

ASSESSMENT OF CORONARY ARTERY DISEASE PREVALENCE IN PATIENTS WITH HYPERTENSION, DIABETES MELLITUS & HYPERLIPIDEMIA

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ABSTRACT

Introduction: Coronary artery disease is the first leading cause of death. Coronary artery disease is the build-up of plaque in the arteries that supply rich oxygen blood to the heart. Plaque causes a narrowing or blockage that could result in myocardial infarction. Atherosclerosis is highly prevalent and forms the underlying pathophysiology for coronary artery disease & it is characterized by a diseased endothelium, low-grade inflammation, lipid accumulation and plaque formation within the intima of the vessel wall. The Inter- Heart study demonstrated that coronary heart disease risk factors such as abnormal lipids, smoking, hypertension, diabetes, abdominal obesity, psychosocial factors, consumption of alcohol, and irregular physical activity account for most of the risk of myocardial infarction worldwide in both sexes and at all ages in all regions. **Objectives:** To examine the association between hypertension, diabetes mellitus, hyperlipidemia and prevalence of coronary artery disease, Prevalence of coronary artery disease in young adults and comparing the gender ratio, To counsel the patients regarding the disease, risk factors of coronary artery disease & lifestyle modifications in patients with hypertension, diabetes mellitus & hyperlipidemia. **Methods:** This is a prospective observational study conducted in 150 patients with hypertension, diabetes mellitus & hyperlipidemia. **Results:** our study reports that there is a significant prevalence of coronary artery disease in hypertensive patients when compared with diabetes & hyperlipidemia patients. The study of CAD and coronary risk factors are more prevalent among older adults when compared with younger adults. It is possible that managing the disease and risk factors with proper treatment, implementing lifestyle modifications can be beneficial for the prevention. **Conclusion:** The study highlights the significant prevalence of coronary artery disease (CAD) among patients with hypertension, diabetes mellitus, and hyperlipidemia. Hypertension appeared as the most common condition associated with CAD, followed by diabetes and hyperlipidemia. Additionally, the prevalence of CAD was notably higher in older adults compared to younger adults, reflecting the cumulative impact of risk factor exposure over time. Gender-specific analysis revealed a higher prevalence in males, underscoring the importance of tailored preventive strategies. Lifestyle factors, such as physical inactivity, smoking, and obesity, were identified as major contributors to CAD risk, emphasizing the need for comprehensive lifestyle interventions. The study underscores the effectiveness of patient counseling and education in improving adherence to medication, promoting regular exercise, dietary modifications, and smoking cessation. These interventions proved measurable improvements in mitigating risk factors and managing the disease. In conclusion, targeted strategies focusing on early detection, effective management of hypertension, diabetes, and hyperlipidemia, along with lifestyle modifications, can significantly reduce the burden of CAD. Future efforts should aim to enhance patient education, promote routine monitoring, and strengthen the integration of multidisciplinary approaches in CAD prevention and management.

KEYWORDS: Prevalence, Hypertension, Diabetes, Hyperlipidaemia, Atherosclerosis, Coronary Artery Disease.

INTRODUCTION

Coronary artery disease (CAD), also known as ischemic heart disease, remains the foremost cause of mortality and morbidity across the globe, representing a critical public health challenge. CAD arises primarily due to the accumulation of atherosclerotic plaques in the coronary arteries, which results in a reduction of blood flow to the myocardium. This insufficient perfusion can lead to myocardial ischemia, angina pectoris, and potentially fatal outcomes such as myocardial infarction (MI), arrhythmias, and sudden cardiac death. The progression of CAD is slow and insidious, often remaining asymptomatic until a significant obstruction of the coronary vessels occurs.

The pathophysiological basis of CAD is atherosclerosis—a chronic, progressive inflammatory disease characterized by lipid deposition, endothelial dysfunction, smooth muscle proliferation, and fibrous tissue formation within the arterial wall. This cascade leads to plaque development and potential rupture, causing thrombus formation and acute coronary syndromes. Over the past few decades, atherosclerosis has emerged as the key determinant in cardiovascular events and has been strongly associated with modifiable risk factors such as hypertension, diabetes mellitus, hyperlipidemia, smoking, obesity, and physical inactivity.

