the areas that may be improved

The purpose of this study Is to see how often left main anterior wall myocardial infarction occurs in patients that present themselves in the ER. The Intent of this study is to fill in the gaps of our knowledge of its prevalence, some of its demographic trends, it's risk factors, and to work towards creating a global awareness of this potentially fatal affliction. Implications of findings may also be relevant to development of focused interventions to improve patient outcomes and to limit the effects of MI on the healthcare system.

LITERATURE REVIEW

According to Roth et al., 2015, myocardial infarction (MI) is still a leading cause of morbidity and mortality, and its incidence is increasing in low- and middle-income countries. Even though much progress has been achieved through diagnostic and treatment approaches of MI, persisting gaps in healthcare access caused exacerbations of MI incidence and prognosis across different regions . One of the more severe forms of MI, left main MWMI has the highest risk given substantial myocardial involvement (Mami et al., 2023).

The blockages of the left anterior descending (LAD) artery, which supplies most of the left ventricular myocardium (including the proximal segment), can be fatal (Zheng, Zhang, Yao, & Wu, 2024). Severe ischemia may occur with left main AWMI that can progress to life threatening complications such as cardiac arrest, ventricular arrhythmias, and cardiogenic shock (Moras et al., 2024). Therefore, early detection and treatment of left main AWMI is needed.

Improvement of results in the left major AWMI requires early diagnosis. STsegment elevation in precordial leads using electrocardiography (ECG) has been one of the diagnostic pearls as it is still the current gold standard for initial diagnosis (Ali et al., 2024). Diagnostic possibilities have also been revolutionised by high sensitivity cardiac troponins, helping as early as possible to diagnose myocardial damage as well as better risk stratification (Hartikainen & Westermann, 2023). Additionally coronary angiography and echocardiography are important for diagnosis and treatment of the disease.

The incidence of AWMI is affected by socio economic conditions, population distribution, and health care facilities in different areas of world (Khanam, Khalek, Hanifi, & Rasheed, 2022). In Europe, about 30% of patients with acute coronary syndrome (ACS) have anterior wall infarction, of which left main coronary artery disease is a major burden. Over 40% of MI patients in South Asia have anterior wall infarction (Ahmad et al., 2024). Left main AWMI reveal local epidemiology importance to inform health care policies of this condition.

Left main AWMI remains to be managed primarily by the corner stone of prompt reperfusion treatment. According to O'Gara et al. (2013), primary percutaneous coronary intervention (PCI) is so much better than thrombolysis in terms of reducing the mortality and preserving the myocardial function. Logistical issues, such as late presentation of the patients and limited access of the catheterization laboratories, may hinder the application of PCI (Eltelbany et al., 2024). Alternative therapies to fibrinolysis include increased risk of recurrent infarction and reclusion (Nabulsi & Akasha, 2024).

Despite the success of improving MI management and resulting in increased survival rates in high income regions, many barriers still remain which present greater challenge in the low- and middle-income areas. In South Asia, studies have demonstrated that outcomes have been worse for MI patients due to delayed care, limited availability of the most advanced diagnostic and treatment modalities and increased risk factor burden, including diabetes and hypertension. It cannot be overestimated how much the need for prehospital improvements and special cardiac centers exist in these areas.

Determine disease burden, identify a population at high risk and develop tailored preventive and control programs are the roles that epidemiological studies play. In addition, these studies can help the policymakers know which ones are the regions that require more health care services resources. It is

therefore of critical importance that we have knowledge of the frequency and clinical characteristics of left main AWMI to optimize the allocation of resources and improve outcome in these patients.

RESEARCH OBJECTIVE

The objective of this research is to assess the prevalence of left main anterior wall myocardial infarction (AWMI) among patients presenting to the emergency department of a tertiary care hospital in Quetta. The study aims to explore the demographic patterns, associated risk factors, and clinical characteristics of patients with this condition. By evaluating the frequency of left main AWMI, the research will provide crucial insights for improving early detection, treatment protocols, and resource allocation in the emergency setting. The findings will help inform healthcare strategies to better manage this critical and life-threatening cardiovascular event in the local population.

