Original Research

# CORRELATION OF ADIPONECTIN WITH BODY MASS INDEX IN CORONARY ARTERY DISEASE PATIENTS WITH AND WITHOUT TYPE II DIABETES MELLITUS

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## ABSTRACT

**Background:** Adiponectin is an adipocyte-derived hormone with anti-inflammatory, anti-atherogenic, and insulin-sensitizing properties. Reduced adiponectin levels have been associated with obesity, type II diabetes mellitus, and coronary artery disease (CAD). The present study aimed to evaluate the relationship between adiponectin, body mass index (BMI), and glycosylated hemoglobin (HbA1c) in CAD patients with and without type II diabetes mellitus.

**Methodology:** This comparative observational study was conducted in the Department of General Medicine at Sree Mookambika Institute of Medical Sciences from January 2025 to December 2026. A total of 90 subjects were included, among whom 30 patients had CAD with type II diabetes mellitus. Blood samples were collected under aseptic precautions for estimation of serum adiponectin and HbA1c levels. BMI was calculated using standard WHO criteria. Statistical analysis was performed to determine correlations and group differences.

**Results:** The mean BMI was significantly higher among diabetic subjects compared to CAD patients with diabetes ($p=0.001$). HbA1c levels were also significantly elevated in diabetic patients ($p=0.001$). Adiponectin showed a negative correlation with BMI ($r=-0.14$) and a positive correlation with HbA1c ($r=0.56$) among CAD patients with diabetes mellitus.

**Conclusion:** Altered adiponectin levels are significantly associated with obesity and glycemic status in CAD patients with type II diabetes mellitus. Adiponectin may serve as a potential biomarker for metabolic and cardiovascular risk assessment.

**Keywords:** Adiponectin, Coronary Artery Disease, Type Ii Diabetes Mellitus, Body Mass Index, Hba1c, Cardiovascular Risk.

## INTRODUCTION

Coronary artery disease (CAD) remains one of the leading causes of morbidity and mortality worldwide and represents a major public health challenge. The development of CAD is multifactorial and involves complex interactions between metabolic, inflammatory, genetic, and environmental factors. Obesity, insulin resistance, metabolic syndrome, and type II diabetes mellitus are well-established contributors to the pathogenesis of atherosclerosis and cardiovascular disease [1].

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In recent years, increasing attention has been focused on the role of adipose tissue as an active endocrine organ involved in metabolic regulation and cardiovascular homeostasis.

Adipose tissue is no longer considered merely a storage site for excess energy but is now recognized as a metabolically active endocrine organ that secretes a variety of biologically active substances known as adipokines. These include tumor necrosis factor-alpha (TNF-α), plasminogen activator inhibitor-1, leptin, resistin, angiotensinogen, and adiponectin [2]. Among these adipokines, adiponectin has gained considerable interest because of its anti-inflammatory, anti-atherogenic, and insulin-sensitizing properties. Adiponectin plays an important role in glucose regulation, lipid metabolism, endothelial function, and maintenance of energy homeostasis [3].

Atherosclerosis is the principal underlying mechanism responsible for coronary artery disease. The formation of atheromatous plaques within coronary arteries can lead to plaque instability,

rupture, and subsequent thrombus formation, resulting in acute coronary syndromes and myocardial infarction [4]. Metabolic syndrome and type II diabetes mellitus significantly accelerate the progression of endothelial dysfunction and atherosclerotic plaque formation. Chronic hyperglycemia, insulin resistance, oxidative stress, and systemic inflammation contribute to vascular injury and increase cardiovascular risk in diabetic individuals [5]. Adiponectin is believed to play a protective role in this process by modulating endothelial inflammatory responses and inhibiting vascular smooth muscle proliferation and foam cell formation [6].

Several studies have demonstrated that low circulating adiponectin levels are associated with obesity, insulin resistance, type II diabetes mellitus, hypertension, dyslipidemia, and coronary artery disease [7]. The circulating concentration of adiponectin typically ranges from 5 to 30 µg/mL, which is considerably higher than many other adipocyte-derived hormones [8]. Reduced adiponectin levels have been linked to increased inflammatory activity and progression of atherosclerosis, suggesting that hypoadiponectinemia may serve as an independent risk factor for cardiovascular disease [9].

