INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

FREQUENCY OF HYPERTRIGLYCERIDEMIA AMONG PATIENTS WITH ACUTE CORONARY SYNDROME PRESENTING AT MARDAN MEDICAL COMPLEX

Original Research

Syed Mahnoor[1]*, Noorul Hadi[2], Syed Aisha[3]
[1]Trainee Medical Officer, Cardiology Department, Mardan Medical Complex, Mardan, Pakistan.
[2]Assistant professor, Cardiology Department, Mardan Medical Complex, Mardan, Pakistan.
[3]Trainee Medical Officer, Medicine Department, Mardan Medical Complex, Mardan, Pakistan.
Corresponding Author: Syed Mahnoor, Trainee Medical Officer, Cardiology Department, Mardan Medical Complex, Mardan, Pakistan, syedamahnoor126@gmail.com
Acknowledgement: We acknowledge the support of the Cardiology Department at Mardan Medical Complex for their assistance in conducting this study.
Submission: 10 February, 2025 Acceptance: 10 April, 2025 Publication: 25 April, 2025
Conflict of Interest: None Grant Support & Financial Support: None

ABSTRACT

Objective: To assess the frequency of hypertriglyceridemia among patients with acute coronary syndrome (ACS) presenting at Mardan Medical Complex, Mardan.

Methodology:
This cross-sectional study was conducted at Cardiology department, Mardan Medical Complex. The sample size was calculated to be 147 patients including patients having age 30 to 70 years diagnosed with ACS, while patients with chronic kidney disease, diabetes, hypertension, or chronic liver disease were excluded. Data on demographics, socio-economic status, and clinical characteristics were collected. Hypertriglyceridemia was defined as triglyceride levels greater than 200 mg/dL in an overnight fasting blood sample.

Results: The study included 147 participants, with a mean age of 54.24 ± 9.83 years. Among the sample, 51.7% (76 patients) had hypertriglyceridemia, and 48.3% (71 patients) did not. The sample consisted of 81 males (55.1%) and 66 females (44.9%).

Conclusion: The study found that hypertriglyceridemia was present in 51.7% of patients with acute coronary syndrome (ACS).

Keywords: Hypertriglyceridemia, Acute Coronary Syndrome, Cardiovascular Risk, Triglycerides.

INTRODUCTION

Acute coronary syndrome (ACS) includes disorders such as ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI), and unstable angina. ACS presents with episodes for chest pain, frequently accompanied by dynamic ECG alterations resulting from a significant decrease in blood flow to the myocardium. [1, 2] This condition results from atherosclerosis, which leads to partial or nearly complete blockage of the coronary arteries, resulting in ischemia of the myocardium and the potential for infarction.[3] Significant advancements have been achieved in the identification and management for acute coronary syndromes; however, cardiovascular disease continues to be the primary cause of mortality globally, with almost 50% of these fatalities attributed to ischaemic cardiovascular disease. Each year, ischaemic heart disease accounts for 12% of the global loss within disability-adjusted life-years.[3-7] Age, gender, obesity, family history, hyperlipidemia, hypertension, diabetes mellitus, smoking, and physical inactivity are related to this condition. [8] A study observed the frequency of hypertriglyceridemia in ACS patients was 58%. [9]

Hypertriglyceridemia typically arises from multiple factors. Genetic factors, elevated production, and/or reduced clearance of triglyceride-rich lipoproteins have been identified as contributors to hypertriglyceridemia. [10]Genetic factors encompass syndromes that predominantly manifest with hypertriglyceridemia. Familial hypertriglyceridemia is characterized by an excess of Very Low-Density Lipoprotein while maintaining normal cholesterol levels. On the other hand, Familial combined hyperlipidemia is associated with polymorphisms in apolipoprotein C-II, apolipoprotein C-III, among others, and primarily manifests with hypertriglyceridemia .[11]