Hypertension, or high blood pressure, is one of the most prevalent cardiovascular risk factors globally and is often referred to as a “silent killer” due to its asymptomatic nature. Persistent elevation of blood pressure accelerates the atherosclerotic process by damaging the endothelium, promoting vascular inflammation, and increasing the mechanical stress on arterial walls. Studies have shown that hypertensive patients are significantly more prone to develop CAD compared to normotensive individuals, particularly when left untreated or poorly controlled.

Diabetes mellitus, particularly type 2 diabetes, is another major contributor to CAD. Chronic hyperglycemia induces several adverse cardiovascular effects, including endothelial dysfunction, increased oxidative stress, and a pro-inflammatory state. Diabetics often have coexisting dyslipidemia and hypertension, further elevating their risk of coronary events. Alarming, CAD tends to be more diffuse and severe in diabetic patients, with a higher likelihood of silent ischemia and worse clinical outcomes following myocardial infarction or revascularization procedures.

Hyperlipidemia, characterized by elevated levels of total cholesterol, low-density lipoprotein (LDL), and triglycerides, is a direct contributor to atherogenesis. LDL cholesterol plays a pivotal role in plaque formation by penetrating the endothelium and triggering an inflammatory response that leads to foam cell formation. While high-density lipoprotein (HDL) has a protective role, an imbalance between HDL and LDL levels exacerbates plaque accumulation. Despite advances in lipid-lowering therapies such as statins, a large proportion of patients remain at elevated risk due to residual lipid abnormalities and non-adherence to treatment.

Together, these three conditions—hypertension, diabetes mellitus, and hyperlipidemia—constitute a triad of metabolic and vascular abnormalities that synergistically increase the risk of CAD. The presence of multiple risk factors compounds the cardiovascular burden, as each condition interacts with others in complex ways that accelerate the development and progression of atherosclerosis. For instance, insulin resistance seen in type 2 diabetes can lead to increased sympathetic activity, contributing to elevated blood pressure, while hyperinsulinemia is known to affect lipid metabolism adversely.

Beyond clinical parameters, lifestyle factors such as tobacco use, excessive alcohol consumption, sedentary behavior, and poor dietary patterns are important modifiable contributors to CAD. Smoking induces endothelial damage and promotes thrombosis, while alcohol abuse is associated with arrhythmias and cardiomyopathy. Obesity, especially central or visceral obesity, plays a central role in the metabolic syndrome, which includes a constellation of CAD risk factors including hypertension, impaired glucose metabolism, and dyslipidemia.

Age and gender also influence the prevalence and outcomes of CAD. Older adults are naturally at higher risk due to the cumulative exposure to cardiovascular risk factors and age-related changes in vascular structure and function. Men are generally more affected by CAD at a younger age compared to women, although post-menopausal women eventually match or exceed the risk in men due to the loss of protective estrogen effects. Genetic predisposition, psychosocial stress, socioeconomic factors, and poor healthcare access further complicate the landscape of CAD prevalence.

The global burden of CAD is significant, with the World Health Organization reporting millions of deaths annually due to cardiovascular causes. In India, the prevalence is rising rapidly due to urbanization, dietary transitions, and increasing rates of lifestyle-related disorders. Recognizing at-risk populations and implementing targeted interventions is crucial to reversing this trend.

Given the high burden and interplay of hypertension, diabetes, and hyperlipidemia in the pathogenesis of CAD, this study aims to explore the prevalence of CAD in patients with these risk factors. It also examines age and gender disparities, identifies modifiable lifestyle contributors, and evaluates the effectiveness of patient counseling and medical interventions. The goal is to highlight the importance of early identification, risk stratification, and comprehensive management in reducing the incidence and impact of coronary artery disease.

OBJECTIVES

- To determine the prevalence of CAD in patients diagnosed with hypertension, diabetes mellitus, and hyperlipidemia.
- To analyze age-wise and gender-wise variations in CAD prevalence.
- To assess the effectiveness of patient counseling in reducing modifiable risk factors through lifestyle interventions.
- To evaluate medication use patterns among patients with CAD and comorbid conditions.

