

Frequency of Comorbidities in Patients Presenting with Acute Coronary Syndrome (ACS)

Comorbidities in Patients Presenting with Acute Coronary Syndrome

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ABSTRACT

Objective: The main objective of the study is to find the frequency of comorbidities in patients presenting with acute coronary syndrome.

Study Design: This retrospective study

Place and Duration of Study: This study was conducted at the Department of Cardiology, Gajju Khan Medical College, Swabi from June 2022 to June 2023.

Methods: Data was collected from 320 acute coronary syndrome patients. Demographic and clinical data were extracted from electronic medical records, including age, gender, past medical history, presenting symptoms, laboratory results, electrocardiogram findings, echocardiography reports, and comorbidities.

Results: Data were collected from 320 patients from both genders. Mean age of the patients was 58.9 ± 8.5 years, and there were 65% male and 35% female patients. The most common presenting symptom was chest pain, reported by 85% of patients, followed by shortness of breath (60%) and fatigue (40%). The prevalence of comorbidities among the study population was as, hypertension (70%), dyslipidemia (60%), diabetes mellitus (50%), obesity (40%), chronic kidney disease (25%), and heart failure (20%). Combinations of comorbidities were also observed, with the most common being hypertension and dyslipidemia (50%), followed by hypertension and diabetes mellitus (40%), and dyslipidemia and diabetes mellitus (30%).

Conclusion: It is concluded that comorbidities play a substantial role in the presentation, management, and outcomes of acute coronary syndrome. High prevalence rates and distinct patterns of comorbidity combinations underscore the importance of comprehensive risk assessment and personalized treatment approaches for acute coronary syndrome patients.

Key Words: ACS, Comorbidities, Risk factors, Patients, Treatment

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INTRODUCTION

Acute coronary syndrome (ACS) represents a spectrum of cardiovascular conditions characterized by sudden, reduced blood flow to the heart, often due to coronary artery disease^[1]. Although ACS continues to be a major cause of morbidity and mortality globally, the presentation and outcomes are often modulated by the presence of other medical conditions. This article defines co-morbidities as the presence of two or more diseases in a patient, where co-morbidity in patients with ACS is identified to worsen the severity of the disease, the choice of treatment, and the prognosis^[2].

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These conditions may range from hypertension diabetes mellitus dyslipidemia obesity chronic kidney disease and heart failure. These conditions are frequently concurrent with ACS and make the disease's clinical course more challenging, raising morbidity and mortality rates, and treatment costs^[3].

CVD continues to be the leading cause of death worldwide and contributes 31% to total deaths. Due to increased life expectancy, morbidity and mortality rates among world population has high tendency for comorbid illness especially those related to cardiovascular diseases of which is ACS^[4]. The presence of more than one disease or condition at the same time, known as comorbidity, translates to high risk for ACS patients as well as complicates treatment. Moreover, the proportion of patients with comorbidities increases, which is also associated with higher mortality and future cardiovascular events in patients with ACS, which emphasize the difficulty of clinical management of such patients^[5].

ACS patients usually present with one or more comorbid conditions; past MI, DM, CPD, CLD, CKD, peripheral vascular disease, and stroke or TIA^[6]. Nonetheless, current clinical protocols for CHD were

developed for treatment of a single chronic disease and its comorbidity, and could be inapt in managing CHD in multimorbidity. Furthermore, patients with the multiple comorbidities are frequently excluded from the compounds of the RCT and therefore the translation is often weak of the investigational findings to the realities of the clinical environment^[7].

Some of the demographic and clinical factors relating to comorbid conditions among ACS patients have been established from previous research^[8]. Furthermore, the results showed that patients with more comorbidities according to their CCI scores reported fewer typical chest pain and dyspnea symptoms. Along the same line, Chen et. al., In a study on 2972 American patients admitted with acute MI noted cardiovascular and non-cardiovascular co-morbidities. Hypertension was the most common cardiac co-morbidity (75%) and chronic kidney disease was the most common non-cardiac comorbidity (22%). Of the patients 8% had a history of multiple coexisting illnesses; these patients were older, women, unmarried, and presented with non-ST elevation MIs.

METHODS

This retrospective study was conducted at Department of Cardiology, Gajju Khan Medical College, Swabi from June 2022 to June 2023. Data was collected from 320 ACS patients.

Inclusion criteria:

- Patients aged 18 years or older.
- Patients with acute chest pain symptoms, and acute coronary syndrome at the initial assessment, with subsequent confirmation of acute coronary syndrome by clinical presentation.

