World Journal of Pharmaceutical and Life Sciences
WJPLS
www.wjpls.org
SJIF Impact Factor: 7.409

EVALUATING PRESCRIBING PATTERNS OF ANTI ANGINAL MEDICATIONS: A PROSPECTIVE OBSERVATIONAL STUDY IN CLINICAL PRACTICE

Dr. Fatima Khatoon*, Dr. Syed Mohammed Kazim, Dr. M. A. Aleem, Mohammed Abdul Mujeeb, Arshiya Muskan, Syed Mahboob Adeem, Sofia Ibtesam

Department of Pharmacy Practice, Nizam Institute of Pharmacy Deshmukhi Telangana, India.

***Corresponding Author: Dr. Fatima Khatoon**
Department of Pharmacy Practice, Nizam Institute of Pharmacy Deshmukhi Telangana, India.

Article Received on 15/07/2025 **Article Revised on 05/08/2025** **Article Accepted on 24/08/2025**

ABSTRACT

Background: Angina pectoris is a primary clinical manifestation of coronary artery disease (CAD) that necessitates pharmacological management. Antianginal medications play a crucial role in symptom control, disease progression prevention, and reducing major cardiovascular events. However, prescribing patterns vary due to physician preferences, patient characteristics, and adherence to clinical guidelines. Understanding these variations is essential for optimizing treatment strategies. **Objective:** This study aims to evaluate antianginal medication use in CAD patients and assess demographic and social factors influencing disease progression. It also examines treatment outcomes, medication adherence, and potential gaps in prescribing practices to enhance evidence-based clinical decision-making. **Methodology:** A prospective observational study was conducted over six months in the Department of Cardiology, focusing on patients diagnosed with CAD receiving antianginal therapy. **Results:** A total of 100 patients with angina were included. The majority (38%) were aged 61–70 years, with 77% male and 23% female. Males had a higher risk due to social habits such as smoking and alcohol use. Blood pressure analysis showed 44% in the prehypertension category, while 39% had hypertension (Stage 1 & 2). Tachycardia was observed in 7% of patients. Hypertension (72%) was the most common comorbidity, followed by diabetes mellitus type 2 (38%). Chest pain (33%) and chest pain with exertional shortness of breath (32%) were the most frequent symptoms. Stable angina was diagnosed in 63% of cases, while 37% had unstable angina. Drug therapy analysis revealed that 37% were on mono therapy, predominantly nicorandil (91%), whereas 63% received combination therapy, with potassium channel opener + beta- blockers + nitrates (27%) being the most prescribed regimen. Prognosis assessment using MACE criteria indicated a significant disease burden, with 70% of patients classified under critical MACE, emphasizing the need for optimized treatment strategies. **Conclusion:** This study highlights a preference for combination therapy (63%) over monotherapy (37%) in angina management, with nicorandil being the most prescribed drug. The high prevalence of hypertension (72%), diabetes (38%), and critical MACE cases (70%) underscores the substantial cardiovascular risk burden. While stable angina (63%) was more common, persistent disease progression emphasizes the need for improved treatment strategies. Despite adherence to standard therapy, adverse outcomes remain a concern, necessitating refined prescribing approaches. Further longitudinal studies are needed to minimize adverse effects and explore the role of monotherapy for safer and more effective antianginal treatment.

INTRODUCTION

Angina pectoris is a clinical syndrome characterized by episodes of chest discomfort due to transient myocardial ischemia. It is a manifestation of coronary artery disease (CAD), often caused by atherosclerotic narrowing of the coronary vessels. When the myocardium receives insufficient oxygen to meet its metabolic demands, ischemic pain arises. Unlike myocardial infarction, angina does not result in permanent damage to the heart muscle. It serves as a warning sign for possible acute coronary events and requires timely diagnosis and management.

Symptoms

The presentation of angina can vary based on the type and severity. Commonly reported symptoms include:

- A pressing, squeezing, or constricting sensation in the chest
- Pain often radiating to the shoulders, arms (especially the left), neck, jaw, or back
- Discomfort brought on by physical exertion, emotional stress, cold weather, or after meals
- Relief of symptoms upon rest or with sublingual nitroglycerin
- Associated symptoms such as dyspnea (shortness of breath), nausea, fatigue, and diaphoresis

Pathophysiology

Angina is primarily a result of reduced oxygen supply to myocardial tissues due to narrowed or blocked coronary arteries. The imbalance between myocardial oxygen demand and supply is often due to atherosclerosis. The pathophysiological sequence can be explained as follows:

Atherosclerotic Plaque Formation → Coronary Artery Narrowing → Decreased Coronary Blood Flow → Myocardial Oxygen Deficit → Anaerobic Glycolysis → Accumulation of Metabolites (e.g., Lactic Acid) → Chest Pain

Note: Variant angina (Prinzmetal) is due to vasospasm, not atherosclerosis.

Diagnosis

A comprehensive diagnostic workup is necessary to evaluate angina and rule out myocardial infarction. The steps include:

- Clinical evaluation with detailed history and physical examination
- Resting Electrocardiogram (ECG): may show ST-segment depression or T wave inversion
- Cardiac biomarkers: Troponin levels to exclude acute MI
- Stress testing: Exercise ECG or pharmacologic stress testing to induce ischemic changes
- Echocardiography: Evaluate left ventricular function and wall motion abnormalities
- Coronary angiography: Definitive test to visualize coronary anatomy and detect occlusions

Antianginal Therapy

The primary goal of antianginal therapy is to restore the balance between myocardial oxygen supply and demand. This is achieved through pharmacological agents that reduce heart rate, decrease preload and afterload, or enhance coronary perfusion.