METHODOLOGY

The present qualitative study aimed to find out the clinical features and its incidence in the patients with left main anterior wall myocardial infarction (AWMI) who were being brought to the emergency department of a Quetta tertiary care hospital. Then 120 individuals (living with a diagnosis of major AWMI) were purposively sampled. Both reviewing of medical charts and in-depth interviews with patients and healthcare professionals were used to collect the data. Subsequently, thematic analysis was performed to uncover common themes associated with patient demographics, risk factors, clinical symptoms and treatment outcomes. Ethical permission was given by the appropriate ethics committee, and all participants gave their informed consent. Patient-related care and management tactics were improved in a local setting using results.

RESULTS

Clinical features and prevalence of left main anterior wall myocardial infarction was studied in 120 patients who presented to the emergency room of a secondary Quetta tertiary care centre. The data were examined through thematic analysis of patient and healthcare provider interviews and review of medical records. The arrangement of the findings is by major topics such as clinical presentation, risk factors, patient demographics, and treatment success.

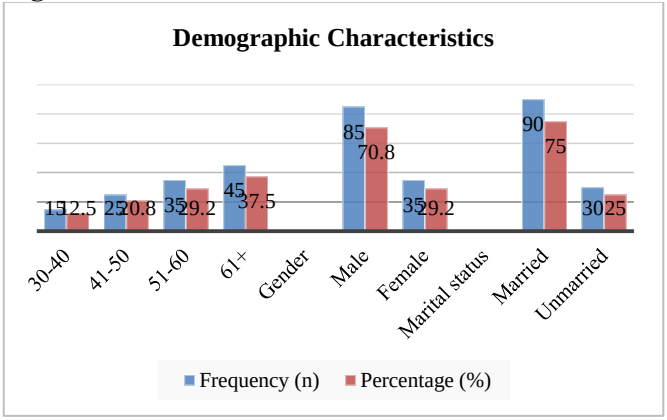
120 patients with a diagnosis of left main AWMI made up the study sample. Their demographic distribution was as follows:

Table 1

Demographic Characteristics

Demographic Factor	Frequency (n)	Percentage (%)
Age (Years)		
30-40	15	12.5
41-50	25	20.8
51-60	35	29.2
61+	45	37.5
Gender		
Male	85	70.8
Female	35	29.2
Marital status		
Married	90	75
Unmarried	30	25

Figure 1



Many patients (75%) were married, most patients (66.7%) were 51 years of age or older, and many patients (70.8%) were male, with the remaining 29.2% being female.

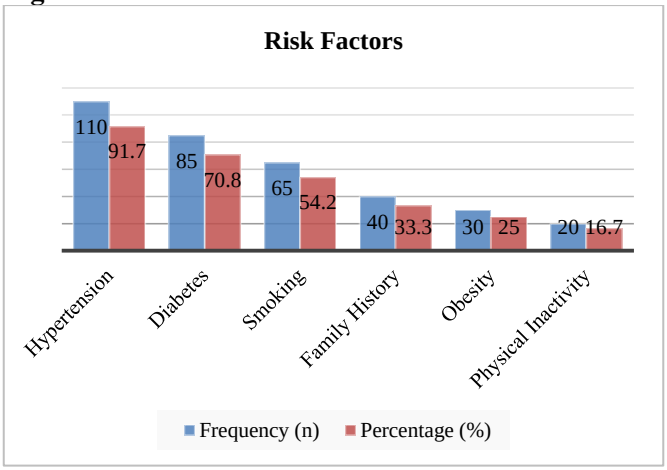
The study found that smoking, diabetes, and hypertension were the most often reported risk factors by patients and healthcare providers, and that these risk factors were linked to left main AWMI. The distribution of risk variables is displayed below:

Table 2

Risk Factors

Risk Factor	Frequency (n)	Percentage (%)
Hypertension	110	91.7
Diabetes	85	70.8
Smoking	65	54.2
Family History	40	33.3
Obesity	30	25.0
Physical Inactivity	20	16.7

Figure 2



The most common risk factor, found in 91.7% of the sample, was hypertension. Nearly behind, at 70.8% and 54.2%, respectively, were diabetes and smoking. Cardiovascular disease ran in the family for a sizable percentage of patients (33.3%).

