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ORIGINAL ARTICLE

Gender based differences in in-hospital complications in patients with acute coronary syndrome.

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ABSTRACT… Objective: To determine the frequency of in-hospital complications in patients being admitted with acute coronary syndrome and also to compare the prevalence of in-hospital complications between male and female patients presenting with acute coronary syndrome. **Study Design:** Cross-sectional study. **Setting:** Faisalabad Institute of Cardiology, Faisalabad. **Period:** 01-01-2022 to 30-06-2022. **Methods:** objective of the present study was to determine the frequency of in-hospital complications in patients being admitted with acute coronary syndrome and also to compare the prevalence of in-hospital complications between male and female patients presenting with acute coronary syndrome. **Results:** Among 965 ACS patients (mean age 58.4 ± 11.5 years, range 26–92), most were over 55 years (56.7%), and males constituted 66.6%. STEMI was the most prevalent ACS type (58.1%), followed by NSTEMI (35.9%) and unstable angina (6.0%). STEMI was more common in males (60.7%) compared to females (53.1%), while NSTEMI was more prevalent in females (41.9% vs. 32.8%). **Conclusion:** This study highlights significant patterns in the presentation, complications, and gender differences among patients with acute coronary syndrome (ACS). These findings underscore the importance of gender-specific approaches in ACS management.

Key words: Acute Coronary Syndrome, Complication, Gender, In-hospital.

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INTRODUCTION

Ischemic heart disease has become the major cause of disease burden worldwide and increased incidences has been reported in low- and middle-income nations, including Pakistan.[1] Acute coronary syndrome (ACS) is defined by reduced myocardial perfusion, which encompasses unstable angina and myocardial infarction.[2] Delays in diagnosis and treatment are linked to higher morbidity and death.[2]

Gender variances in the presentation and management of acute coronary syndrome (ACS) are well known internationally.[3] Recent advancements in cardiovascular treatment have led to a decrease in cardiovascular death rates. However, some studies suggest gender differences in ACS therapy and outcomes.[4,5] While effective treatments for ACS have been developed, it is unclear how widely these tactics are employed in clinical practice.[6]

Women often live longer than males, and as the prevalence of cardiovascular disease rises with age, it is likely that preventing CVD among older women will be a significant public health concern.[7] There is speculation that increased complications in the hospital in females with acute coronary syndrome, which leads to increased mortality, are caused by their unusual symptoms and the delay in therapy.[8] A research found that in-hospital consequences in individuals presenting with acute coronary syndrome included: Left ventricular failure occurs in 5.7% of men and 9.1% of women. Cardiogenic shock occurred in 2.8% of men and 3.1% of women. Cardiac arrest is 1.7% in males and 1.7% in females.[8]

The impact of gender on mortality in acute coronary syndrome patients is unclear, and there is less data on its significance as an independent predictor of disease progression. Therefore, the objective of the present study was to determine the frequency of in-hospital complications in patients being admitted with acute coronary syndrome and also to compare the prevalence of in-hospital complications between male and female patients presenting with acute coronary syndrome.

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The gender-based difference in complications and mortality will highlights the importance of conducting more local gender-based studies that may provide useful evidence for the diagnosis and management of acute coronary syndrome.

METHODS

This cross-sectional study has been conducted in Faisalabad Institute of Cardiology, Faisalabad for the duration of six months from 01-01-2022 to 30-06-2022. Prior approval was obtained from Institutional Ethical Review Committee (letter no. 25-2019/DME/FIC/FSD, dated November 09, 2019). The sample size for the study was calculated using WHO sample size calculator keeping P=1.7%, Confidence level=95% and absolute precision=1%, the calculated sample size is 645.

All male and female patients presenting with acute coronary syndrome for the first time were recruited in the study. However, patients with prior LV dysfunction, history of any kind of arrhythmia before this hospital admission, and history of any structural heart disease were excluded from the study.

Non probability consecutive sampling was applied to recruit patients. After taking approval from hospital ethical committee, patients coming through the emergency fulfilling the inclusion criteria were enrolled and informed consent was taken. Patients were treated as per protocol of acute coronary syndrome by primary PCI/fibrinolysis or anticoagulation. Standard management was done. Complications at the time of presentation or during the hospital stay were assessed, managed and documented. All the information was collected on a specially designed proforma.

Data was entered and analyzed with the help of SPSS version 21.0. Frequency and percentages was calculated for qualitative variable. A p-value of <0.05 has been implied as significant.

RESULTS

Total 965 patients were included. The mean age of the patients was 58.4 + 11.5 years with minimum and maximum value of 26.0 to 92.0. Majority of the patients being over 55 years old 56.7% compared 43.3% were from age between 25 to 55 years. There were 66.6% male and 33.4% female. Among the type of acute coronary syndrome, (ACS), STEMI was the most common affecting 58.1% of patients, followed by NSTEMI as 35.9% and unstable angina at only 6.0% (Table-I).