Classification of Antianginal Drugs

Class	Drug Examples	Mechanism of Action	Typical Dose
Nitrates	Nitroglycerin, Isosorbide dinitrate	Release NO → Vasodilation → ↓ Preload & myocardial oxygen demand	Nitroglycerin: 0.3–0.6 mg SL Isosorbide dinitrate: 5–10 mg TID
Beta-blockers	Metoprolol, Atenolol	↓ HR & contractility → ↓ myocardial oxygen demand	Metoprolol: 50–100 mg/day Atenolol: 50–100 mg/day
CCBs	Amlodipine, Verapamil, Diltiazem	Dihydropyridines → Vasodilation; Non- DHP → ↓ HR & contractility	Amlodipine: 5–10 mg/day Verapamil: 80–120 mg TID
Ranolazine	Ranolazine	Inhibits late Na+ current → ↓ intracellular Ca2+ → ↑ myocardial relaxation	500–1000 mg BID
Ivabradine	Ivabradine	Inhibits If current in SA node → ↓ HR without ↓ contractility	5–7.5 mg BID

METHODOLOGY

STUDY POPULATION

A total of 150 patients were enrolled in the study.

STUDY CRITERIA

The study was conducted based on the following criteria

✓ **Inclusion Criteria**

- Patients of either gender, aged 35 years or older
- Patients with newly diagnosed or existing angina or coronary artery disease
- Patients willing to participate in the study
- Patients prescribed antianginal medications
- Patients with or without comorbidities
- Both inpatients and outpatients

✓ **Exclusion Criteria**

- Pregnant or lactating women
- Patients unwilling to participate in the study
- Patients with incomplete medical records
- Patients with severe comorbidities (e.g., heart failure, advanced liver disease)

SOURCES OF DATA

- Patient case files
- Medication charts
- Laboratory data reports

DATA COLLECTION AND ASSESSMENT OF STUDY OBSERVATIONS

For patient identification and data collection, a structured, valid, and reliable data collection form was designed to document patient characteristics. Demographic data, clinical features (such as angina type and history of cardiovascular events), and medication profiles (including antianginal drugs, doses, and duration) were recorded to support prescribing pattern analysis.

STATISTICAL ANALYSIS

All collected data were entered into Microsoft Excel. Statistical analysis was performed using descriptive statistical methods to generate frequencies and percentages.

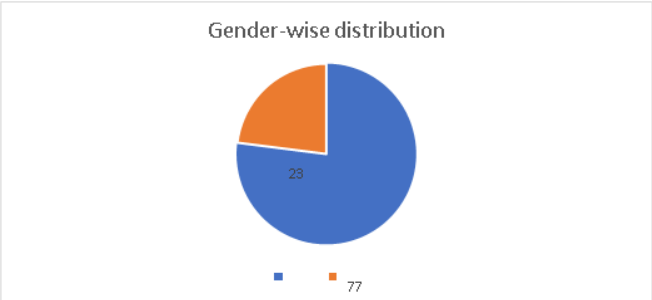
PRESENTATION OF DATA

Results were represented using tables, graphs, bar diagrams, and pie charts for better visualization and interpretation.

RESULTS

GENDER WISE DISTRIBUTION

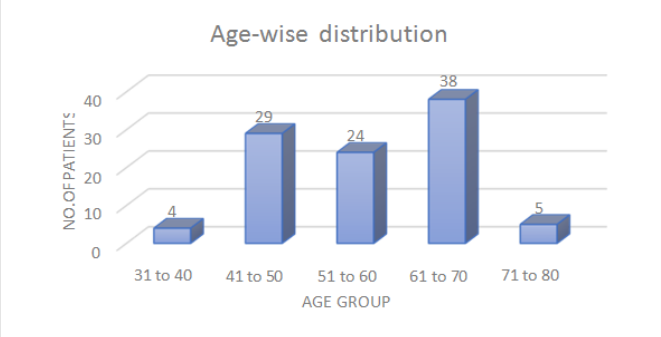
Gender	Frequency
Male	77
Female	23



Out of 100 patients included in study 77% of the patients were male, while 23% were female.

AGE WISE DISTRIBUTION

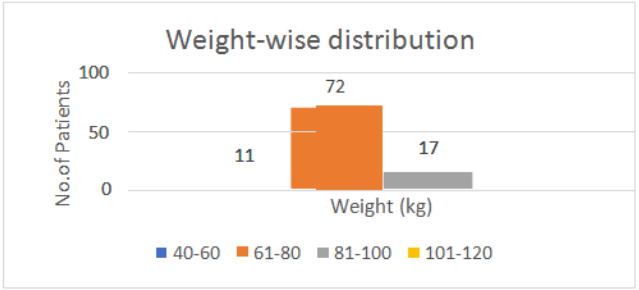
Age Group	No. of Patients
31 to 40	4
41 to 50	29
51 to 60	24



The 31 to 40 years age group comprised 4% of patients, the 41 to 50 years group 29%, and the 51 to 60 years group 24%. The 61 to 70 years group had the highest proportion at 38%, while the 71 to 80 years group included 5% of patients.