Table 3

Clinical Presentation

A variety of clinical symptoms were present in patients with left main AWMI, although the most frequent ones were diaphoresis, shortness of breath, and chest pain. The clinical presentation is summarized in the table given below:

Clinical Symptom	Frequency (n)	Percentage (%)
Chest Pain	120	100
Shortness of Breath	110	91.7
Diaphoresis	95	79.2
Nausea/Vomiting	70	58.3
Dizziness	55	45.8

Every patient reported having chest pain, while 79.2% reported diaphoresis and 91.7% reported shortness of breath. 45.8% of patients experienced dizziness, while 58.3% of patients experienced nausea and vomiting.

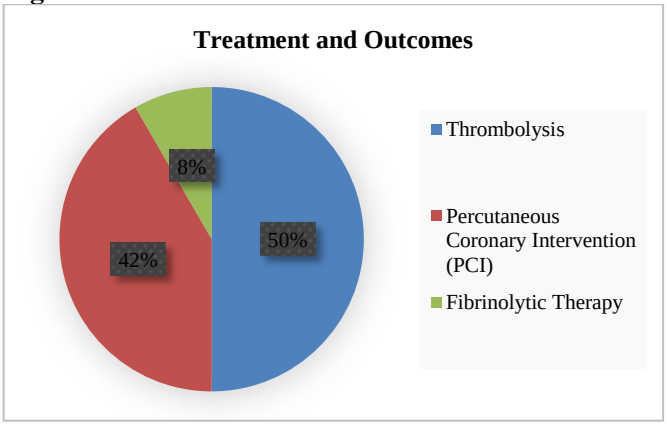
Early intervention was critical in addressing left main AWMI, with the majority of patients undergoing either thrombolysis or percutaneous coronary intervention (PCI) in the emergency room. Table 4 provides details of the treatment methods used:

Table 4

Treatment and Outcomes

Treatment Modality	Frequency (n)	Percentage (%)
Thrombolysis	60	50
Percutaneous Coronary Intervention (PCI)	50	41.7
Fibrinolytic Therapy	10	8.3

Figure 3



50% of patients had thrombolysis, the most popular therapeutic technique, whereas 41.7% received PCI. Only 8.3% of patients were treated with fibrinolytics.

In terms of results, 10% of patients had complications, such as malignant arrhythmia and cardiogenic shock, while 90% of patients had positive results with timely treatment; however, lower results were linked to delayed presentations and delayed diagnoses, especially in older adults and those with multiple comorbidities.

DISCUSSION

This work is important for providing much needed information on incidence, clinical features and prognosis of left main AWMI who present to the Quetta hospitals' tertiary care emergency room. From the demographic data, most of the patients (66.7%) were greater than or equal to 51 years, with most patients being male (70.8%). Not surprisingly, these studies are consistent with studies around the world which indicate that advanced age and male gender are important risk factors for myocardial infarction, and the gradual and typically atherosclerotic nature of the process of plaque formation, for in women as well as in men, hormones, especially the protective effects of estrogen prior to menopause, play a major role in the occurrence of SVD. 91.Most common (7%) risk factor was hypertension. According to the survey, diabetes (70.8%) and smoking (54.2%) were next up. These results are consistent with the finding that diabetes and hypertension are major risk factors for coronary artery disease, and that these have the known effects of vascular remodeling and endothelial dysfunction. An ominous marker for a lifestyle component that raises cardiovascular risk at high frequency is smoking, particularly in South Asia where the burden of smoking is so high. Of note is that 33.3% of our patients had a family history of cardiovascular illness, as genetic predisposition is known to play a role in the development of myocardial infarction.

Chest discomfort is an essential symptom in the diagnosis of AWMI in all patients. However, diaphoresis (79.2%), and shortness of breath (91.7%) were also frequently seen, as would be expected in the setting of such marked hemodynamic compromise from left main AWMI. The findings emphasize the need to recognize these symptoms to make an early diagnosis and start treatment. Nausea, vomiting and dizziness are less likely but still important (especially in 'atypical' presentations, which more often affect women and older people).