Exclusion criteria:

- Patients with a diagnosis of chronic stable angina or other non-ACS cardiac conditions.
- Patients with incomplete medical records or missing data on key variables, such as comorbidities or laboratory results.

Data Collection: Details obtained from EMRs included patients’ demographics such as age, sex, medical history, first complaint, biochemistry, ECG results, echocardiography, and the presence of comorbidities. Comorbidities of interest included hypertension, diabetes mellitus, dyslipidemia, obesity, chronic kidney disease, and heart failure. Information on age, gender, past medical history, presenting symptoms, laboratory results, electrocardiogram findings, echocardiography reports, and comorbidities was obtained. The frequency of each comorbidity among ACS patients was calculated, along with the prevalence rates expressed as percentages.

Statistical Analysis: Data were collected and analyzed using SPSS v29.0 A preliminary data analysis was done where frequency tables and descriptive statistics were used to look at quantitative Variables such as age,

gender and time taken to seek treatment among the study population.

RESULTS

Data were collected from 320 patients from both genders. Mean age of the patients was 58.9±8.5 years, and there were 65% male and 35% female patients. The most common presenting symptom was chest pain, reported by 85% of patients, followed by shortness of breath (60%) and fatigue (40%). Electrocardiogram findings indicated that 40% of patients had ST-segment elevation, while 30% exhibited non-ST-segment elevation.

Table No. 1: Demographic data of patients

Characteristic	Value
Total Patients	320
Mean Age (years)	58.9±8.5
Gender	
Male	65%
Female	35%
Presenting Symptoms	
Chest Pain	85%
Shortness of Breath	60%
Fatigue	40%
Electrocardiogram Findings	
ST-Segment Elevation	40%
Non-ST-Segment Elevation	30%

Table No. 2: Prevalence and pattern of comorbidities in acute coronary syndrome patients

Comorbidity	Prevalence (%)
Hypertension	70%
Dyslipidemia	60%
Diabetes Mellitus	50%
Obesity	40%
Chronic Kidney Disease	25%
Heart Failure	20%
Comorbidity Combination	
Hypertension + Dyslipidemia	50%
Hypertension + Diabetes Mellitus	40%
Dyslipidemia + Diabetes Mellitus	30%
Dyslipidemia + Obesity	25%
Hypertension + Chronic Kidney Disease	20%
Diabetes Mellitus + Chronic Kidney Disease	15%

The prevalence of comorbidities among the study population was as, hypertension (70%), dyslipidemia (60%), diabetes mellitus (50%), obesity (40%), chronic kidney disease (25%), and heart failure (20%). Combinations of comorbidities were also observed, with the most common being hypertension and dyslipidemia (50%), followed by hypertension and diabetes mellitus (40%), and dyslipidemia and diabetes mellitus (30%). Other combinations included

dyslipidemia and obesity (25%), hypertension and chronic kidney disease (20%), and diabetes mellitus and chronic kidney disease (15%).

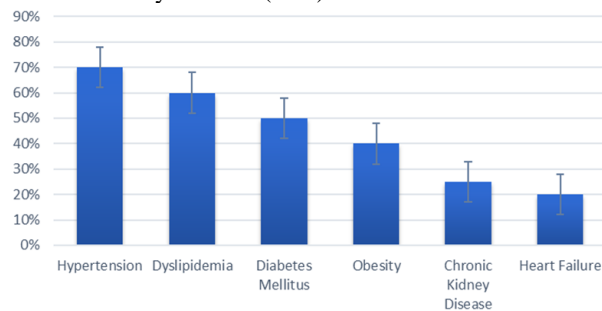


Figure No. 1: Prevalence of Comorbidity (%)

The treatment modalities utilized in the study population were as follows: coronary angiography (80%), percutaneous coronary intervention (PCI) (60%), and coronary artery bypass grafting (CABG) (20%). Pharmacotherapy was also administered, with high rates of usage observed for antiplatelet agents (95%), statins (90%), beta-blockers (80%), and ACE inhibitors or ARBs (70%).