WEIGHT WISE DISTRIBUTION

Weight (Kg)	No. of Patients
40-60	11
61-80	72
81-100	17

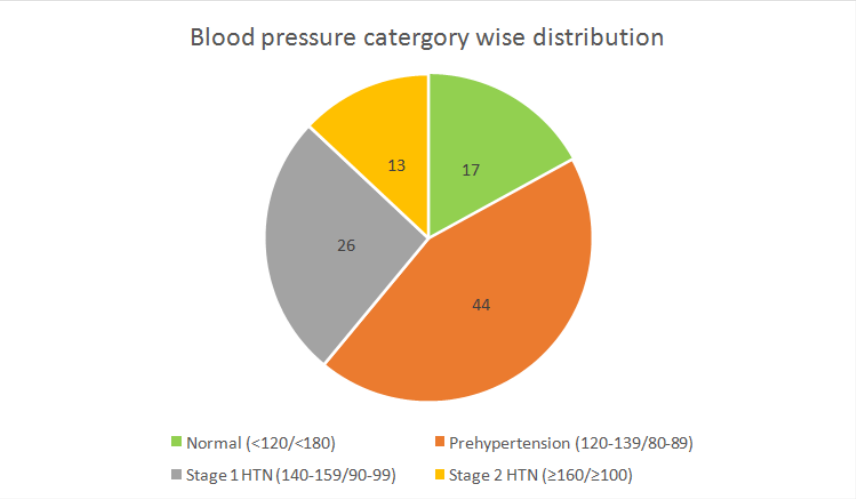


11% of patients belonged to the 40-60 kg weight group, followed by 17% in the 81-100 kg category. The majority, 72% of patients, fell within the 61-80 kg weight range.

EXAMINED VITALS OF THE PATIENT

- **BLOOD PRESSURE**

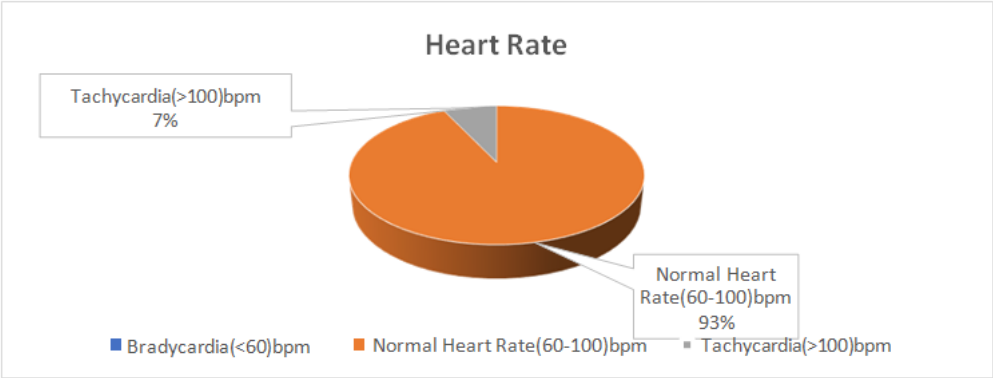
Blood Pressure Categories	BP Range	Number of Patients
Normal	<120/<180	17
Prehypertension	120-139/80-89	44
Stage 1 HTN	140-159/90-99	26
Stage 2 HTN	≥160/≥100	13



Out of 100 patients, 17% of patients had normal BP, while 44% were in the prehypertension category. Stage 1 hypertension was observed in 26% of patients, and 13% had Stage 2 hypertension. The high prevalence of prehypertension and hypertension highlights the need for early detection and intervention to prevent cardiovascular complications.

- **HEART RATE**

Heart Rate(bpm)	No. of Patients
Bradycardia (<60) bpm	-
Normal Heart Rate (60-100) bpm	93
Tachycardia (>100) bpm	7