METHODS

This prospective observational study was conducted in a clinical setting, evaluating 150 patients with diagnosed hypertension, diabetes, and/or hyperlipidemia. Data were collected through clinical interviews, medical records, and diagnostic investigations. Prevalence was analyzed across different demographic subgroups, and counseling interventions were implemented and assessed for impact using pre- and post-intervention comparisons.

RESULTS

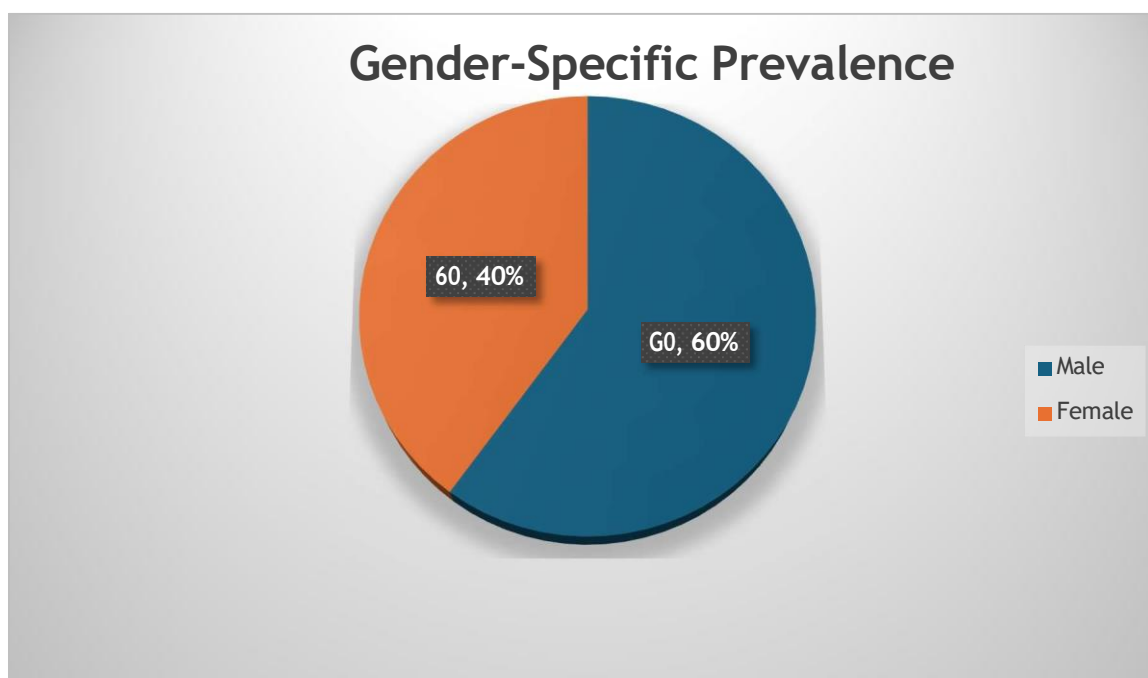
The study was conducted on 150 patients diagnosed with either hypertension, diabetes mellitus, hyperlipidemia, or a combination of these conditions. The primary objective was to assess the prevalence of CAD among these populations, along with evaluating the impact of lifestyle, gender, age, comorbidities, and medication adherence.

1. Prevalence by Comorbidity

- Among the 150 patients, **65 (43.3%)** had CAD associated with **hypertension**, marking it as the most prevalent risk factor.
- **50 patients (33.3%)** with **diabetes mellitus** were found to have CAD.
- The lowest prevalence was observed among patients with **hyperlipidemia**, with **35 (23.3%)** affected.