Table No. 3: Treatment and management of comorbidities in acute coronary syndrome patients

Treatment	Percentage
Coronary Angiography	80%
PCI	60%
CABG	20%
Pharmacotherapy	
Antiplatelet Agents	95%
Statins	90%
Beta-Blockers	80%
ACEIs or ARBs	70%
Diuretics	30%

Table No. 4: Correlation between different variables

Variable 1	Variable 2	Correlation Coefficient	p-value
Age (years)	Hypertension	0.25	<0.05
Diabetes Mellitus	Dyslipidemia	0.30	<0.01
Chronic Kidney Disease	Heart Failure	0.15	<0.05
Hypertension	Percutaneous Coronary Intervention (PCI)	-0.20	<0.01
Diabetes Mellitus	In-Hospital Mortality	0.35	<0.001

The correlation analysis revealed significant associations between several variables. Age showed a positive correlation with hypertension ($r = 0.25$, $p < 0.05$), indicating that older individuals were more likely to have hypertension. Similarly, diabetes mellitus was positively correlated with dyslipidemia ($r = 0.30$, $p <$

0.01), suggesting a higher prevalence of dyslipidemia among diabetic patients. Chronic kidney disease showed a positive correlation with heart failure ($r = 0.15$, $p < 0.05$), indicating a relationship between these two conditions.

DISCUSSION

We observed a high prevalence of comorbidities among patients presenting with acute coronary syndrome (ACS), with hypertension, dyslipidemia, and diabetes mellitus being the most common. These results corroborate prior studies showing how ACS patients bear a substantial cardiovascular disease risk factor burden^[9]. Of note, we also found a different pattern of comorbidity clusters with skewed distribution of some differential comorbidities. It is important to have awareness about such patterns for risk assessment and intervention planning to deal with several comorbidities at the same time^[10]. The complexity of clinical decision making based on the client's multimorbidity and the lack of clear steerage has been linked to lower compliance with medication and worse outcomes among patients diagnosed with acute coronary syndrome (ACS)^[11]. This results in the treatment of multiple comorbidities with underprescribing and undertreatment of medications and standard of care interventions, especially for percutaneous coronary interventions and dual antiplatelet therapy, regarding which the safety and efficacy among such populations remains ambiguous. Thus, patients with ACS and significant comorbidities have significantly poorer in-hospital and one-year prognosis, added to this, high one-year mortality rates^[12].

Several co-morbidities were ascertained to affect the clinical profile and the approach towards ACS. For instance, patients with diabetes mellitus pointed towards more frequent atypical presentations and patients with hypertension were more likely to have STEMI^[13]. Data has shown that about forty percent of patients presented with ACS have one or more other conditions including previous MI, diabetes, chronic lung disorder, chronic kidney disease, peripheral vascular pathology, or cerebrovascular disease. However, current clinical practice guidelines for CHD are primarily focused on the management of single diseases consonant with the treatment of separate chronic illnesses and could not effectively lay down guidelines for the treatment of CHD complicated by coexisting conditions^[14]. In addition, the frequently isolation of patients with MCC in population of RC trials reduces the relevance of the results of research in conditions of everyday clinical practice^[15]. In an other study, researcher has therefore carried out a study using data derived from 19, 496 patients with ACS recorded in the AMIS plus registry. They demonstrated that increased CCI value was connected with age, sex,

hypertension, dyslipidemia, obesity and the history of cigarette smoking, but not with current cigarette smoking. Furthermore, fewer patient’s classical symptoms including chest pain and dyspnea were coded when the CCI score was higher. Another researchers identified both cardiovascular and non-cardiovascular conditions in another study conducted on 2,972 patients with AMI hospitalized in the United States of America^[11]. They noted that hypertensive heart disease was the most common coexisting cardiac disease, which was seen in 75 percent of patients, while chronic kidney disease was the most frequent non cardiac disease seen in 22 percent patients^[16]. Furthermore, compared with patients with one comorbidity, patients with two or more comorbidities were more likely to be older, female, unmarried, with prior MI and STEMI^[17].

CONCLUSION

It is concluded that comorbidities play a substantial role in the presentation, management, and outcomes of acute coronary syndrome (ACS). High prevalence rates and distinct patterns of comorbidity combinations underscore the importance of comprehensive risk assessment and personalized treatment approaches for ACS patients.

Author’s Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Umer Ibrahim Paracha, Ibrahim Shah
Drafting or Revising Critically:	Akhtar Sher, Matiullah Khan, Samiullah Khan
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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REFERENCES

- Burke LA, Rosenfeld AG, Daya MR, Vuckovic KM, Zegre-Hemsey JK, Diaz MF, et al. Impact of comorbidities by age on symptom presentation for suspected acute coronary syndromes in the emergency department. *Eur J Cardiovasc Nurs* 2017;16(6):511–521.
- Zhang, Fangyuan, et al. Prognostic Impact of Comorbidity Measures on Outcomes following Acute Coronary Syndrome: A Systematic Review. *Int J Clin Pract* 2021;75(10): e14345.
- Canivell S, Muller O, Gencer B, Heg D, Klingenberg R, Räber L, et al. Prognosis of cardiovascular and non-cardiovascular

multimorbidity after acute coronary syndrome. *PLoS One* 2018;13(4):e0195174.