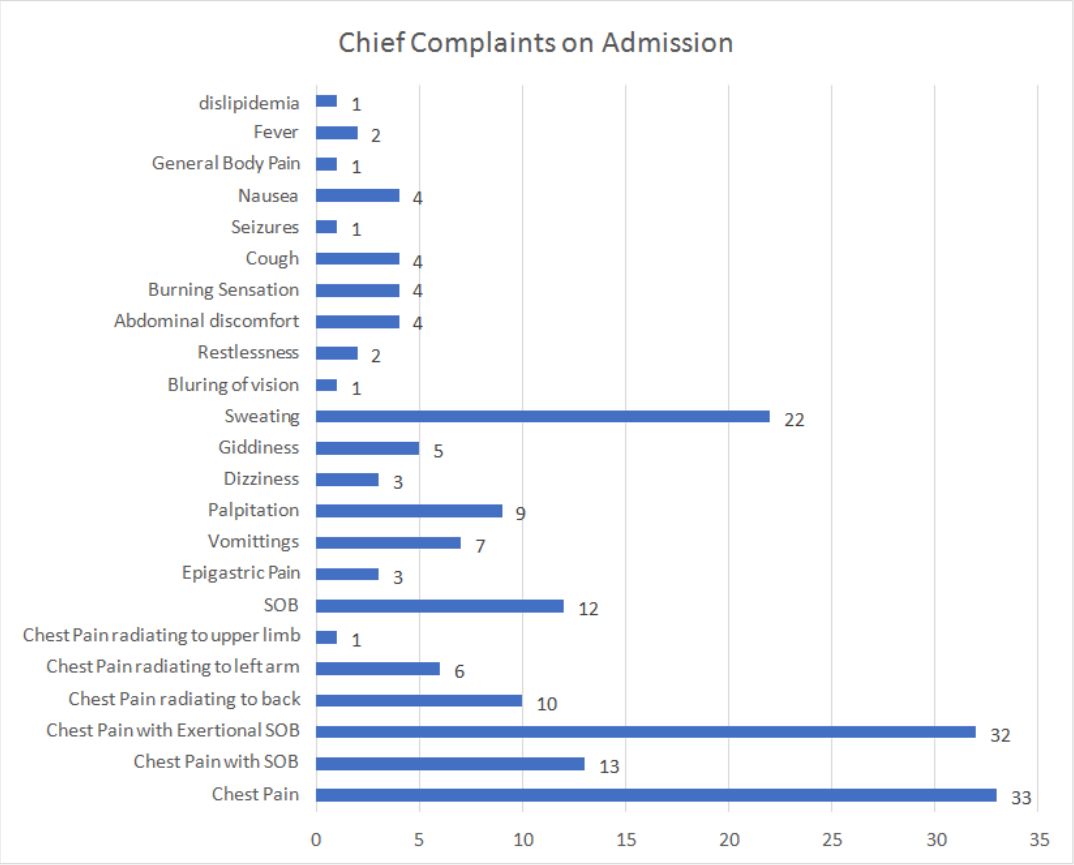


Tachycardia (>100 bpm) was found in 7% of the patients, Normal Heart Rate (60-100 bpm) was seen in 93% of the patients

CHIEF COMPLAINTS ON ADMISSIONS

Chief Complaints	No. of patients
Chest Pain	33
Chest Pain with SOB	13
Chest Pain with Exertional SOB	32
Chest Pain radiating to back	10

Chest Pain radiating to left arm	6
Chest Pain radiating to upper limb	1
SOB	12
Epigastric Pain	3
Vomiting	7
Palpitation	9
Dizziness	3
Giddiness	5
Sweating	22
Blurring of vision	1
Restlessness	2
Abdominal discomfort	4
Burning Sensation	4
Cough	4
Seizures	1
Nausea	4
General Body Pain	1
Fever	2
Dyslipidaemia	1

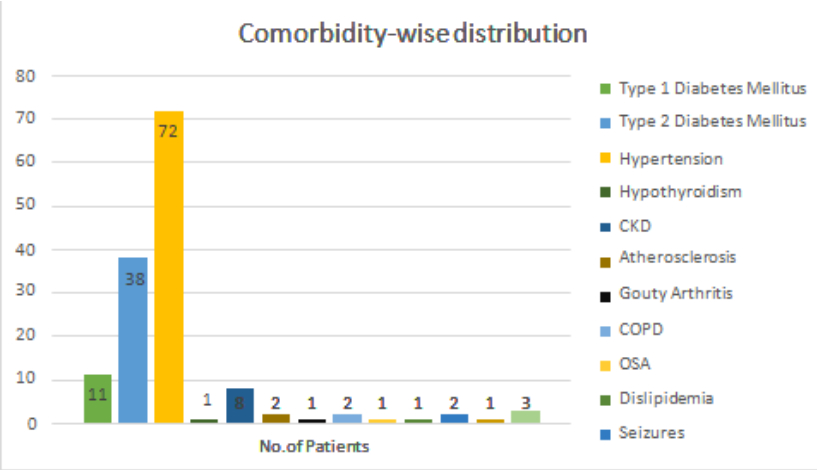


A predominant number of patients had chief complaints of chest pain at 33%, chest pain with an exertional SOB at 32% during the day of admission followed by sweating, chest pain radiating to the back, SOB, giddiness, palpitations, burning sensation, and abdominal discomfort.

COMORBIDITIES-BASED DISTRIBUTION

Comorbidity	No. of Patients
Type 1 Diabetes Mellitus	11
Type 2 Diabetes Mellitus	38
Hypertension	72

Hypothyroidism	1
CKD	8
Atherosclerosis	2
Gouty Arthritis	1
COPD	2
OSA	1
Dyslipidaemia	1
Seizures	2
Asthma	1
Others	3

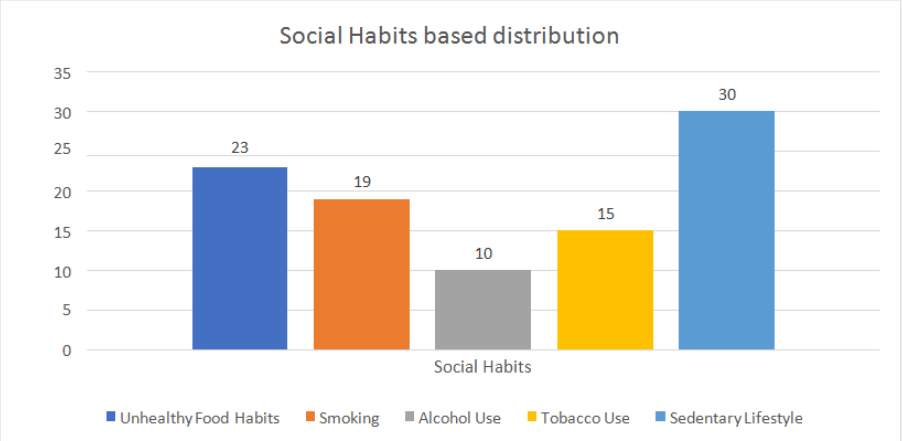


The following comorbid conditions were recorded in the study.

