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FREQUENCY OF ERECTILE DYSFUNCTION IN ACUTE CORONARY SYNDROME AND RELATION WITH SEVERITY OF CORONARY VESSEL INVOLVEMENT: A CROSS-SECTIONAL STUDY

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Abstract

OBJECTIVE

To ascertain the relationship between the severity of coronary vessel involvement and the frequency of erectile dysfunction in Acute Coronary Syndrome patients at Chandka Medical College Hospital Larkana.

METHODS

This cross-sectional study was conducted at Chandka Medical College Hospital, Larkana, in collaboration with the National Institute of Cardiovascular Diseases. A total of 185 male patients aged 25–60 years with confirmed acute coronary syndrome were enrolled through consecutive sampling. Erectile dysfunction was assessed using the five-item International Index of Erectile Function (IIEF-5). Data were analysed using SPSS version 22, and associations were determined using the Chi-square test with a significance level of $p \leq 0.05$.

RESULTS:

Among 185 patients with acute coronary syndrome, erectile dysfunction was identified in 31 patients (16.8%). It was significantly associated with age (29.3% in 25–40 years vs. 11% in 41–60 years; p=0.01) and residence (32.4% in rural vs. 13.2% in urban; p=0.01). No significant association was observed with the type of ACS (p=0.34), severity of coronary artery disease (p=0.44), smoking (p=0.48), or previous cardiac events (p=0.20).

CONCLUSION

Erectile dysfunction was present in a subset of patients with acute coronary syndrome, more commonly among younger and rural men, without significant correlation to the angiographic severity of coronary artery disease. Future multicentre longitudinal studies are needed to determine whether erectile dysfunction can reliably predict coronary artery disease progression and outcomes.

INTRODUCTION

Acute coronary syndrome (ACS) represents a spectrum of cardiovascular emergencies that include unstable angina pectoris and myocardial infarction (MI).[1] Clinical manifestations often involve chest pain radiating to the left arm, shoulder, or jaw, accompanied by shortness of breath, palpitations, nausea, vomiting, and excessive perspiration.[2] Each year, over 780,000 episodes of ACS are reported worldwide, of which approximately 40% are myocardial infarction and 60% are unstable angina.[3] Myocardial infarction is further classified as ST-elevation (STEMI) or non-ST-elevation (NSTEMI) based on electrocardiographic findings.[4] Both unstable angina and myocardial infarction share a common pathophysiological mechanism involving atherosclerotic plaque rupture, thrombus formation, and myocardial ischemia.[5] Atherosclerosis causes progressive narrowing of the arterial lumen through plaque accumulation and thrombosis, which eventually leads to coronary artery disease (CAD) and ACS.[6]

Despite significant therapeutic advances in interventional cardiology and pharmacological management, ACS continues to pose a global health burden, contributing to high morbidity and mortality rates.[7–12] Beyond its cardiovascular consequences, ACS shares several biological and risk factor pathways with erectile dysfunction (ED). ED is defined as the persistent inability to achieve or maintain an erection sufficient for satisfactory sexual performance and is recognized as both a vascular disorder and a marker of endothelial dysfunction, paralleling the pathophysiological changes seen in CAD.[13,14] Both conditions share common risk factors, including increasing age, diabetes mellitus, hypertension, dyslipidemia, obesity, smoking, sedentary lifestyle, and depression.[15,16]

The physiological mechanism of erection involves complex neurovascular processes regulated by the balance between sympathetic and parasympathetic activity. Under non-aroused conditions, sympathetic tone maintains the penis in a flaccid state. During sexual stimulation, parasympathetic activation leads to the release of nitric oxide (NO) from endothelial cells, causing smooth muscle relaxation and increased blood flow to the corpora cavernosa through the cyclic guanosine monophosphate (cGMP) pathway, resulting in erection. Impairment in this pathway due to endothelial dysfunction reduces NO bioavailability and compromises erectile function.[16]

Erectile dysfunction has been widely recognized as an independent risk factor for cardiovascular disease and an early manifestation of systemic atherosclerosis. For men with either incident or prevalent ED, the hazard ratio for cardiovascular events has been reported to be 1.45, indicating a significantly higher risk compared with men without ED.[13] Previous studies have reported a high prevalence of ED among patients with coronary artery disease, ranging from 42% to 62%, particularly in those with multivessel involvement.[14,15] The association between ED and CAD is further explained by the artery size hypothesis, which suggests that smaller arteries, such as the penile arteries, are affected by atherosclerosis earlier than larger coronary vessels.[17] Consequently, ED may appear several years before the onset of symptomatic CAD, serving as an early warning sign of underlying vascular disease.

The present study aims to determine the prevalence of erectile dysfunction among patients with acute coronary syndrome and to evaluate its association with the number of affected coronary vessels. Understanding this relationship may help identify ED as a potential early clinical marker of more extensive coronary disease and improve cardiovascular risk assessment and comprehensive management in patients with ACS.