- Potts J, Kwok CS, Ensor J, Rashid M, Kadam U, Kinnaird T, et al. Temporal Changes in Co-Morbidity Burden in Patients Having Percutaneous Coronary Intervention and Impact on Prognosis. *Am J Cardiol* 2018;122(5):712-722.
- Yang CC, Fong Y, Lin LC, Que J, Ting WC, Chang CL, Wu HM, et al. The age-adjusted Charlson comorbidity index is a better predictor of survival in operated lung cancer patients than the Charlson and Elixhauser comorbidity indices. *Eur J Cardiothorac Surg* 2018;53(1):235-240.
- Rashid M, Kwok CS, Gale CP, Doherty P, Olier I, Sperrin M, et al. Impact of co-morbid burden on mortality in patients with coronary heart disease, heart failure, and cerebrovascular accident: a systematic review and meta-analysis. *Eur Heart J Qual Care Clin Outcomes* 2017;3(1):20-36.
- Sanchis J, Soler M, Núñez J, Ruiz V, Bonanad C, Formiga F, et al. Comorbidity assessment for mortality risk stratification in elderly patients with acute coronary syndrome. *Eur J Intern Med* 2019;62:48-53.
- Zhang F, Bharadwaj A, Mohamed MO, Ensor J, Peat G, Mamas MA. Impact of Charlson Co-Morbidity Index Score on Management and Outcomes after Acute Coronary Syndrome. *Am J Cardiol* 2020;130:15-23.
- Hautamäki M, Lyytikäinen LP, Mahdiani S, Eskola M, Lehtimäki T, Nikus K, et al. The association between charlson comorbidity index and mortality in acute coronary syndrome - the MADDEC study. *Scand Cardiovasc J* 2020;54(3):146-152.
- Karabağ T, Altuntaş E, Kalaycı B, Şahin B, Somuncu MU, Çakır MO. The relationship of Charlson comorbidity index with stent restenosis and extent of coronary artery disease. *Interv Med Appl Sci* 2018;10(2):70-75.
- Wellejus Albertsen L, Heide-Jørgensen U, Schmidt SAJ, Grey C, Jackson R, Sørensen HT, et al. The DANish Comorbidity Index for Acute Myocardial Infarction (DANCAMI): Development, Validation and Comparison with Existing Comorbidity Indices. *Clin Epidemiol* 2020;12:1299-1311.
- Baechli, Ciril, et al. Association of Comorbidities with Clinical Outcomes in Patients After Acute Myocardial Infarction. *IJC Heart Vasculature* 2020;29:100558.
- Shruthi, D. R., et al. Psychiatric Comorbidities in Acute Coronary Syndromes: Six-month Follow-up Study. *Ind J Psychiatr* 2018;60(1):60-64.
- Burke, Larisa A, et al. Impact of Comorbidities by Age on Symptom Presentation for Suspected Acute Coronary Syndromes in the Emergency Department. *Eur J Cardiovas Nurs : J Working*

- Group Cardiovascular Nurs Eur Soc Cardiol 2017;16:511.
15. Breen K, Finnegan L, Vuckovic K, Fink A, Rosamond W, DeVon HA. Multimorbidity in Patients With Acute Coronary Syndrome Is Associated With Greater Mortality, Higher Readmission Rates, and Increased Length of Stay: A Systematic Review. *J Cardiovasc Nurs* 2020;35(6):E99-E110.
 16. Steen DL, Khan I, Andrade K, Koumas A, Giugliano RP. Event Rates and Risk Factors for Recurrent Cardiovascular Events and Mortality in a Contemporary Post Acute Coronary Syndrome Population Representing 239 234 Patients During 2005 to 2018 in the United States. *J Am Heart Assoc* 2022;11(9):e022198.
 17. Sanchis J, García Acuña JM, Raposeiras S, Barrabés JA, Cordero A, Martínez-Sellés M, et al. Comorbidity burden and revascularization benefit in elderly patients with acute coronary syndrome. *Rev Esp Cardiol (Engl Ed)* 2021;74(9):765-772.