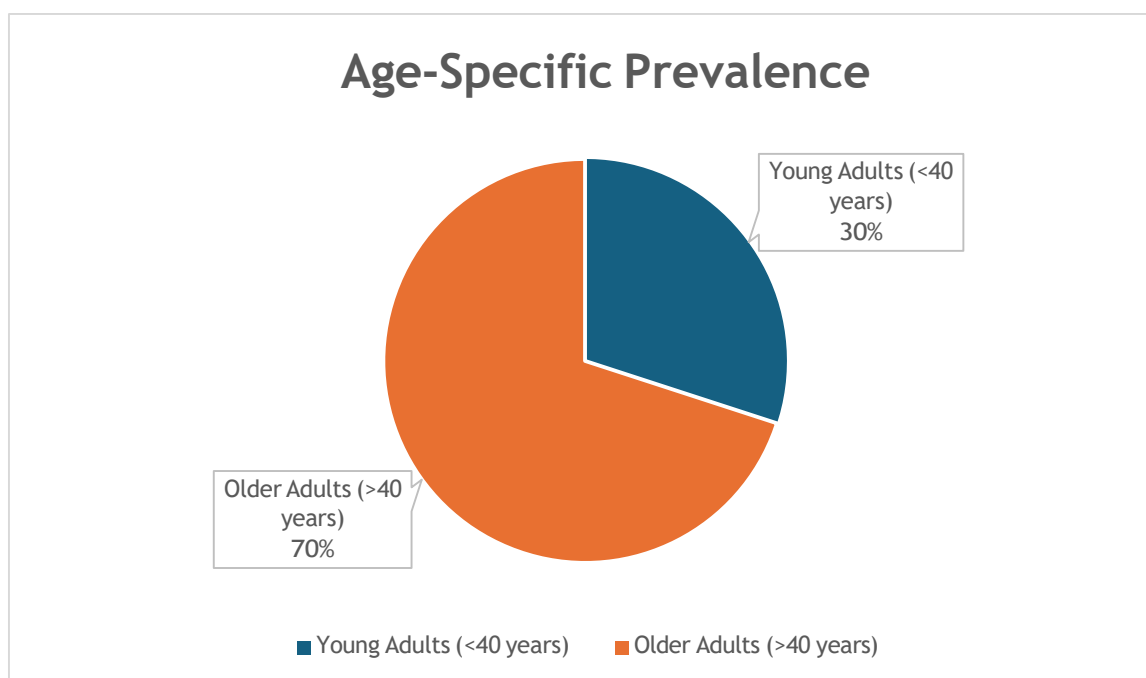
2. Gender-Based Prevalence

- **Male patients accounted for 60% (n=90)** of the study population, with higher CAD prevalence, likely linked to behavioral and metabolic factors.
- **Female patients made up 40% (n=60)**, showing lower but still notable CAD prevalence.



3. Age-Based Prevalence

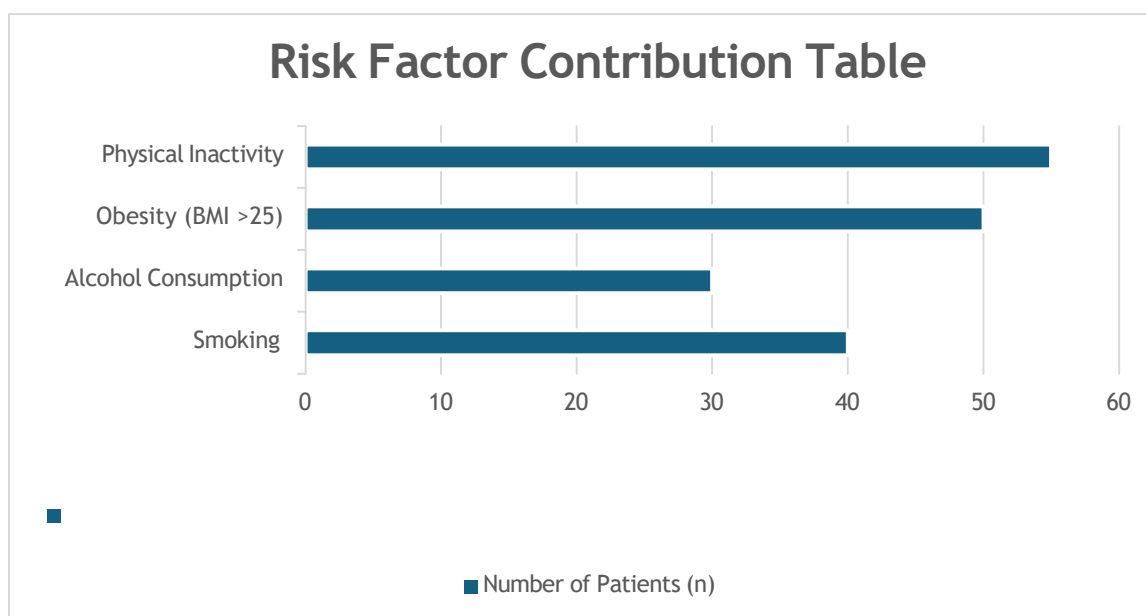
- Patients were stratified into two groups:
 - **Young Adults (<40 years):** 45 individuals (30%)
 - **Older Adults (>40 years):** 105 individuals (70%)
- Older adults had significantly **higher CAD prevalence**, underscoring the cumulative effect of risk factor exposure over time.