TABLE-I

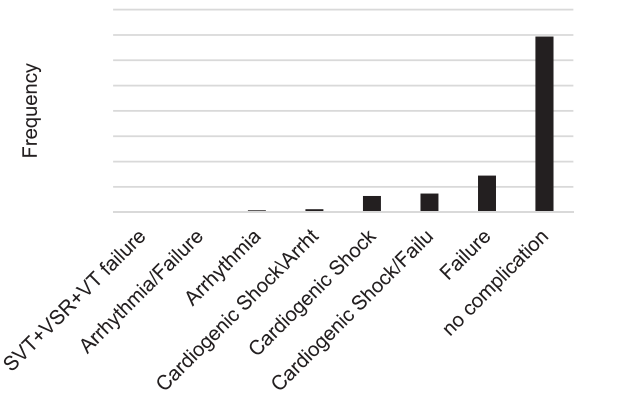
Descriptive of age, gender and type of ACS

Age Mean (+ SD)	58.4 + 11.5
Age Group	**N (%)**
25 to 55 years	418(43.3%)
>55 year	547(56.7%)
Gender	
Male	643(66.6%)
Female	322(33.4%)
Type of ACS	
STEMI	561(58.1%)
NSTEMI	346(35.9%)
Unstable Angina	58(6.0%)

Out of 965 patients, the majority 69.3% had no complications. Among those with complications, the most frequent was failure, occurring in 14.4% of cases, followed by cardiogenic shock/failure 7.4% and cardiogenic shock alone 6.4%. Less common complications included cardiogenic shock with arrhythmia 1.1%, arrhythmia alone 0.7%, and arrhythmia with failure 0.3%. Rare complications such as cardiogenic shock with VT, SVT, VSR, and VT failure each accounted for only 0.1% of cases (Figure-1).

FIGURE-I

Complication



Among patients aged 25 to 55 years, males had a slightly higher frequency 43.7% compared to female 42.5%, while in >55 years' age group, females were most common (57.5%) compared to males 56.3%. Although the difference between genders was not statistically significant (p=0.73). As type of acute coronary syndrome, STEMI was significantly more common in male 60.7% than in females 53.1% (p=0.01). NSTEMI was observed in a higher percentage of females 41.9% compared to males 32.8%. Unstable angina occurred slightly more common in males 6.5% than in females 5.0%. Overall, Males show a higher frequency in STEMI and unstable angina, while females have higher percentage in NSTEMI and older age group (Table-II).

Among 965 patients, males 70.9% had a higher frequency of no complications compared to females 66.1%. Failure was more common in females 15.8% than males 13.7%. Cardiogenic shock combined with failure occurred more frequently in females 9.3% compared to males 6.4%. Arrhythmia was slightly more common in males 0.9% than in females 0.3% and the remaining one as shown in table: 3 Overall, males experienced more cases with no complications, while females had slightly high number of severe complications like failure and cardiogenic shock with failure. There was no significant relationship of complications between gender (P<0.05) (Table-III).

DISCUSSION

This cross-sectional study was conducted to determine the frequency of in-hospital complications in patients being admitted with acute coronary syndrome and also to compare the prevalence of in-hospital complications between male and female patients presenting with acute coronary syndrome. Among 965 ACS patients (mean age 58.4 ± 11.5 years, range 26–92), most were over 55 years (56.7%), and males constituted 66.6%. STEMI was the most prevalent ACS type (58.1%), followed by NSTEMI (35.9%) and unstable angina (6.0%).

TABLE-II

Comparison of age group and type of ACS with gender

	Group	Male	Female	Total	P-Value
Age group	25 to 55	281(43.7%)	137(42.5%)	418(43.3%)	0.11(0.73)
	>55	362(56.3%)	185(57.5%)	547(56.7%)	
Type of ACS	STEMI	390(60.7%)	171(53.1%)	561(58.1%)	7.94(0.01)
	NSTEMI	211(32.8%)	135(41.9%)	346(35.9%)	
	Unstable Angia	42(6.5%)	16(5.0%)	58(6.0%)	

TABLE-III

Comparison of complication with gender

Complication	Gender		Total	P value
	Male	Female		
Arrhythmia	6(0.9%)	1(0.3%)	7(0.7%)	10.11(0.43)
Arrhythmia/Failure	1(0.2%)	2(0.6%)	3(0.3%)	
Cardiogenic Shock	41(6.4%)	20(6.2%)	61(6.3%)	
Cardiogenic Shock VT	1(0.2%)	0	1(0.1%)	
Cardiogenic Shock/Failu	41(6.4%)	30(9.3%)	71(7.4%)	
Cardiogenic Shock\Arrht	7(1.1%)	4(1.2%)	11(1.1%)	
Failure	88(13.7%)	51(15.8%)	139(14.4%)	
No complication	456(70.9%)	213(66.1%)	669(69.3%)	
SVT	1(0.2%)	0	1(0.1%)	
VSR	0	1(0.3%)	1(0.1%)	
VT Failure	1(0.2%)	0	1(0.1%)	