Elevated triglycerides contribute to atherogenesis, plaque instability, and thrombotic events, which are central to the pathophysiology of ACS. This study aims to assess the frequency of hypertriglyceridemia in patients with acute coronary syndrome at Mardan Medical Complex, Mardan, given the limited local literature on the topic. The findings of this study will provide valuable insights for health care providers and patients. Understanding the precise extent of the issue enables healthcare professionals to provide effective treatment for patients with ACS. Furthermore, emerging evidence indicates the potential advantages of targeted therapies aimed at lowering triglyceride levels. A focused study on hypertriglyceridemia in acute coronary syndrome could provide valuable insights for precision medicine strategies and improve cardiovascular treatment standards for this high-risk group of patients.

METHODOLOGY:

This study was conducted at the Department of Cardiology at Mardan Medical Complex, Mardan from 08-August-2024 to 08-February-2025. The research was designed as a cross-sectional study which was conducted after taking ethical clearance from the hospital. We calculated the sample size using the open epi calculator, based on the previous frequency of hypertriglyceridemia patients with ACS 58%[9], confidence level of 95% margin error 8%, the calculated sample was 147. The sampling method employed was non-probability consecutive sampling.

The inclusion criteria consisted of patients having age 30 to 70 years, both male and female, who presented with acute coronary syndrome, as defined by the operational criteria for ACS. Exclusion criteria included patients with diabetes, chronic liver disease, hypertension and chronic kidney disease.

After the patients gave their consent, baseline demographic data, including age, gender, body mass index (BMI), educational status, employment status, socio-economic background, and residential area, were recorded for each participant.

Patients diagnosed with acute coronary syndrome were assessed for hypertriglyceridemia, which was confirmed if the participants presented with symptoms such as abdominal pain (VAS > 4), loss of appetite, and fatigue. Hypertriglyceridemia was defined by triglyceride levels greater than 200 mg/dL in an overnight fasting sample collected in the early morning. All evaluations were conducted under the supervision of a senior consultant with at least five years of post-fellowship experience. Each patient's information was recorded on a standardized proforma.

The statistical analysis was performed using IBM SPSS version 25. For continuous variables such as age, weight, height, and BMI, descriptive measures like mean with standard deviation or median and interquartile ranges were computed. The Shapiro-Wilk test evaluated the normality of data distribution. Categorical variables, including gender, hypertriglyceridemia status, education level, employment status, socio-economic background, and residential area, were summarized through frequency counts and percentages. To address potential influencing factors like age, gender, BMI, and socio-economic variables, stratification was implemented. Associations

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

between variables were analyzed post-stratification using Chi-square or Fisher's exact tests, with statistical significance set at 5%. All results were methodically compiled and presented in tabular form for clarity.

RESULTS:

The mean age of the participants was 54.24 ± 9.83 years, with a mean body mass index (BMI) of 27.44 ± 3.72 kg/m².
In terms of demographic characteristics, the sample consisted of 81 males (55.1%) and 66 females (44.9%). Socioeconomic status was categorized into three groups: 35 participants (23.8%) had a low income (less than 20,000 Rs/month), 99 (67.3%) fell into the middle-income bracket (20,000 to 50,000 Rs/month), and 13 (8.8%) were classified as high-income earners (more than 50,000 Rs/month). Education status revealed that 78 participants (53.1%) were literate, while 69 (46.9%) were illiterate. Professionally, 66 individuals (44.9%) were employed, and 81 (55.1%) were unemployed. Regarding residence, 77 participants (52.4%) lived in rural areas, and 70 (47.6%) resided in urban settings (Table 1).
The prevalence of hypertriglyceridemia was observed in 76 participants (51.7%), while 71 (48.3%) did not exhibit this condition (Figure 1). Age distribution analysis showed that among those with hypertriglyceridemia, 19 (25.0%) were aged 30 to 50 years, and 57 (75.0%) were aged 51 to 70 years. In contrast, among those without hypertriglyceridemia, 30 (42.3%) were aged 30 to 50 years, and 41 (57.7%) were aged 51 to 70 years. This age-related difference was statistically notable (p = 0.02). BMI distribution also revealed notable associations. Among participants with hypertriglyceridemia, 14 (18.4%) had a BMI of 18 to 24.99 kg/m², 34 (44.7%) had a BMI of 25 to 29.99 kg/m², and 28 (36.8%) had a BMI of 30 kg/m² or higher. In comparison, among those without hypertriglyceridemia, 30 (42.3%) had a BMI of 18 to 24.99 kg/m², 27 (38.0%) had a BMI of 25 to 29.99 kg/m², and 14 (19.7%) had a BMI of 30 kg/m² or higher. These differences were statistically meaningful (p = 0.004). We did not find association of hypertriglyceridemia with other demographic effect modifiers (Table 2).