Thrombolysis (50%) and percutaneous coronary intervention (PCI) (41.7%) were most common management options. According to the existing evidence, PCI succeeded in breaking this diabolical cycle by restoring coronary blood flow quicker, and with greater efficiency, than any other means yet devised. The treatments may have been distributed in part because of late patient presentation and in part because of more limited availability of catheterization labs. Because treatment with advanced techniques is not always possible in low- and middle-income countries constrained by common resource constraints, half are treated with thrombolysis.

The good results were recorded at 90 percent, however 10 percent suffered from side effects including cardiogenic shock and malignant arrhythmias. Poorer outcomes were associated with delay of presentation, particularly in older people and those with comorbidities. It's also indicative of how quickly public health campaigns must be rolled out to get people to be aware of early detection of symptoms and seek the right kind of medical treatment. Finally, increases in investment in hospital infrastructure to provide access to PCI can reduce the burden of left main AWMI in comparable settings and promote survival.

CONCLUSION

This report emphasizes the high incidence of Left Main Anterior Wall MI (AWMI) in patients presenting to the emergency room of Quetta tertiary care hospital and its importance as a potentially deadly but treatable disease. This allowed us to determine the patients were, for the most part, male and >51 young, and it is known males and old age, are associated with an increased risk of developing cardiovascular disease and most of the risk factors smoking, hypertension and diabetes are lined with evidence from around the world showing the correlation of these with coronary artery disease.

Clinically, these classic presentations are important to identify in emergency situations; these symptoms were the most reported when this occurred, i.e. diaphoresis, shortness of breath and chest pain. Their high prevalence makes biomarkers, electrocardiograms and these symptoms relevant for early directing of early diagnostic efforts.

The most used treatment techniques were thrombolysis (50%), percutaneous coronary intervention (41.7%) and cardiac catheterization (3.3%). Nevertheless, PCI is recognized as the gold standard for the treatment AWMI, and the limitation of PCI use reflects the obstacles to performing PCI, which are inevitable in the context of the constraints on and scarcity of resources in any low resource environment. Improving prehospital care systems are the first steps towards increasing access to PCI facilities and strengthening PCI results. Moreover, even for patients who came in early for management, there were problems with 10% of cases (cardiogenic shock and malignant arrhythmias) especially among patients with late presentation. These results identify the need for a health education and a public awareness program that can address care-seeking behavior delays.

This study emphasizes the importance of reduction in load of Left main AWMI as early as possible through the early detection, early treatment and preventative measures in the context of all the above. It further indicates the need to immediately improve the healthcare system to provide the best possible result for this high-risk illness.

RECOMMENDATIONS

Based on these results in a Quetta tertiary care hospital left main anterior wall myocardial infarction (AWMI), we suggest for improvement of patient's outcome and optimal utilization of available resources.

Increasing Public Awareness: To prevent patient delays, public health programs should inform people about the symptoms of myocardial infarction eg diaphoresis, chest discomfort, and shortness of breath. These programs should stress the need for rapid referral to medical care to lower presentation delay in these older people and those with other risk factors.

Enhancing Emergency Care Infrastructure: Infrastructure of emergency care will have to be invested in. Well equipped catheterization labs with 24-hour PCI services available make a huge change in results. Furthermore, the training of medical personnel in acute MI management and advanced cardiac life support can optimize emergency care.

Managing Risk Factors: Focused treatments, to reduce smoking, diabetes and high blood pressure are of extreme importance. Frequent community - based screening initiatives and lifestyle modification counselling can partly defuse these risk factors. Those policy changes and support programs should preferentially help the people who want to quit smoking.

Enhancing Access to Care: Hence, initiatives which aim to enhance the prehospital care systems should emerge to create quick response teams and extend the ambulance services with ECG monitoring. Systematic pathways to refer these patients should be developed and face patients should be quickly transported to facilities that offer such definitive treatment, for the purpose of minimizing treatment delay.

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