

## Evaluating the Prevalence and Clinical Consequences of Metabolic Syndrome Among Cardiac Patients

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### ABSTRACT

**Background:** Increased cardiovascular risk is closely linked to metabolic syndrome, which is defined by a collection of metabolic disorders such as insulin resistance, dyslipidemia, hypertension, and abdominal obesity. In order to better understand the effects of metabolic syndrome and develop care methods, this study looks into its prevalence and clinical outcomes among cardiac patients.

**Methods:** The metabolic syndrome and its components were evaluated in 80 cardiac patients in total. Demographic information, the distribution and prevalence of metabolic syndrome components, clinical outcomes were all gathered.

**Results:** Of the population under study, 65% had metabolic syndrome. The most prevalent characteristics were fasting hyperglycemia (67.5%) and high blood pressure (77.5%). In comparison to individuals without metabolic syndrome, patients with metabolic syndrome showed significantly higher mean values for triglycerides (165.7 mg/dL), fasting glucose (130.4 mg/dL), systolic blood pressure (140.8 mmHg), and waist circumference (102.5 cm). Patients with metabolic syndrome had worse clinical outcomes, including greater rates of heart failure (42.3%), arrhythmias

(30.8%), and acute myocardial infarction (53.8%), along with a higher death rate (19.2%).

**Conclusion:** Metabolic syndrome has an extremely high prevalence in cardiac patients and has been linked to very poor clinical outcomes, including increased rates of myocardial infarction, heart failure, and mortality. Metabolic syndrome is, therefore, an important issue that needs to be effectively managed through targeted interventions and improved medication adherence for better patient outcomes and reduced cardiovascular risk. Further research is needed to arrive at the best possible treatment strategies and bridge existing gaps in adherence.

**Keywords:** Metabolic syndrome, cardiovascular risk, cardiac patients, prevalence, clinical outcomes.

### I. INTRODUCTION

The metabolic syndrome represents a noteworthy public health issue that is typified by an array of metabolic irregularities, such as insulin resistance, dyslipidemia, hypertension, and abdominal obesity. Given its strong correlation with a higher risk of cardiovascular diseases (CVD), research on this syndrome is essential to enhancing the care of cardiac patients.<sup>[1,2,3]</sup>

A significant percentage of cardiac patients suffer from metabolic syndrome. Its frequency varies from 25% to 65% in different populations, according to epidemiological research, which reflects its pervasive influence on cardiovascular health. The significant frequency among cardiac patients emphasizes the need for focused therapy and increased awareness. The metabolic anomalies that characterize the syndrome are made worse by age, sedentary lifestyles, and poor eating habits, all of which contribute to the high prevalence

The presence of three or more of the following factors is usually required for the diagnosis of metabolic syndrome: low high-density lipoprotein (HDL) cholesterol, high triglycerides, raised blood pressure, elevated fasting glucose, and abdominal obesity. These elements are frequently present in cardiac patients and have a major impact on the total risk profile. For example, dyslipidemia and high blood pressure are common conditions, and many patients present with more than one of these conditions at the same time.<sup>[4,5,6]</sup>

In cardiac patients, metabolic syndrome has a major negative influence on clinical outcomes and raises morbidity and mortality. It is commonly known that metabolic syndrome is linked to unfavorable cardiovascular outcomes such acute myocardial infarction (AMI), heart failure, and stroke. Individuals who have metabolic syndrome are more likely to experience these occurrences because of the concomitant conditions of dyslipidemia, insulin resistance, and high blood pressure. In order to effectively manage metabolic syndrome in cardiac patients, each component must be addressed by medication, lifestyle changes, and routine monitoring.<sup>[7,8]</sup>

The increasing incidence of metabolic syndrome and its significant consequences for cardiovascular wellness are the driving forces behind the need for this research. Although the various components of metabolic syndrome are well understood, there is an absence of thorough research that particularly address the prevalence and clinical implications of metabolic syndrome in individuals with heart problems. This study intends to demonstrate the severity of metabolic syndrome within this high-risk population by looking at the distribution of metabolic syndrome components and clinical outcomes. Gaining an understanding of these variables can help develop more efficient management techniques, enhance patient outcomes, and direct future research into focused interventions. The results of this study are crucial

for improving clinical procedures and creating plans to lessen the detrimental impact of metabolic syndrome on cardiovascular health.<sup>[9,10]</sup>

#### **AIM**

To evaluate the prevalence of metabolic syndrome among cardiac patients and assess its impact on clinical outcomes.