4. Risk Factor Contribution

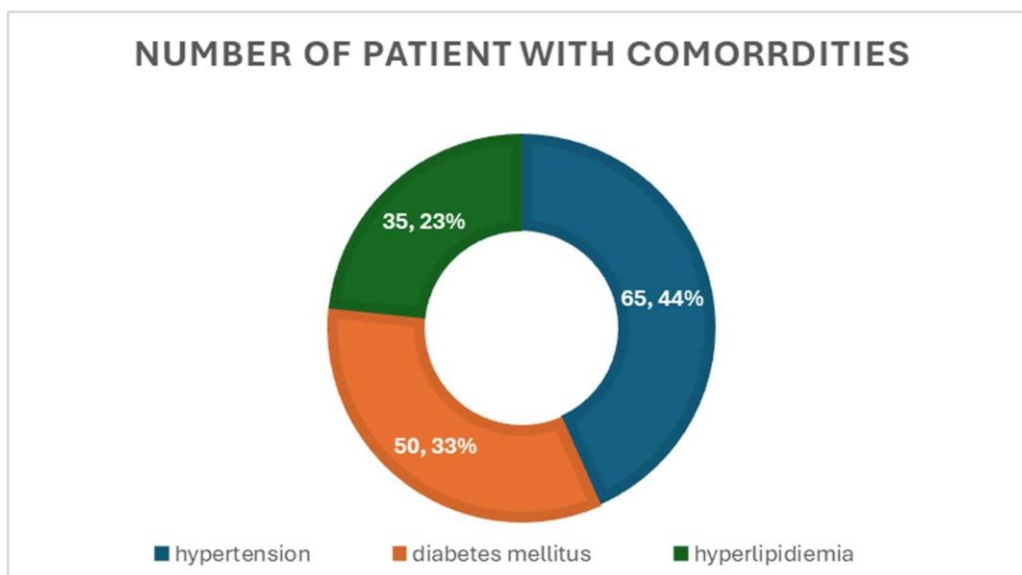
- **Physical inactivity** was the most common risk factor (36.7%), followed by **obesity (33.3%)**, **smoking (26.7%)**, and **alcohol use (20%)**.

	Smoking	Alcohol Consumption	Obesity (BMI >25)	Physical Inactivity
Number of Patients (n)	40	30	50	55