Table 1: Demographics

Demographics		**Frequency**	**Percentage**
Gender	Male	81	55.1%
	Female	66	44.9%
Socioeconomic status	Low (< 20K Rs/Month)	35	23.8%
	Middle (20 to 50K Rs/Month)	99	67.3%
	High (> 50K Rs/Month)	13	8.8%
Education status	Literate	78	53.1%
	Illiterate	69	46.9%
Profession	Employed	66	44.9%
	Unemployed	81	55.1%
Residence	Rural	77	52.4%
	Urban	70	47.6%

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

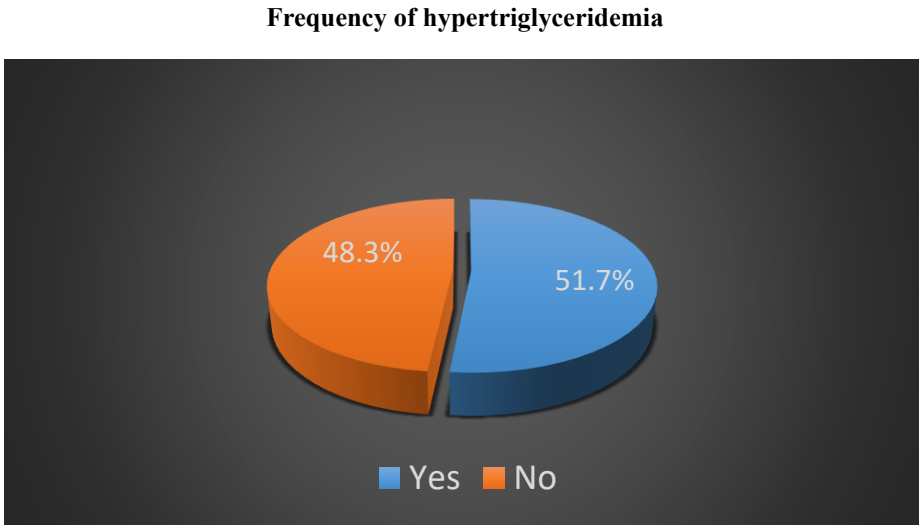

Figure 1 Frequency of hypertriglyceridemia

Table 2: Stratification of hypertriglyceridemia with age and BMI

Demographics		Hypertriglyceridemia				P value
		Yes		No		
		N	%	N	%	
Age distribution (Years)	30 to 50	19	25.0%	30	42.3%	0.02
	51 to 70	57	75.0%	41	57.7%	
Gender	Male	41	53.9%	40	56.3%	0.77
	Female	35	46.1%	31	43.7%	
Socioeconomic status	Low (< 20K Rs/Month)	20	26.3%	15	21.1%	0.25
	Middle (20 to 50K Rs/Month)	47	61.8%	52	73.2%	
	High (> 50K Rs/Month)	9	11.8%	4	5.6%	
Education status	Literate	39	51.3%	39	54.9%	0.66
	Illiterate	37	48.7%	32	45.1%	
Profession	Employed	33	43.4%	33	46.5%	0.71
	Unemployed	43	56.6%	38	53.5%	
Residence	Rural	44	57.9%	33	46.5%	0.16
	Urban	32	42.1%	38	53.5%	
BMI (Kg/m2)	18 to 24.99	14	18.4%	30	42.3%	0.004
	25 to 29.99	34	44.7%	27	38.0%	
	= > 30	28	36.8%	14	19.7%	

