Original Research Article

Pattern of STEMI and Its Related Clinical Factors in North Kordofan Sudan

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Abstract

Background: Myocardial infarction (MI) is a common emergency department (ED) and coronary care unit (CCU) presentation globally. The purpose of this investigation was to determine the prevalent pattern and clinical presentation of STEMI type among Sudanese patients in the state of Northern Kordofan (rural population). **Methodology**: This is a descriptive study conducted at Coronary Care Unit (CCU) at El-Obeid Teaching hospital in El-Obeid city, North Kordofan State, Sudan. The study included a full coverage of patients admitted with clinical diagnosis of STEMI, during the period from Nov 2018 to March 29, 2022. Besides initial presenting symptoms, the diagnosis and STEMI categorization based on the ECG findings. **Results:** Only 141 of the 174 patients admitted to our facility had comprehensive patient identification information. The majority of patients had an anterior presentation, followed by anteroseptal, inferior, anterolateral, septal, and inferolateral, with proportions of 46/141 (32.6%), 32/141 (22.7%), 29/141 (20.4%), 26/141 (18.4%), 7/141 (5.0%), and 1/141 (0.7%), respectively. Only 32/141 (22%) of the 141 individuals presented within 12 hours of their initial chest discomfort. Approximately 59 out of 141 (41.8%) patients presented themselves after 72 hours had passed. Streptokinase was administered to about 40 individuals, and 12 of them (30%) presented after 12 hours. **Conclusion**: STEM is prevalent in rural Sudan, with an increasing prevalence of anterior type. The majority of patients presented late in response to their initial chest discomfort, which can lead to unfavorable or poor outcomes. Health education regarding MI is considered essential in rural communities.
Keywords: Myocardial infraction, Sudan, STEMI, Streptokinase.

INTRODUCTION

Myocardial infarction (MI) is a perilous condition of the coronary nature that is closely linked to abrupt cardiac fatality. Its prevalence rates span from 3.8% to 23.3% on a global scale [1, 2]. Acute coronary syndrome (ACS) encompasses a spectrum of cardiovascular conditions, namely ST-elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (NSTEMI), and unstable angina. This particular ailment can be classified as a form of coronary heart disease (CHD), which holds responsibility for a significant portion, precisely one-third, of mortalities among individuals who have surpassed the age of 35. While certain forms of CHD may manifest without any discernible symptoms, acute coronary syndrome typically presents with noticeable symptoms [3].

Acute STEMI is a condition in which transmural myocardial ischemia causes necrosis or damage to the myocardium [4]. STEMI represents the utmost severe manifestation of acute myocardial infarction, necessitating the implementation of efficacious and prompt myocardial reperfusion therapy, ideally administered within a 12-hour window subsequent to the onset of symptoms. Nevertheless, it is worth noting that a notable proportion, specifically ranging from 10% to 15%, of individuals diagnosed with STEMI exhibit a delayed arrival at medical establishments, occurring a full 12 hours subsequent to the initial manifestation of symptoms [5].

The dearth of information pertaining to the epidemiological aspects of cardiac ailments in Sudan is a matter of concern. Based on the extant data, it is discernible that Sudan exhibits a prevalence rate of 2.5% in relation to cardiac ailments. A significant majority, exceeding 80%, of cardiovascular disease (CVD) cases observed in Sudan can be attributed to the presence of hypertensive heart disease (HHD), rheumatic heart disease (RHD), ischemic heart disease (IHD), and cardiomyopathy [6]. Henceforth, the primary objective of this inquiry was to ascertain the prevailing pattern and clinical manifestation of STEMI subtype within the Sudanese populace residing in the region of Northern Kordofan, specifically focusing on the rural population.

METHODOLOGY

This study pertains to a descriptive investigation that was carried out within the confines of the Coronary Care Unit (CCU) situated at El-Obeid Teaching Hospital, located in the esteemed city of El-Obeid, which resides in the North Kordofan State of Sudan. The investigation encompassed a comprehensive examination of individuals who were admitted with a clinical diagnosis of ST-segment elevation myocardial infarction (STEMI) within the timeframe spanning from November 2018 to March 29, 2022. In addition to the preliminary manifestations, the diagnosis and classification of ST-segment elevation myocardial infarction (STEMI) are contingent upon the electrocardiographic (ECG) observations.

RESULTS

This study comprised 141 patients ranging in age from 24 to 95 years old, with a mean age of 61. Out of 141 patients, 105/141(74.5%) were males and 36(25.5%) were females with male-female ratio 3.00:1.00. As shown in Table 1 and Figure 1, the majority of the patients 84/141(60%) were between the ages of 50 and 70.