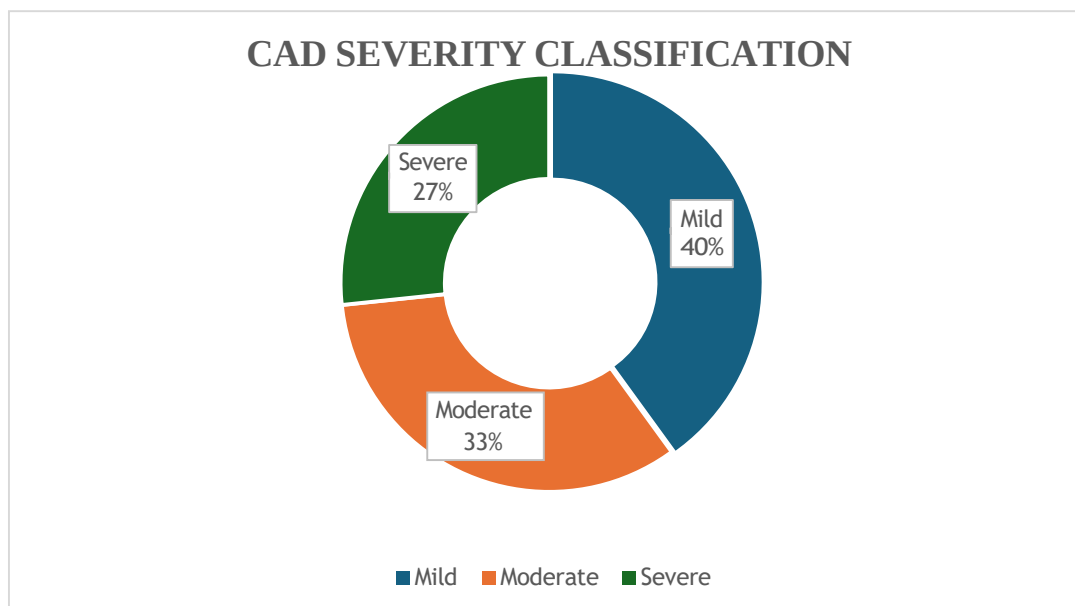
Comorbidity Prevalence

- The most common combination was **hypertension + diabetes (26.7%)**.
- Other combinations included:
 - Hypertension + hyperlipidemia (23.3%)
 - Diabetes + hyperlipidemia (16.7%)
 - All three conditions (10%)—these patients were at the **highest CAD risk**.



5. CAD Severity

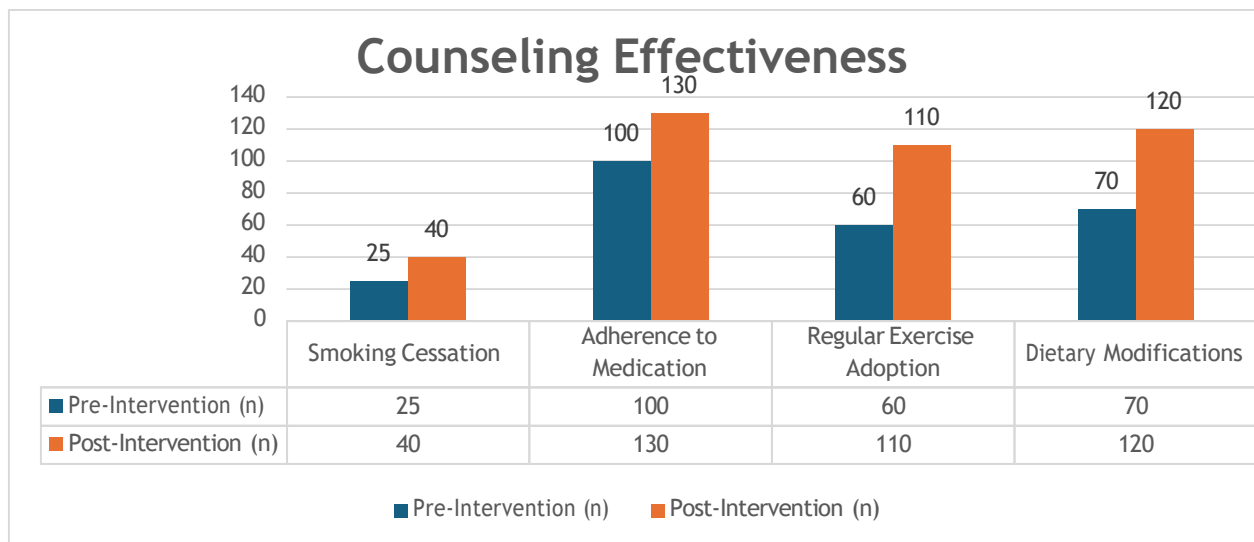
- CAD severity was categorized based on clinical history and diagnostic findings:
 - **Mild CAD:** 60 patients (40%)
 - **Moderate CAD:** 50 patients (33.3%)
 - **Severe CAD:** 40 patients (26.7%)