Hypothyroidism (1%), Gouty Arthritis (1%), Obstructive Sleep Apnea (1%), Dyslipidaemia (1%), Asthma (1%), Atherosclerosis (2%), COPD (2%), Seizures (2%), Others (3%), Chronic Kidney Disease (CKD) (8%), Type 1 Diabetes Mellitus (11%), Type 2 Diabetes Mellitus (38%), Hypertension (72%).

SOCIAL HABITS OF THE PATIENTS

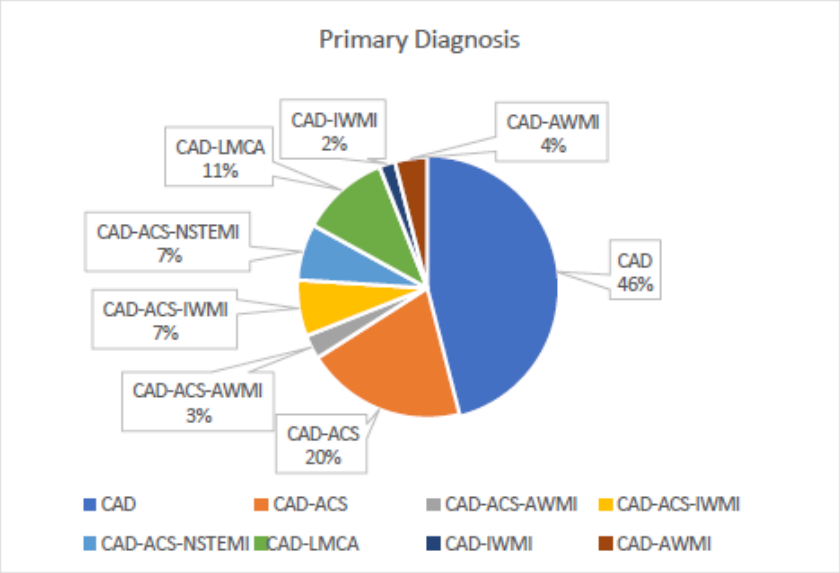
Social Habits	No. of Patients
Unhealthy Food Habits	23
Smoking	19
Alcohol Use	10
Tobacco Use	15
Sedentary Lifestyle	30



Out of 100 patients included in the study, alcohol use was observed in 10% of patients, followed by tobacco use in 15%. Smoking accounted for 19%, while unhealthy food habits were noted in 23%. The highest prevalence was seen in sedentary lifestyle in 30% of patients.

PRIMARY DIAGNOSIS

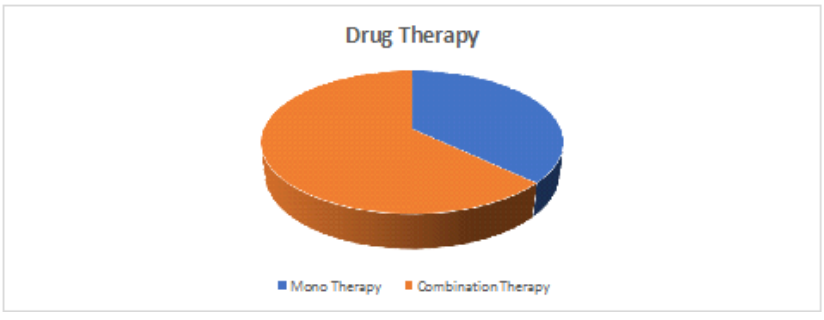
Primary Diagnosis	No. of Patients
CAD	46
CAD-ACS	20
CAD-ACS-AWMI	3
CAD-ACS-IWMI	7
CAD-ACS-NSTEMI	7
CAD-LMCA	11
CAD-IWMI	2
CAD-AWMI	4



Following primary diagnosis was recorded for 100 patients:
CAD-IWMI (2%), CAD-AWMI (4%), CAD-ACS-AWMI (3%), CAD-ACS-IWMI (7%), CAD-ACS-NSTEMI (7%), CAD-LMCA (11%), CAD-ACS (20%), CAD (46%).