#### **OBJECTIVES:**

1. To determine the Prevalence of Metabolic Syndrome.
2. To Identify the Prevalence of Metabolic Syndrome Components.
3. To examine Clinical Outcomes Associated with Metabolic Syndrome.
4. To Compare Mean Values of Metabolic Syndrome Components.
5. To Identify Medication Use Patterns among cardiac patients with metabolic syndrome.

#### **II. METHODOLOGY:**

**Study Site :** The study was carried out at a tertiary care hospital over a period of six months

**Study Duration:** The study is conducted over a period of 6 months.

**Study Design:** This is a cross-sectional, observational study

**Sample Size:** A total of 80 cardiac patients were recruited for the study

#### **Study Criteria**

##### **Inclusion Criteria:**

1. Adults aged 40 years and above.
2. Diagnosed with a cardiac condition (e.g., coronary artery disease, heart failure).
3. Willing to provide informed consent.

##### **Exclusion Criteria:**

4. Pregnancy or lactation.
5. Participation in another clinical trial during the study period.

**Study method and data collection :** A total of 80 cardiac patients, aged 40 and above, were selected through purposive sampling based on their diagnosis of a cardiac condition and willingness to participate. Metabolic syndrome was diagnosed according to the International Diabetes Federation criteria, requiring at least three of the following: abdominal obesity, elevated blood pressure, elevated fasting glucose, elevated triglycerides, and low HDL cholesterol. Data were collected via medical records, patient interviews, and clinical assessments. Descriptive statistics were used to analyze demographic characteristics, prevalence of

metabolic syndrome components, and clinical outcomes. The mean values of metabolic syndrome components were compared between patients with and without metabolic syndrome.

### Statistical Analysis

Descriptive statistics were used to analyze demographic characteristics and the prevalence of metabolic syndrome components. Mean values of metabolic syndrome components were compared between patients with and without metabolic syndrome. The distribution of drug classes and specific medications was assessed,

## III. RESULTS

### Prevalence calculation

Prevalence is calculated as the number of patients with metabolic syndrome during the time of study

divided by total number of patients with cardiac patients during the time.

There were 80 patients enrolled in this study with cardiac patients.

Metabolic syndrome is diagnosed when a person has three or more of the following five risk factors: waist circumference over 40 inches (men) or 35 inches (women), blood pressure over 130/85 mmHg, fasting triglyceride (TG) level over 150 mg/dl, fasting high-density lipoprotein (HDL) cholesterol level less than 40 mg/dl (men) or 50 mg/dl (women) and fasting blood sugar over 100 mg/dl. 52 out of the 80 patients with cardiac diseases have three or more of the risk factors.

Hence, the Prevalence of Metabolic Syndrome among Cardiac Patients in this study was found to be 65%.

### 1. Subject Characteristics

Characteristic	Total	Metabolic Syndrome	Non-Metabolic Syndrome
<b>Age (years)</b>			
30-39	10 (12.5%)	4 (7.7%)	6 (21.4%)
40-49	22 (27.5%)	14 (26.9%)	8 (28.6%)
50-59	30 (37.5%)	22 (42.3%)	8 (28.6%)
60-69	18 (22.5%)	12 (23.1%)	6 (21.4%)
<b>Gender</b>			
Male	56 (70%)	40 (76.9%)	16 (57.1%)
Female	24 (30%)	12 (23.1%)	12 (42.9%)
<b>BMI (kg/m<sup>2</sup>)</b>			
Normal Weight	15 (18.75%)	5 (9.6%)	10 (35.7%)
Overweight	30 (37.5%)	15 (28.8%)	15 (53.6%)
Obese	35 (43.75%)	32 (61.5%)	3 (10.7%)
<b>Residence Area</b>			
Urban	60 (75%)	40 (76.9%)	20 (71.4%)
Rural	20 (25%)	12 (23.1%)	8 (28.6%)