6. Counseling Effectiveness

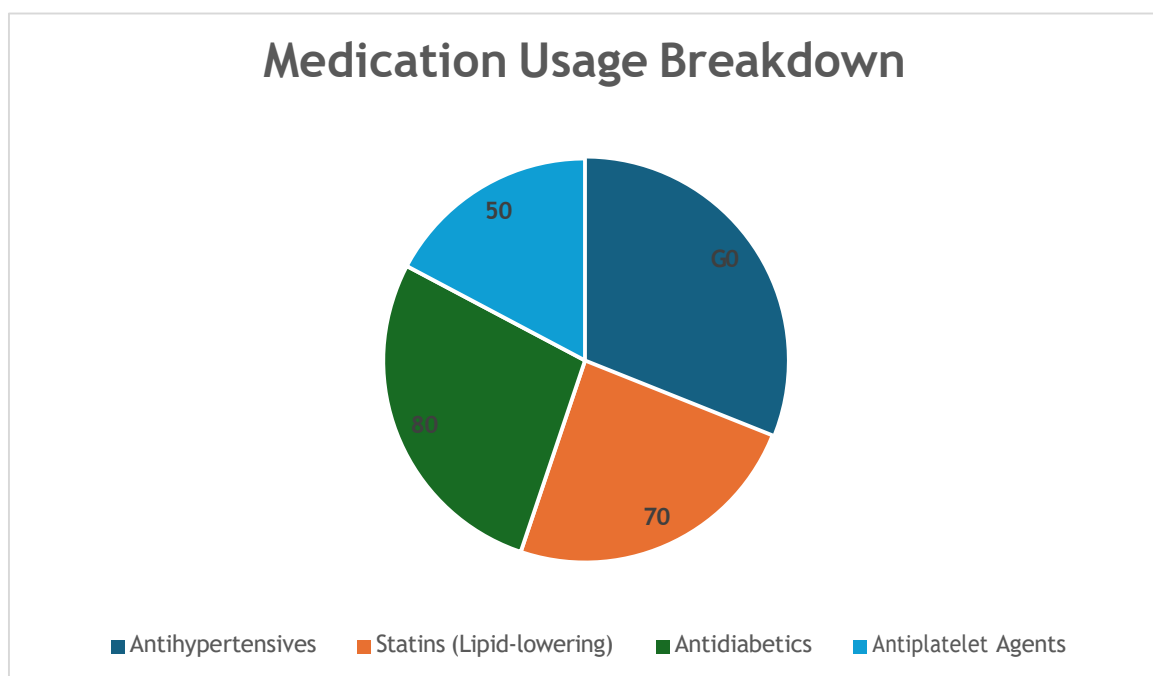
Post-intervention results demonstrated significant improvement:

- **Smoking cessation** improved by 37.5%.
- **Medication adherence** increased from 100 to 130 patients (30% improvement).
- **Regular exercise adoption** rose by 83.3%.
- **Dietary modifications** showed a 71.4% improvement



Medication Usage Breakdown

Medication Class	Number Patients (n)	of Usage (%)	Observations
Antihypertensives	90	60.0%	Widely used among hypertensive and comorbid patients.
Statins (Lipid-lowering)	70	46.7%	Common in hyperlipidemia patients.
Antidiabetics	80	53.3%	Includes oral and insulin therapies.
Antiplatelet Agents	50	33.3%	Used for patients with significant CAD risk.



DISCUSSION

The findings of this study underscore the dominant role of **hypertension** in the development of coronary artery disease, as nearly half of the patients with this condition had associated CAD. This aligns with global and regional data suggesting that elevated blood pressure significantly accelerates endothelial damage and atherosclerosis. The second most common comorbidity, **diabetes mellitus**, also presented a high CAD prevalence, consistent with known mechanisms involving chronic inflammation, hyperglycemia-induced vascular damage, and associated metabolic derangements.

Interestingly, **hyperlipidemia**, although a well-established risk factor, showed the **lowest individual prevalence**, which could reflect under-diagnosis or effective lipid control in certain patients due to prior interventions. However, when combined with hypertension or diabetes, hyperlipidemia greatly compounded the CAD risk, particularly in patients with all three conditions.

Age was a major influencing factor, with older adults (>40 years) showing more than twice the prevalence seen in younger adults. This is biologically plausible, considering the longer duration of exposure to risk factors and the progressive nature of atherosclerosis.

Gender differences were also apparent. **Male patients** showed significantly higher CAD prevalence, which may be attributed to higher smoking rates, stress, hormonal differences, and later health-seeking behavior compared to females.

From a lifestyle perspective, **physical inactivity and obesity** emerged as the leading modifiable contributors. This emphasizes the need for preventive public health strategies targeting sedentary lifestyles, especially among individuals with underlying metabolic conditions.