MATERIAL AND METHODS

A cross-sectional study was conducted to evaluate the relationship between the severity of coronary vessel involvement and the frequency of erectile dysfunction (ED) among patients with acute coronary syndrome (ACS) at Chandka Medical College Hospital (CMCH), Larkana. The study was carried out in the Department of Medicine, CMCH, in collaboration with the National Institute of Cardiovascular Diseases (NICVD), Larkana, following approval of the synopsis and

ethical clearance from the institutional review committees.

A total of **185 patients** were enrolled using a non-probability consecutive sampling technique. Male patients aged 25–60 years with a confirmed diagnosis of ACS on coronary angiography who provided written informed consent were included. Patients were excluded if they had a history of prostate or penile surgery, penile deformity, were on beta-blockers, or had a known history of malignancy, chronic hematologic disorders, thyroid disease, mental illness, diabetes mellitus, hypertension, or thromboembolic events.

After obtaining ethical approval, informed consent was obtained in the local language (Urdu or Sindhi). Data was collected in a private setting to ensure confidentiality. Each participant was informed about the study objectives and the concept of erectile dysfunction. Literate participants completed the questionnaire themselves, while the researcher assisted those with limited literacy. Erectile dysfunction was assessed using the five-item International Index of Erectile Function (IIEF-5), translated into Urdu and Sindhi, under the supervision of a consultant physician with over five years of experience. All information was recorded in a predesigned proforma.

Data was analyzed using SPSS 26. Quantitative variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The **Chi-square test** was applied to assess associations between erectile dysfunction and categorical study variables and a p-value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 185 male patients diagnosed with acute coronary syndrome (ACS) were included in the study. The majority of participants were between 41 and 60 years of age (68.6%), while 31.4% were aged 25 to 40 years. Most patients belonged to urban areas (81.6%), and a smaller proportion (18.4%) were from rural regions. Among the clinical presentations, ST-elevation myocardial infarction (STEMI) was the most frequent diagnosis (44.9%), followed by non–ST-elevation myocardial infarction (NSTEMI) in 34.1% and unstable angina in 21.1%. Coronary angiographic findings revealed that three-vessel disease (3VD) was most common (55.1%), whereas two-vessel and single-vessel disease were observed in 30.3% and 14.6% of cases, respectively **Table 1**.

Lifestyle and clinical patterns showed considerable variation across participants. Current smoking was reported by 37.8% of patients, whereas 62.2% were non-smokers. A previous cardiac event was recorded in 20.5% of participants, while 79.5% had no prior history of myocardial infarction. Socioeconomic assessment indicated that nearly half of the patients (51.4%) reported a monthly family income of ≤50,000 PKR, while 48.6% earned more. Employment status showed a similar imbalance, with 65.9% of patients being unemployed compared to 34.1% who were employed.

Educational attainment also varied: 49.7% had higher education, 35.1% had completed secondary education, 9.7% had primary education, and 5.4% were illiterate. The overall prevalence of erectile dysfunction (ED) among patients with ACS was 16.8% (31 participants), while 83.2% (154 participants) did not report symptoms of ED **Table 1.**

Table 1: Distribution of baseline characteristics among the study participants.

Variables	Frequency (%)
Age	
25 to 40 years	58 (31.4)
41 to 60 years	127 (68.6)
Residence status	
Urban	151 (81.6)
Rural	34 (18.4)

Type of ACS	
NSTEMI	63 (34.1)
STEMI	83 (44.9)
Unstable Angina	39 (21.1)
Severity of CAD	
1VD	27 (14.6)
2VD	56 (30.3)
3VD	102 (55.1)
Smoking status	
Yes	70 (37.8)
No	115 (62.2)
History of prior attack	
Yes	38 (20.5)
No	147 (79.5)
Family monthly income	
≤50000	95 (51.4)
>50000	90 (48.6)
Occupational status	
Employed	63 (34.1)
Unemployed	122 (65.9)
Educational status	
Illiterate	10 (5.4)
Primary	18 (9.7)
Secondary	65 (35.1)
Higher	92 (49.7)
Erectile dysfunction	
Yes	31 (16.8)
No	154 (83.2)
Total	185 (100)

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Analysis of patient characteristics according to erectile dysfunction status demonstrated significant associations with age and residence. Erectile dysfunction was more frequent among younger patients aged 25–40 years (29.3%) compared with those aged 41–60 years (11%) (p=0.01).

Likewise, ED was more prevalent among rural residents (32.4%) than urban residents (13.2%) (p=0.01). These findings indicate a notable sociodemographic trend, with younger and rural individuals being more likely to experience erectile dysfunction **Table 2**.

Table 2: Distribution of patient characteristics according to the Erectile dysfunction.