DRUG THERAPY

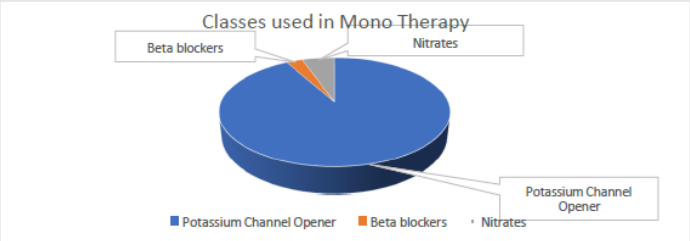
Drug Therapy	No. of Patients
Mono Therapy	37
Combination Therapy	63



Mono Therapy (37%), Combination Therapy (63%)

MONO-THERAPY

Mono Therapy	No. of Patients
Potassium Channel Opener (Nicorandil)	34
Beta-blockers (Metoprolol)	1
Nitrates (GTN, Isosorbide dinitrate)	2



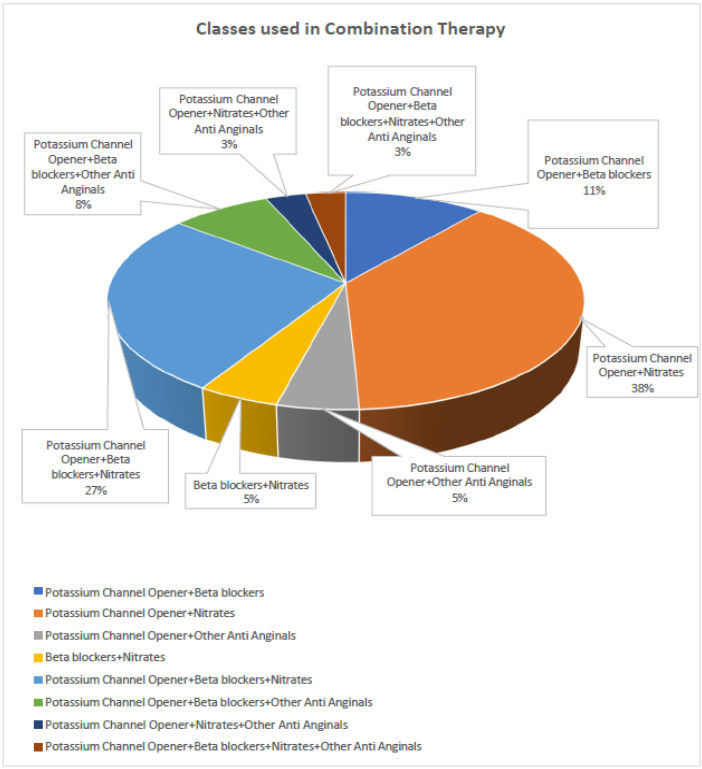
Beta-blockers (1%), Nitrates (2%), Potassium Channel Opener (34%).

Metoprolol (1%), Glyceryl Trinitrate (1%), Isosorbide Dinitrate (1%), Nicorandil (34%).

COMBINATION THERAPY

- **Classes used in Combination therapy**

CLASSES USED IN COMBINATION THERAPY	
Double Therapy	
Potassium Channel Opener+Beta blockers	7
Potassium Channel Opener+Nitrates	24
Potassium Channel Opener+Other Anti Anginals	3
Beta blockers+Nitrates	3
Triple Therapy	
Potassium Channel Opener+Beta blockers+Nitrates	17
Potassium Channel Opener+Beta blockers+Other Anti Anginals	5
Potassium Channel Opener+Nitrates+Other Anti Anginals	2
Quadruple Therapy	
Potassium Channel Opener+Beta blockers+Nitrates+Other Anti Anginals	2



Double Therapy: Beta blockers+ Nitrates 3 (5%), Potassium Channel Opener + Other Anti Anginal 3 (5%), Potassium Channel Opener + Beta blockers 7 (11%), Potassium Channel Opener + Nitrates 24 (38%).

Triple Therapy: Potassium Channel Opener+ Nitrates+ Other Anti Anginal 2 (3%), Potassium Channel Opener + Beta blockers + Other Anti Anginal 5 (8%), Potassium Channel Opener + Beta blockers + Nitrates 17 (27%).

Quadruple Therapy: Potassium Channel Opener + Beta blockers + Nitrates + Other Anti Anginal 2 (3%). Total 63 (100%).