The **effectiveness of counseling interventions** is a key highlight of this study. There was notable improvement in lifestyle behaviors, especially in physical activity and diet adherence. Medication compliance also improved post-intervention, showcasing the pivotal role of patient education and routine follow-up.

Finally, **CAD severity classification** revealed that while a majority had mild to moderate disease, **over one-fourth of patients had severe CAD**, necessitating aggressive management and close monitoring.

CONCLUSION

This study reinforces the high prevalence of coronary artery disease among patients with hypertension, diabetes mellitus, and hyperlipidemia, with hypertension emerging as the most significant individual contributor. CAD was more common in older adults and males, suggesting demographic disparities that must be addressed through tailored prevention and management strategies.

The presence of multiple comorbidities significantly elevated the risk and severity of CAD, highlighting the need for integrated management of metabolic syndrome components. Lifestyle factors such as inactivity, smoking, and obesity played a major role, but also provided opportunities for successful intervention, as demonstrated by the counseling outcomes in this study.

The implementation of structured lifestyle counseling and patient education had a measurable impact on behavior change, demonstrating that non-pharmacological interventions are highly effective when combined with medical therapy.

In conclusion, this study underscores the importance of **early detection, continuous monitoring, risk factor control, and patient-centered care** in mitigating the burden of CAD. Future efforts should focus on longitudinal monitoring, larger population studies, and the incorporation of digital health tools for long-term disease management.

REFERENCES

1. Bertoluci M., Rocha V. Cardiovascular risk assessment in patients with diabetes. *Diabetol. Metab. Syndr*, 2017; 9: 25. doi: 10.1186/s13098-017-0225-1
2. Baldwin M. Assessing cardiovascular risk factors and selecting agents to successfully treat patients with type 2 diabetes mellitus. *J. Am. Osteopath. Assoc*, 2011; 111(2): S2–S12.
3. Mansour A.A., Douri F.A. Diabetes in Iraq: Facing the epidemic. A systematic review. *Wulfemia*, 2015; 22(3): 258–273.
4. Lam T., Burns K., Dennis M., Cheung N.W., Gunton J.E. Assessment of cardiovascular risk in diabetes: Risk scores and provocative testing. *World J. Diabetes*, 2015; 6(4): 634–641. doi: 10.4239/wjd.v6.i4.634.
5. Shah A.D., Langenberg C., Rapsomaniki E., et al. Type 2 diabetes and incidence of cardiovascular diseases: A cohort study in 1.9 million people. *Lancet Diabetes Endocrinol*, 2015; 3(2): 105–113. doi: 10.1016/S2213-8587(14)70219-0.
6. Schofield J., Ho J., Soran H. Cardiovascular risk in type 1 diabetes mellitus. *Diabetes Ther*, 2019; 10(3): 773–789. doi: 10.1007/s13300-019-0612-8.
7. Rydén L., Grant P.J., Anker S.D., et al. ESC Guidelines on diabetes, pre-diabetes, and cardiovascular diseases developed in collaboration with the EASD: the Task Force on diabetes, pre-diabetes, and cardiovascular diseases of the European Society of Cardiology (ESC) and developed in collaboration with the European Association for the Study of Diabetes (EASD). *Eur. Heart J.*, 2013; 34(39): 3035–3087. doi: 10.1093/eurheartj/ehi108.
8. Moser M. The treatment of hypertension. A story of myths, misconceptions, controversies and heroics. 2nd ed. Darien, CT: Le Jacq Communications, Inc.; 2002.
9. Truett J., Cornfield J., Kannel W. A multivariate analysis of the risk of coronary heart disease in Framingham. *J. Chronic Dis*, 1967; 20(7): 511–524. doi: 10.1016/0021-9681(67)90082-3.
10. American Heart Association. Coronary risk handbook: Estimating risk of coronary heart disease in daily practice. New York: American Heart Association, 1973.
11. Kannel W.B., McGee D., Gordon T. A general cardiovascular risk profile: The Framingham Study. *Am. J. Cardiol*, 1976; 38(1): 46–51. doi: 10.1016/0002-9149(76)90061-8.
12. Pickering G. The nature of essential hypertension. London, New York: Grune & Stratton, Inc, 1961.