Variables	Erectile dysfunction Yes n (%)	Erectile dysfunction No n (%)	P value
Age 25 to 40 years 41 to 60 years	17 (29.3) 14 (11)	41 (70.7) 113 (89)	0.01
Residence status Urban Rural	20 (13.2) 11 (32.4)	131 (86.8) 23 (67.6)	0.01

Type of ACS NSTEMI STEMI Unstable Angina	 14 (22.2) 11 (13.3) 06 (15.4)	 49 (77.8) 72 (86.7) 33 (84.6)	0.34
Severity of CAD 1VD 2VD 3VD	 05 (18.5) 12 (21.4) 14 (13.7)	 22 (81.5) 44 (78.6) 88 (86.3)	0.44
Smoking status Yes No	 10 (14.3) 21 (18.3)	 60 (85.7) 94 (81.7)	0.48
History of prior attack Yes No	 09 (23.7) 22 (15)	 29 (76.3) 125 (85)	0.20
Family monthly income ≤50000 >50000	 17 (17.9) 14 (15.6)	 78 (82.1) 76 (84.4)	0.67
Occupational status Employed Unemployed	 11 (17.5) 20 (16.4)	 52 (82.5) 102 (83.6)	0.85
Educational status Illiterate Primary Secondary Higher	 01 (10) 02 (11.1) 08 (12.3) 20 (21.7)	 09 (90) 16 (88.9) 57 (87.7) 72 (78.3)	0.34

No statistically significant associations were found between erectile dysfunction and other clinical or socioeconomic variables. The type of ACS (p=0.34) and the severity of coronary artery disease (p=0.44) showed no meaningful relationship with ED. Similarly, smoking status (p=0.48), previous cardiac events (p=0.20), family income (p=0.67), employment status (p=0.85), and educational level (p=0.34) were not significantly associated with erectile dysfunction. Overall, the occurrence of ED in patients with ACS appeared to be influenced primarily by age and residence rather than by the angiographic severity of coronary artery disease or conventional cardiovascular risk factors **Table 2**.

DISCUSSION

This study explored the prevalence of erectile dysfunction (ED) in patients with acute coronary syndrome (ACS) and examined how it relates to demographic and clinical characteristics. The findings showed that 16.8% of participants experienced ED, with higher rates among younger men and those living in rural areas. No significant association was observed between ED and the angiographic severity of coronary artery disease (CAD), type of ACS, or other traditional cardiovascular risk factors.

The overall prevalence of ED in this cohort was lower than that reported in many international studies. The COBRA trial, for example, found that ED was highly prevalent among patients with CAD, particularly in those with multivessel or left main coronary involvement compared with single-vessel disease.[18] Canat et al. also reported a clear association between the number of affected vessels and the severity of ED, noting that patients with triple-vessel disease had the most severe dysfunction.[19] Likewise, Al-Daydamony and colleagues identified ED severity as an independent predictor of left main and triple-vessel

disease in ACS patients.[20] The lack of a similar relationship in the present study may reflect cultural and contextual factors that influence symptom reporting, rather than a true absence of biological association.

One interesting finding was that ED was more frequent among younger participants. This contrasts with previous research showing that the risk of ED typically increases with age.[19] In this study, psychosocial and socioeconomic factors may have played a stronger role. Younger men in rural areas often face higher levels of stress, unemployment, and limited access to healthcare—all of which can negatively affect sexual health independent of CAD severity. This highlights the importance of viewing ED not only as a vascular condition but also as a reflection of social, psychological, and lifestyle influences.

The findings are consistent with a growing body of research suggesting that ED is not solely a localized vascular problem but a manifestation of broader systemic processes. Vlachopoulos et al. proposed that metabolic syndrome and inflammation represent shared mechanisms underlying both ED and CAD.[21] The artery size hypothesis offers additional insight, suggesting that smaller arteries—such as the penile arteries—are affected by atherosclerosis earlier than larger coronary vessels.[22] This theory explains why ED often precedes chronic or stable CAD but may not be as prominent in acute events, where plaque rupture is the main mechanism.

Overall, these results indicate that ED in patients with ACS should be interpreted with caution and within a broader context. Although many studies have identified ED as an early marker of significant or subclinical CAD,[18,22] the present findings suggest that its predictive value can vary depending on demographic and clinical context. Routine evaluation of ED remains important in cardiovascular risk assessment, but its absence should not be considered reassuring, especially in populations where stigma or embarrassment may limit open discussion about sexual health.

Several limitations should be considered when interpreting these results. Because of the cross-sectional study design, causality cannot be inferred; it remains unclear whether ED developed before the onset of CAD or alongside it. The study was conducted in a single tertiary care hospital in Larkana, which may limit the generalizability of findings. Patients at Chandka Medical College Hospital and the National Institute of Cardiovascular Diseases may differ from those in other settings in terms of socioeconomic background, health awareness, and access to care.

The sensitive nature of ED may also have influenced the results. Despite using a validated questionnaire, underreporting due to embarrassment or social stigma is possible, which could have led to an underestimation of the true prevalence. Furthermore, several factors known to influence ED—such as depression, anxiety, hormonal changes, and medication use—were not assessed and could have acted as unmeasured confounders.

Finally, the sample size and study duration were relatively modest. Although the findings identify important trends, larger, multicentre, and longitudinal studies are needed to confirm whether ED can reliably serve as an early indicator of CAD severity or progression in patients with ACS.

CONCLUSION

Erectile dysfunction was present in a subset of patients with acute coronary syndrome, more commonly among younger and rural men, without significant correlation to the angiographic severity of coronary artery disease. Future multicentre longitudinal studies are needed to determine whether erectile dysfunction can reliably predict coronary artery disease progression and outcomes.

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