The majority of patients, 98/140 (69.5%), were urban, while the remaining 43/141 (30.5%) were rural, as shown in Table 1, Figure 1.

**Table 1: Distribution of the patients by demographic characteristics**

Variable	males	Females	Total
Age			
<50 years	25	8	33
51-60	33	9	42
61-70	33	9	42
71-80	7	8	15
81+	7	2	9
Total	105	36	141
Residence			
RURAL	32	11	43
URBAN	73	25	98
Total	105	36	141
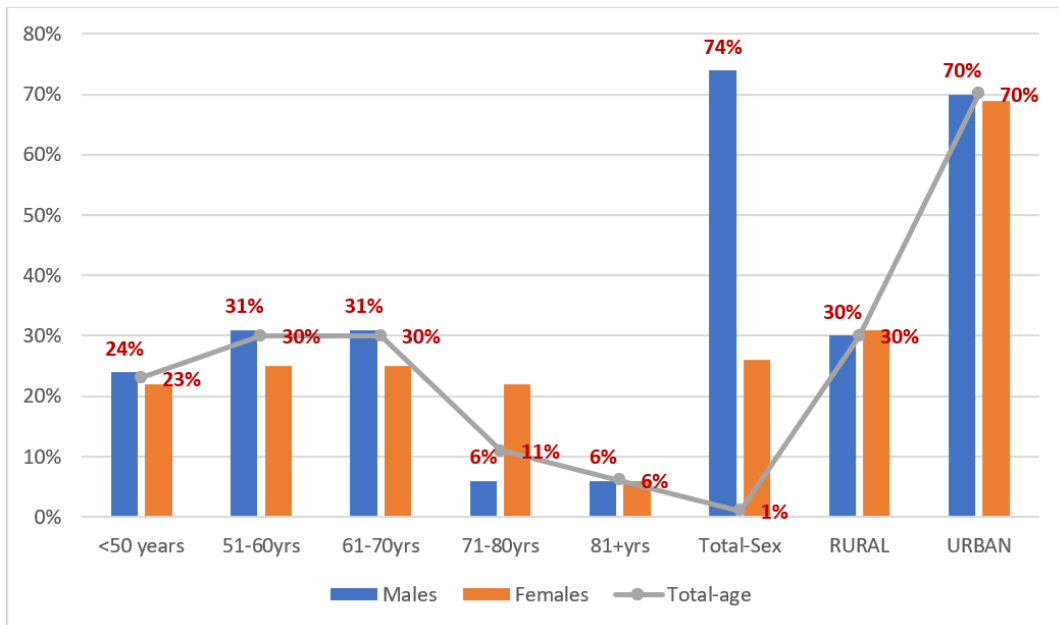
Figure 1: Demographical characteristics of patients

The most common STEMI subtype was anterior, followed by anteroseptal, inferior, anterolateral, septal, and inferolateral, accounting for 46/141(32.6%), 32/141(22.7%), 29/141(20.6%), 26/141(18.4%), 7/141(5%), and 1/141(0.7%), respectively.
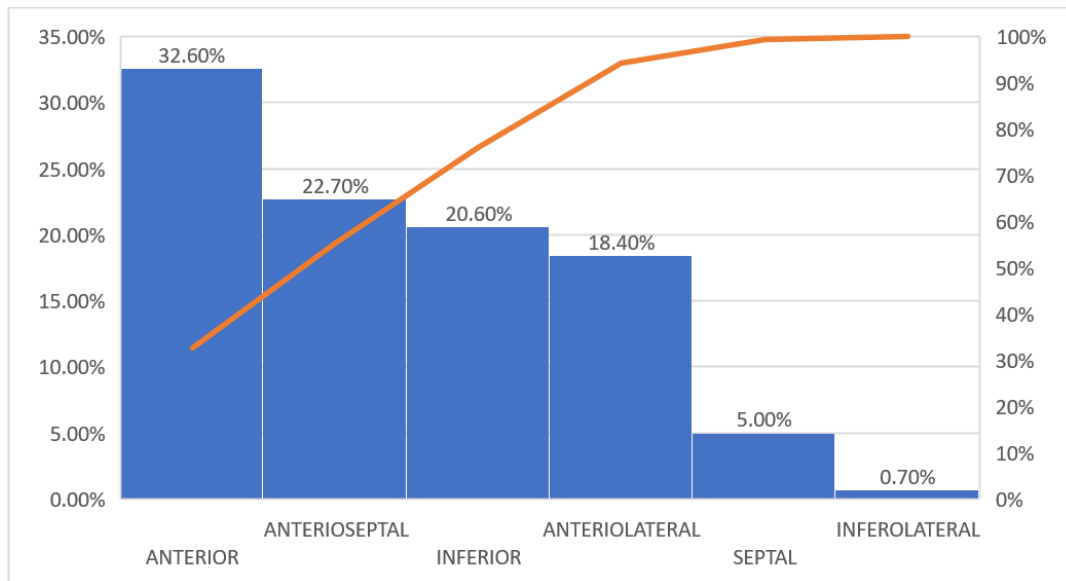
Figure 2: MI types