DISCUSSION:

The results indicate a high prevalence of hypertriglyceridemia, with 51.7% of the patients exhibiting this condition. Malik et al., found that 83.33% of ACS patients had hypertriglyceridemia, while another study by Abdelaziz et al., reported elevated figures of triglycerides in 63.33% patients in their cohort.[12, 13] These studies collectively underscore the importance of hypertriglyceridemia as a significant risk factor in ACS patients. González-Pacheco et al., who reported that 47.5% of their ACS patients had some form of dyslipidemia, with low HDL-C levels being the most prevalent.[14] Similarly, Muneeb et al. found that 83.2% of their ACS patients had dyslipidemia, with

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

low HDL-C levels observed in 72.3% of the cases. These findings collectively highlight the critical role of dyslipidemia, particularly hypertriglyceridemia and low HDL-C, in the pathogenesis of ACS.[15]

Mean age in our study was 54.24 ± 9.83 years, with males (55.1%) compared to females (44.9%). This gender distribution is consistent with findings from González-Pacheco et al., where 81.7% of the ACS patients were male.[14] The age distribution in the current study is also comparable to other studies, such as the one by Rahman et al., which reported a mean age of 58 ± 12.33 years in their ACS patient cohort. These similarities in demographic variables suggest that ACS tends to affect older males more frequently, which is a common trend observed in cardiovascular research.[16]

The study also explored the link between hypertriglyceridemia and other risk factors such as age and BMI. It was found that patients aged 51 to 70 years had a higher prevalence of hypertriglyceridemia (75.0%) compared to those aged 30 to 50 years (25.0%). This age-related difference was statistically notable ($p = 0.02$), which is even with the findings of Rahman et al., which reported higher frequency of hypertriglyceridemia in older patients.[16] Additionally, the study found BMI of 30 kg/m² or higher had a higher prevalence of hypertriglyceridemia (36.8%) compared to those with a BMI of 18 to 24.99 kg/m² (18.4%). This association between obesity and hypertriglyceridemia is well-documented in the literature, with studies such as the one by Muneeb et al. reporting that 62% of their ACS patients were obese, and dyslipidemia was more frequent in overweight patients.[15]

The findings of the current study also align with the broader literature on the role of dyslipidemia in ACS. For instance, Lee et al., found that high triglyceride levels with low HDL-C levels were linked with elevated risks of incident CHD and ischemic stroke, particularly in individuals with diabetes.[17] Similarly, the study by González-Pacheco et al., emphasized the importance of early lipid profile assessment in ACS patients to guide lipid-lowering therapy.[14] These studies collectively highlight the need for aggressive management of dyslipidemia in ACS patients to reduce the risk of adverse cardiovascular outcomes.

The current study adds to the literature that hypertriglyceridemia and other forms of dyslipidemia are prevalent among ACS patients and are associated with notable cardiovascular risks. The findings underscore the importance of early identification and management of dyslipidemia in this population, particularly in older and obese individuals. Future research should focus on developing targeted interventions to address these risk factors and improve outcomes in ACS patients.

CONCLUSION:

The study found that hypertriglyceridemia was present in 51.7% of patients with acute coronary syndrome (ACS), highlighting its notable prevalence in this high-risk population. This underscores the importance of routine lipid profiling, particularly triglyceride levels, in ACS patients to identify and manage dyslipidemia effectively. Early detection and targeted interventions, such as lifestyle modifications and triglyceride-lowering therapies, could potentially reduce cardiovascular risks and improve outcomes. Healthcare providers should prioritize lipid management as part of comprehensive ACS care to mitigate the burden of hypertriglyceridemia and its associated complications.