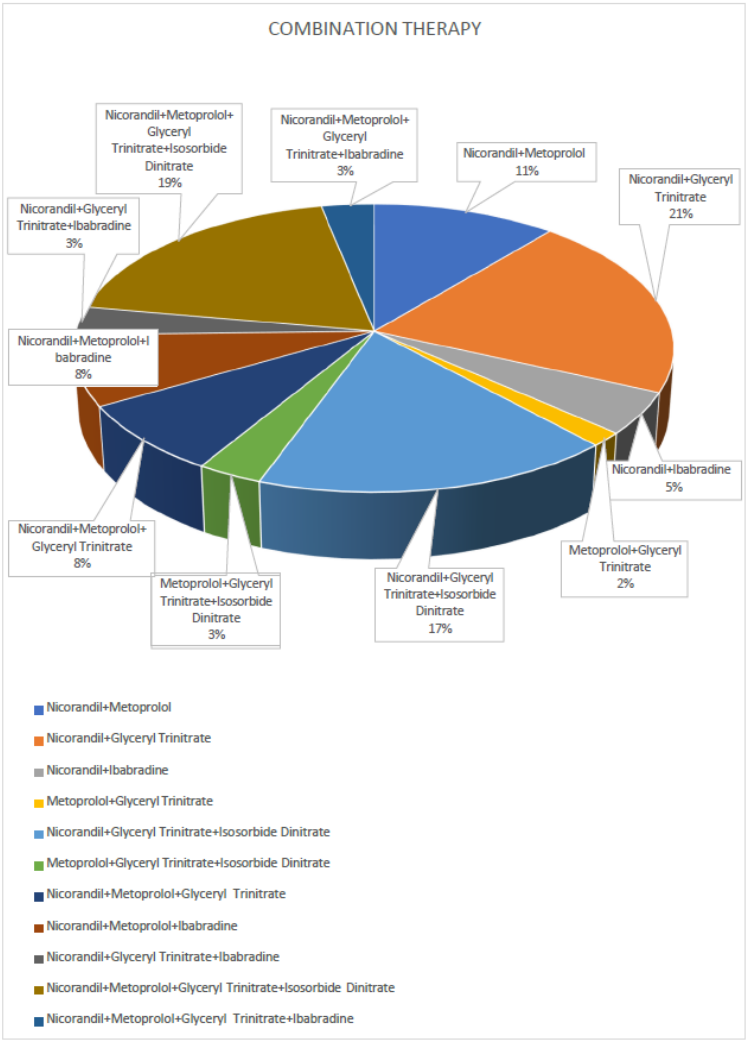
➢ **Drugs used in Combination therapy**

DRUGS USED IN COMBINATION THERAPY	No. of Patients
DOUBLE THERAPY	
Nicorandil +Metoprolol	7
Nicorandil + Glyceryl Trinitrate	13
Nicorandil + Ivabradine	3
Metoprolol + Glyceryl Trinitrate	1
TRIPLE THERAPY	
Nicorandil + Glyceryl Trinitrate + Isosorbide Dinitrate	11
Metoprolol + Glyceryl Trinitrate + Isosorbide Dinitrate	2
Nicorandil + Metoprolol + Glyceryl Trinitrate	5
Nicorandil + Metoprolol + Ivabradine	5
Nicorandil + Glyceryl Trinitrate + Ivabradine	2
QUADRUPLE THERAPY	
Nicorandil + Metoprolol + Glyceryl Trinitrate + Isosorbide Dinitrate	12
Nicorandil + Metoprolol + Glyceryl Trinitrate + Ivabradine	2

Double Therapy: Metoprolol + Glyceryl Trinitrate 1 (2%), Nicorandil + Ivabradine 3 (5%), Nicorandil + Metoprolol 7 (11%), Nicorandil + Glyceryl Trinitrate 13 (21%).

Triple Therapy: Nicorandil + Glyceryl Trinitrate + Ivabradine 2 (3%), Metoprolol+Glyceryl Trinitrate + Isosorbide Dinitrate 2 (3%), Nicorandil + Metoprolol + Glyceryl Trinitrate 5 (8%), Nicorandil+ Metoprolol + Ivabradine 5 (8%), Nicorandil + Glyceryl Trinitrate + Isosorbide Dinitrate 11 (17%).

Quadruple Therapy: Nicorandil + Metoprolol + Glyceryl Trinitrate + Ivabradine 2 (3%), Nicorandil +Metoprolol + Glyceryl Trinitrate+ Isosorbide Dinitrate 12 (19%)



DISCUSSION

Out of 100 patients assessed, 77% were male and 23% were female. Males exhibited higher engagement in social habits such as smoking and alcohol consumption, which may contribute to increased angina risk. The incidence of angina increased with age, peaking in individuals aged 61-70, with females comprising 57% of this group. While males tend to develop cardiac diseases earlier, women are more vulnerable post-50. The majority of patients (61-80 kg) had a normal weight range, with a few classified as morbidly obese (81-100 kg).

Vital parameters showed that 7% of patients had tachycardia, while 93% had a normal heart rate. Blood pressure analysis revealed that 44% of patients were prehypertensive, 26% had stage 1 hypertension, and 13% had stage 2. Hypertension was the most common comorbidity (72%), followed by diabetes mellitus type 2 (38%), diabetes type 1 (11%), and chronic kidney disease (8%). Chest pain was the most common complaint (33%), often associated with exertional shortness of breath (32%). Lifestyle risk factors included sedentary habits (30%), unhealthy diets (29%), smoking (19%), and alcohol consumption (10%).

Among the diagnosed cases, 63% had stable angina, and 37% had unstable angina. Monotherapy was prescribed for 37% of patients, with nicorandil (91%) being the most commonly used drug. Combination therapy was more prevalent (63%), with potassium channel openers frequently combined with beta-blockers and nitrates. Our study's findings align with Cheng et al. (2023), which highlighted the effectiveness of nicorandil and beta-blocker combinations in CAD patients. Our study also observed a strong preference for this regimen in real-world practice, with 31% of combination therapy patients receiving nicorandil + beta- blockers in combination.

Ferrari et al. (2018) emphasized that monotherapy alone is often inadequate for optimal angina control, advocating for combination therapy. Our study supports this conclusion, as 63% of patients received combination therapy. Ferrari's review also underscored beta-blockers and calcium channel blockers as primary agents, a trend reflected in our prescribing patterns. Despite guideline-directed treatment, Ferrari noted a persistent risk of adverse outcomes, aligning with our study's high incidence of critical MACE cases (70%). This highlights the continued need for optimized therapeutic strategies and adherence to evidence-based guidelines for better patient outcomes.