The majority of patients were in the 50-59 age group (37.5%). The distribution showed a higher prevalence of metabolic syndrome in older age groups. Males were predominant (70%), with a higher prevalence of metabolic syndrome compared to females. Obesity was prevalent

(43.75%), particularly among those with metabolic syndrome (61.5%). Most patients lived in urban areas (75%), with a slight increase in metabolic syndrome prevalence compared to those in rural areas.

### 2. Prevalence of Metabolic Syndrome Components Among Cardiac Patients

Component	Total	Metabolic Syndrome	Non-Metabolic Syndrome
<b>Abdominal Obesity</b>	48 (60%)	40 (76.9%)	8 (28.6%)
<b>Elevated Blood Pressure</b>	62 (77.5%)	50 (96.2%)	12 (42.9%)
<b>Elevated Fasting Glucose</b>	54 (67.5%)	46 (88.5%)	8 (28.6%)
<b>Elevated Triglycerides</b>	44 (55%)	38 (73.1%)	6 (21.4%)
<b>Low HDL Cholesterol</b>	50 (62.5%)	42 (80.8%)	8 (28.6%)

This table displays the prevalence of each component of metabolic syndrome among the patients. Abdominal Obesity was found in 60% of patients, significantly higher in those with metabolic syndrome (76.9%), Elevated Blood Pressure was present in 77.5% of patients, with a higher prevalence among those with metabolic syndrome (96.2%), Elevated Fasting Glucose was

observed in 67.5% of patients, with 88.5% among those with metabolic syndrome, Elevated Triglycerides was found in 55% of patients, notably higher in those with metabolic syndrome (73.1%) and Low HDL Cholesterol was Found in 62.5% of patients, with a prevalence of 80.8% among those with metabolic syndrome.

### 3. Distribution of the Number of Metabolic Syndrome Components Present in Cardiac Patients

Number of Components	Total (n=52)
3 Components	20 (38.5%)
4 Components	18 (34.6%)
5 Components	14 (26.9%)

This table provides the distribution of patients based on the number of metabolic syndrome components present. It shows how many patients have three, four, or five components of the syndrome and the percentage of each category.

### 4. Clinical Outcomes of Cardiac Patients with Metabolic Syndrome

Clinical Outcome	Metabolic Syndrome	Non-Metabolic Syndrome
Acute Myocardial Infarction	28 (53.8%)	8 (28.6%)
Heart Failure	22 (42.3%)	6 (21.4%)
Arrhythmias	16 (30.8%)	4 (14.3%)
Mortality Rate	10 (19.2%)	2 (7.1%)

This table compares clinical outcomes between patients with and without metabolic syndrome. Acute Myocardial Infarction affected 53.8% of patients with metabolic syndrome compared to 28.6% of those without, Heart Failure was Seen in 42.3% of patients with metabolic syndrome, versus 21.4% in the non-metabolic

syndrome group, Arrhythmias was reported in 30.8% of those with metabolic syndrome, compared to 14.3% of those without, Mortality Rate was higher in patients with metabolic syndrome (19.2%) compared to those without (7.1%).