AUTHOR CONTRIBUTION

Author	Contribution
Syed Mahnoor*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Noorul Hadi	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Syed Aisha	literature search

REFERENCE:

Bergmark BA, Mathenge N, Merlini PA, Lawrence-Wright MB, Giugliano RP. Acute coronary syndromes. Lancet. 2022;399(10332):1347-58.

Kimura K, Kimura T, Ishihara M, Nakagawa Y, Nakao K, Miyauchi K, et al. JCS 2018 guideline on diagnosis and treatment of acute coronary syndrome. Circ Res. 2019;83(5):1085-196.

Khurana KV, Ranjan A. ST-segment elevation in conditions of non-cardiovascular origin mimicking an acute myocardial infarction: a narrative review. Cureus. 2022;14(10):e30868.
Roth GA, Abate D, Abate KH, Abay SM, Abbafati C, Abbasi N, et al. Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2018;392(10159):1736-88.
Vos T, Lim SS, Abbafati C, Abbas KM, Abbasi M, Abbasifard M, et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2020;396(10258):1204-22.
Tsao CW, Aday AW, Almarzooq ZI, Alonso A, Beaton AZ, Bittencourt MS, et al. Heart disease and stroke statistics—2022 update: a report from the American Heart Association. Circulation. 2022;145(8):153-639.
Virani SS, Alonso A, Aparicio HJ, Benjamin EJ, Bittencourt MS, Callaway CW, et al. Heart disease and stroke statistics—2021 update: a report from the American Heart Association. Circulation. 2021;143(8):254-743.
Singh A, Museedi AS, Grossman SA Acute Coronary Syndrome; 2024.
Ali K, Waheed I, Ahmad S, Sadiq Z, Ahmad G, Aqeel M. Frequency of hypertriglyceridemia in patients presenting with acute coronary syndrome. J Cardiovasc Dis 2021;17(2):61-4.
Schaefer EJ, Geller AS, Endress G. The biochemical and genetic diagnosis of lipid disorders. Curr Opin Lipidol. 2019;30(2):56-62.
Rygiel K. Hypertriglyceridemia - Common Causes, Prevention and Treatment Strategies. Curr Cardiol Rev. 2018;14(1):67-76.
Malik MN, Malik SN, Rahman M, Afzal M. Association of Dyslipidaemia and Acute Coronary Syndrome in Patients Admitted to CCU, PIMS. Ann Pak Inst Med Sci. 2014;10(3):155-61.
Abdelaziz A, Fawzy M. Prevalence and pattern of dyslipidemia in acute coronary syndrome patients admitted to medical intensive care unit in Zagazig University hospital, Egypt. Zagazig Univ. Med. J. 2014 May 1;20(3):1-0.
González-Pacheco H, Vargas-Barrón J, Vallejo M, Piña-Reyna Y, Altamirano-Castillo A, Sánchez-Tapia P, et al. Prevalence of conventional risk factors and lipid profiles in patients with acute coronary syndrome and significant coronary disease. Ther Clin Risk Manag. 2014;10:815-823.
Muneeb M, Khan AH, Khan Niazi A, Khan MU, Charha ZJ, Kazmi T, et al. Patterns of Dyslipidemia Among Acute Coronary Syndrome (ACS) Patients at a Tertiary Care Hospital in Lahore, Pakistan. Cureus. 2022;14(12):e32378 .
Rahman A, Khan S, Shah S, Khan MN, Khan MN, Mohammad R. Frequency of Hypertriglyceridemia in Patients Presenting with Acute Coronary Syndrome in Local Population. Med Forum. 2021;32(10):91-94.
Lee JS, Chang PY, Zhang Y, Kizer JR, Best LG, Howard BV. Triglyceride and HDL-C Dyslipidemia and Risks of Coronary Heart Disease and Ischemic Stroke by Glycemic Dysregulation Status: The Strong Heart Study. Diabetes Care. 2017;40(4):529-537.