CONCLUSION

This study highlights the preference for combination therapy (63%) over monotherapy (37%) in angina management, reflecting its clinical advantage in symptom control. Nicorandil was the most frequently prescribed antianginal, used in both monotherapy (91%) and combination regimens, particularly with beta-blockers and nitrates (27%). The high prevalence of hypertension (72%), diabetes (49%), and critical MACE cases (70%) underscores the substantial cardiovascular risk burden, necessitating aggressive risk factor management. While stable angina (63%) was more common, persistent disease progression and adverse outcomes indicate the need for optimized treatment strategies.

Despite adherence to guideline-based therapy, adverse effects remain a concern, emphasizing the need for refined prescribing approaches. Ongoing longitudinal studies continue to explore strategies to minimize adverse effects and evaluate the potential of monotherapy in antianginal treatment, aiming to improve patient safety and streamline therapeutic approaches in clinical practice.

ACKNOWLEDGEMENT

The Authors are thankful to the people who have directly or indirectly contributed and helped us to conduct this research.

BIBLIOGRAPHY

1. What is Angina? | NHLBI, NIH [Internet]. NHLBI, NIH. 2023. Available from: https://www.nhlbi.nih.gov/health/angina
2. Hermiz C, Sedhai YR. Angina [Internet]. StatPearls - NCBI Bookshelf. 2023. Available from: https://www.ncbi.nlm.nih.gov/books/NBK557672/
3. Angina - Causes, symptoms & treatments [Internet]. British Heart Foundation. Available from: https://www.bhf.org.uk/informationsupport/conditions/angina#Heading6
4. Angina [Internet]. Cleveland Clinic. 2024. Available from: https://my.clevelandclinic.org/health/diseases/21489-angina

4.1 Angina - Diagnosis and treatment - Mayo Clinic [Internet]. Available from: https://www.mayoclinic.org/diseases-conditions/angina/diagnosis-treatment/drc-20369378

5. Johns Hopkins Medicine; Angina Pectoris; 07 January 2019
6. BrJCardiol. Angina module 1: epidemiology - The British Journal of Cardiology [Internet]. BJC. Available from: https://bjcardio.co.uk/2020/04/angina-module-1-epidemiology-2/

6.1 Angina Chest Pain – Symptoms & Risk Factors | MedStar Health [Internet]. Available from: https://www.medstarhealth.org/services/angina

7. Angina - Diagnosisand treatment- Mayo Clinic [Internet]. Available from: https://www.mayoclinic.org/diseases-conditions/angina/diagnosis-treatment/drc-20369378
8. BrJCardiol. Angina module 3: pathophysiology -

The British Journal of Cardiology [Internet]. BJC. Available from: https://bjcardio.co.uk/2020/04/angina-module-3-pathophysiology/
9. Angina - Causes, symptoms & treatments [Internet]. British Heart Foundation. Available from: https://www.bhf.org.uk/informationsupport/conditions/angina#Heading6
10. Angina Chest Pain – Symptoms & Risk Factors | MedStar Health [Internet]. Available from: https://www.medstarhealth.org/services/angina
11. Watson S. Angina (Ischemic chest pain) [Internet]. WebMD. 2023. Available from: https://www.webmd.com/heart-disease/heart-disease-angina
12. Angina: symptoms, complications, and treatment [Internet]. Available from: https://www.practo.com/health-wiki/angina-symptoms-complications-and-treatment/244/article
13. Center NYCD. 12-Lead Electrocardiogram (EKG) [Internet]. New York Cardiac Diagnostic Center in New York City. 2023. Available from: https://newyorkcardiac.com/12-lead-electrocardiogram-ek
14. Vibhu. Exercise Stress test - (EST/Treadmill test) || Thorndale Medical Clinic [Internet]. Available from: https://www.thorndalemedical.com/exercise-stress-test.php
15. Saxena K. Blood test at home to keep yourself healthy - Redcliffe Labs [Internet]. MyHealth. 2025. Available from: https://redcliffelabs.com/myhealth/lab-test/blood-test-at-home-to-keep-yourself-healthy- redcliffe-labs/
16. Unstable angina: Medline Plus Medical Encyclopedia [Internet]. Available from: https://medlineplus.gov/ency/article/000201.htm
17. Tarkin, J. M., & Kaski, J. C. Pharmacological treatment of chronic stable angina pectoris. *Clinical Medicine*, 2013; *13*(1): 63–70. https://doi.org/10.7861/clinmedicine.13-1-63
18. Antianginal drugs - Classification, pharmacological actions, pharmacokinetics, uses, adverse effects, interactions | Pharmacology [Internet]. pharmacy180.com. Available from: https://www.pharmacy180.com/article/antianginal-drugs-1187/
19. National Institute for Health and Clinical Excellence. Clinical guideline CG126. London: NICE; 2011. Management of stable angina. http://guidance.nice.org.uk/CG126 [Accessed 3 January 2013]. [PubMed] [Google Scholar]
20. Fox K. Garcia MA. Ardissino D, et al. Guidelines on the management of stable angina pectoris: executive summary: the task force on the management of stable angina pectoris of the European Society of Cardiology. Eur Heart J., 2006; 27: 1341–81. doi: 10.1093/eurheartj/ehl001. [DOI] [PubMed] [Google Scholar]