### 5. Mean Values of Metabolic Syndrome Components

Component	Metabolic Syndrome (n=52)	Non-Metabolic Syndrome (n=28)
Waist Circumference (cm)	102.5 ± 8.3	88.4 ± 7.2
Systolic Blood Pressure (mmHg)	140.8 ± 10.5	125.6 ± 9.7
Fasting Glucose (mg/dL)	130.4 ± 15.2	95.8 ± 10.4
Triglycerides (mg/dL)	165.7 ± 20.4	120.3 ± 15.8
HDL Cholesterol (mg/dL)	40.3 ± 5.6	50.2 ± 6.1

Patients with metabolic syndrome exhibited higher mean values for waist circumference (102.5 cm) compared to those without (88.4 cm), indicating greater abdominal obesity. Their systolic blood pressure was notably elevated at 140.8 mmHg, compared to 125.6

mmHg in non-metabolic syndrome patients. Fasting glucose levels were also higher in the metabolic syndrome group (130.4 mg/dL) versus the non-metabolic syndrome group (95.8 mg/dL), reflecting poorer glucose control. Additionally, triglyceride levels were elevated in patients with

metabolic syndrome (165.7 mg/dL) compared to those without (120.3 mg/dL), and HDL cholesterol was lower in the metabolic syndrome group (40.3

mg/dL) versus the non-metabolic syndrome group (50.2 mg/dL).

#### 6. Treatment patterns among Cardiac Patients with Metabolic Syndrome

Drug Class	Number of Patients (n=52)
ACE Inhibitors	32 (61.5%)
Beta-Blockers	28 (53.8%)
Calcium Channel Blockers	24 (46.2%)
Antiplatelets	42 (80.8%)
Diuretics	38 (73.1%)
Oral Hypoglycemics	26 (50%)
Insulin	34 (65.4%)
ARBs	16 (30.8%)
Nitrates	20 (38.5%)

This table lists the common drug classes and specific drugs used among cardiac patients with metabolic syndrome. Statins and ACE Inhibitors were common drugs used among patients with metabolic syndrome.

#### IV. DISCUSSION

The study revealed a prevalence of metabolic syndrome of 65% among the cardiac patients, highlighting its significant burden in this population. The demographic analysis reveals that metabolic syndrome is more prevalent in middle-aged to older adults, particularly in the 50-59 age groups. Males were predominant with a higher prevalence of metabolic syndrome compared to females. Obesity was more prevalent particularly among those with metabolic syndrome. Most patients lived in urban areas have high metabolic syndrome prevalence compared to those in rural areas.

The distribution of the number of metabolic syndrome components among patients shows that a majority exhibit three or four components, with 38.5% having three components and 34.6% having four. The prevalence of individual components of metabolic syndrome, such as elevated blood pressure (77.5%) and elevated fasting glucose (67.5%), underscores the widespread nature of these risk factors among cardiac patients. The markedly higher prevalence of these components in patients with metabolic syndrome (96.2% and 88.5%, respectively) confirms their central role in the syndrome. Elevated triglycerides and low HDL cholesterol are also significantly more common in patients with metabolic syndrome, highlighting the metabolic disturbances that accompany this condition.

The clinical outcomes of cardiac patients with metabolic syndrome reveal a higher incidence of acute myocardial infarction (53.8%) and heart failure (42.3%) compared to those without metabolic syndrome. This increased risk is consistent with the known association between metabolic syndrome and adverse cardiovascular events.

The table detailing drug classes and specific medications used among patients with metabolic syndrome shows a diverse range of treatments. Statins are the most commonly prescribed class (80.8%), reflecting their role in managing dyslipidemia associated with metabolic syndrome. The use of ACE inhibitors, beta-blockers, and antiplatelets indicates a focus on managing hypertension and preventing cardiovascular events.

#### V. CONCLUSION

This study concludes by highlighting the significant influence metabolic syndrome has on clinical outcomes and its high incidence among cardiac patients. The results highlight the significance of identifying and treating metabolic syndrome, as it affects 65% of the sample and can lead to serious cardiovascular events. Significantly increased mean values for important metabolic parameters, such as blood pressure, fasting glucose, waist circumference, and HDL cholesterol, were seen in patients with metabolic syndrome. Elevated risks of myocardial infarction, heart failure, and mortality are linked to these disorders. The examination of drug usage indicates a thorough approach to these patients' care. The present study highlights the necessity of focused therapies and more investigation to enhance the

management approaches for cardiac patients suffering from metabolic syndrome.

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