Complications were absent in 69.3% of patients. Heart Failure was the most frequent complication (14.4%), followed by cardiogenic shock with failure (7.4%) and cardiogenic shock alone (6.4%). STEMI was more common in males (60.7%) compared to females (53.1%), while NSTEMI was more prevalent in females (41.9% vs. 32.8%). Males had a higher frequency of no complications (70.9%), whereas females showed a slightly higher incidence of severe complications like failure (15.8% vs. 13.7%) and cardiogenic shock with failure (9.3% vs. 6.4%). Although there were gender differences in ACS types and complication patterns, no significant relationship between gender and complications was observed ($p<0.05$).

STEMI patients were much more likely to be male.[9] Patients with NSTEMI were more likely to be female, with a little significant difference in the prevalence of unstable angina.[10] In our study Females who were suffering from ischamic heart disease were older than males and had more comorbidities. A USA study of 78,254 AMI patients (2001–2006) found women were older and had more comorbidities. More recent USA data from 413,500 STEMI hospitalizations confirmed higher comorbidity rates in women, except for smoking and prior sternotomy. Studies from Switzerland, Germany, and the Netherlands also exhibited that ACS women were significantly older and possessed greater rates of hypertension and diabetes.[11,12,13,14,15]

Evidence-based medicine showed no significant difference in medication use between the two groups during admission. In-hospital treatment such as aspirin, ACE inhibitors, lipid-lowering agents, LMWH and PCI were consistent between female and male patients with ACS.[16] Female NSTE-ACS patients had a greater incidence of in-hospital congestive heart failure, leading to reduced administration of βblockers compared to male patients.[17]

Hao et al. found that women hospitalized for ACS had a higher unadjusted in-hospital death rate than males.[8] This difference was especially significant in patients with STEMI.[8] After adjusting for age and other clinical factors, the risk of death in women with STEMI was significantly reduced. In-hospital death rates were greater among women aged 55-64, 65-74, and ≥75 years compared to males. After adjusting for clinical profiles and acute therapies, there were no significant interactions between age categories and sex in terms of in-hospital mortality risk. Inconsistent results in subgroup and sex-age interaction analyses may be due to varying in-hospital mortality rates, age categories, and variables utilized in various research.[8]

Other variables, such as delayed hospital presentation and acute therapies, may also contribute to the reported gender disparity in STEMI fatality rates. A research found that women arrived at hospitals for STEMI treatment 1.4 hours later than males.[8] Delays in presenting with STEMI have been linked to higher risk of mortality and recurring episodes.[18] Female patients may take longer to make it to the hospital than males due to symptom misunderstanding, lack of knowledge, and impediments to treatment access.[19] Women received less acute therapies, such as DAPT and reperfusion therapy, than males. Disparities in acute care led to the higher death rate among males compared to women. A meta-analysis indicated that women's higher death rates during primary PCI were likely due to differences in baseline cardiovascular risk factors and clinical characteristics.[20]

Although, this study also has some limitations. Firstly, this is a single center study which may limit the generalizability of the findings. The patient population may not fully represent the diverse demographics and clinical characteristics seen in different regions or healthcare settings, potentially affecting the applicability of the results to broader populations. Secondly, the study did not provide long-term follow-up data to examine the evolution of complications or outcomes, which may have provided further information about the prognosis and effectiveness of therapies for ACS patients.

CONCLUSION

This study identifies significant trends in presentation, complications, and gender differences in individuals with acute coronary syndrome (ACS). STEMI appeared as the most prevalent kind, mostly affecting men, whereas NSTEMI was more common in women. The majority of patients reported no issues, however females had a greater rate of

serious consequences such as cardiogenic shock with failure. These findings highlight the necessity of gender-specific methods in ACS management. The study also emphasizes the need of early diagnosis and personalized therapy to reduce consequences. Further studies with varied demographics and longitudinal follow-ups are needed to better knowledge and outcomes for ACS patients.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Style is a way to say who you are without having to speak.

Unknown

AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Kashif Ijaz:** Manuscript writing.
2	**Abbad Ur Rehman:** Study design, synopsis.
3	**Muhammad Akram Asi:** Data analysis.
4	**Farhan Umair:** Results, references.
5	**Naeem Asghar:** Proof reading.
6	**Hafiz Rana Faiq Ilyas:** Finalize.