The majority of men presented with anterior type, followed by anteroseptal and inferior, accounting for 33/105 (31%), 25/105 (24%), and 22/105 (21%), respectively. As indicated in Table 2, Fig 3, the majority of females presented with anterior representing 13/36 (%36). Rural patients were seen with anterior, followed by anterolateral, representing 15/43 (34%) and 12/43 (28%), respectively, as shown in Table 2 Fig. 3.

Table 2: Pattern of MI by residence, and age

	ANTERIOR	INFERIOR	ANTERIOSEPTAL	ANTERIOLATERAL	SEPTAL	inferolateral	Total
Males	33	22	25	20	4	1	105
Females	13	7	7	6	3	0	36
RURAL	15	7	6	12	2	1	43
URBAN	31	22	26	14	5	0	98
<50 years	10	6	12	3	1	1	33
51-60	15	11	7	6	3	0	42
61-70	11	9	10	10	2	0	42
71-80	6	2	1	5	1	0	15
81+	4	1	2	2	0	0	9
Total	46	29	32	26	7	1	141

DISCUSSION

Considering the limited availability of cardiovascular disease literature originating from Sudan, it is noteworthy to highlight that this report represents the inaugural publication from the Kordofan state, situated in the central region of Sudan.

The empirical observations derived from the current investigation have revealed a higher incidence of STEMI among the male demographic characterized by a comparably older age. These findings are congruent with the global reports [7, 8]. A comparable study looked at 315 Sudanese, with males accounting for 59.3% of the sample, with 25 (13.5%) of them having heart failure (HF), and females accounting for 40.7%, with 9.9% having HF, showing an overall prevalence of 12.06% for HF [9].

Based on the findings of the inquiry, it has been determined that a notable proportion of patients,

specifically 30.5%, hailed from rural localities, whereas the majority, amounting to 69.5%, originated from metropolitan areas. Generally, individuals residing in rural areas who experience STEMI tend to exhibit poorer clinical outcomes compared to their urban counterparts. In a study involving a substantial number of patients with STEMI from US hospitals participating in the National Cardiovascular Data Registry Chest Pain-MI Registry, it was observed that rural patients experienced delays in reperfusion, had lower rates of receiving primary percutaneous coronary intervention (PPCI) or meeting the recommended time for reperfusion, and had higher rates of receiving fibrinolytic therapy [10]. In a study from Sudan, the prescribing patterns of optimal medical therapy (OMT) were evaluated, specifically focusing on the administration of five-medication regimens for secondary prevention subsequent to acute coronary syndrome (ACS). STEMI was detected in 58.4% of patients. Patients used 99.7% aspirin, 99.5% statins, 97% clopidogrel, 96.8% dual antiplatelet treatment, 70.4%

BBs, and 57.9% ACEIs/ARBs. OMT for secondary prevention was prescribed to 267 (45.2%) ACS patients at discharge [11].

The differentiation among various subtypes of ACS serves as a crucial factor in facilitating the prompt identification and subsequent management of acute cases. The growth of medi-legal litigation frequently arises as a result of inadequate diagnosis and management of acute coronary syndrome (ACS) [12]. In this study, the anterior subtype of STEMI was the most prevalent, followed by the anteroseptal, inferior, anterolateral, septal, and inferolateral subtypes. Anterior STEMI can be classified according to their location on the heart using electrocardiogram (EKG) findings; those with inferior infarctions have ST-segment elevation in leads V1 to V4, those with anterior infarctions have ST-segment elevation in leads V3 to V6, and those with extensive anterior infarctions have ST-segment elevation in leads V1 to V6 [13].

IN CONCLUSION

The prevalence of STEMI in rural Sudan is significant, particularly with a rising incidence of the anterior type in rural Sudan is significant, particularly with a rising incidence of the anterior type. It is concerning, however, that a majority of patients exhibited delayed presentation in response to their initial chest discomfort, potentially resulting in unfavorable or suboptimal outcomes. Consequently, it is imperative to prioritize health education initiatives pertaining to myocardial infarction (MI) within rural communities.

ACKNOWLEDGEMENT

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