Body mass index (BMI) is a commonly used anthropometric parameter for assessing obesity and has a strong association with metabolic abnormalities and cardiovascular complications. Increased BMI is frequently associated with lower adiponectin levels, indicating an inverse relationship between adiposity and adiponectin secretion [10]. In patients with coronary artery disease, particularly those with coexisting type II diabetes mellitus, alterations in adiponectin levels may reflect both metabolic dysfunction and cardiovascular risk burden.

The prevalence of type II diabetes mellitus is rapidly increasing worldwide and has become a major independent risk factor for cardiovascular diseases, including coronary artery disease, acute coronary syndrome, and myocardial infarction [11]. Identifying biomarkers associated with metabolic and cardiovascular dysfunction may aid in early diagnosis, risk stratification, and therapeutic monitoring. Therefore, the present study was undertaken to evaluate the relationship between adiponectin levels and body mass index in patients with coronary artery disease with and without type II diabetes mellitus and to assess the potential role of adiponectin as a biomarker in cardiovascular disease.

**Aim**

To evaluate the relationship between serum adiponectin levels and body mass index in patients with coronary artery disease with and without type II diabetes mellitus.

**Objectives**

1. To estimate serum adiponectin levels in patients diagnosed with coronary artery disease.
2. To assess and compare body mass index (BMI) among coronary artery disease patients with and without type II diabetes mellitus.

## MATERIALS AND METHODS

This comparative observational study was conducted in the Department of General Medicine at Sree Mookambika Institute of Medical Sciences during the study period from January 2025 to December 2026. The study included patients diagnosed with coronary artery disease, among whom 30 patients had associated type II diabetes mellitus. Patients with sexually transmitted diseases, rheumatoid arthritis, sepsis, asthma, malignancy, renal disease, liver disease, chronic systemic illness, malnutrition, and pregnant women were excluded from the study to avoid confounding factors that could influence adiponectin levels and metabolic parameters.

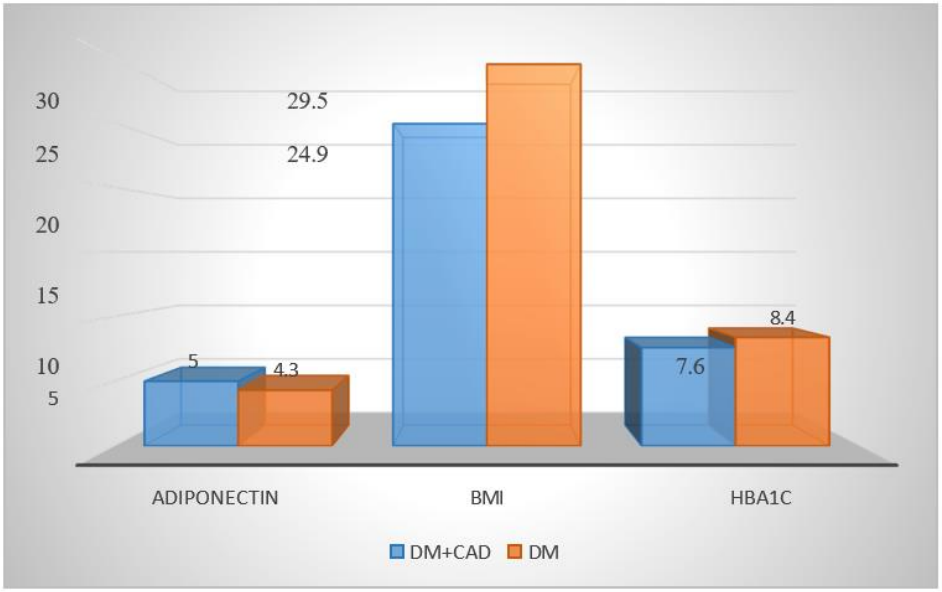
After obtaining informed consent, detailed clinical history and general examination findings were recorded for all study participants. Anthropometric measurements including body mass index (BMI) were assessed using standard methods. Blood samples were collected from all subjects under strict aseptic precautions. Approximately 5 mL of venous blood was collected from each participant. Of this, 3 mL of blood was transferred into a plain vial for estimation of serum adiponectin levels, while 2 mL of blood was transferred into an EDTA vial for estimation of glycosylated hemoglobin (HbA1c). The collected blood samples were centrifuged at 3000 rpm for 10 minutes to separate serum and plasma. The separated samples were then transferred into different aliquots and stored appropriately for further biochemical investigations.

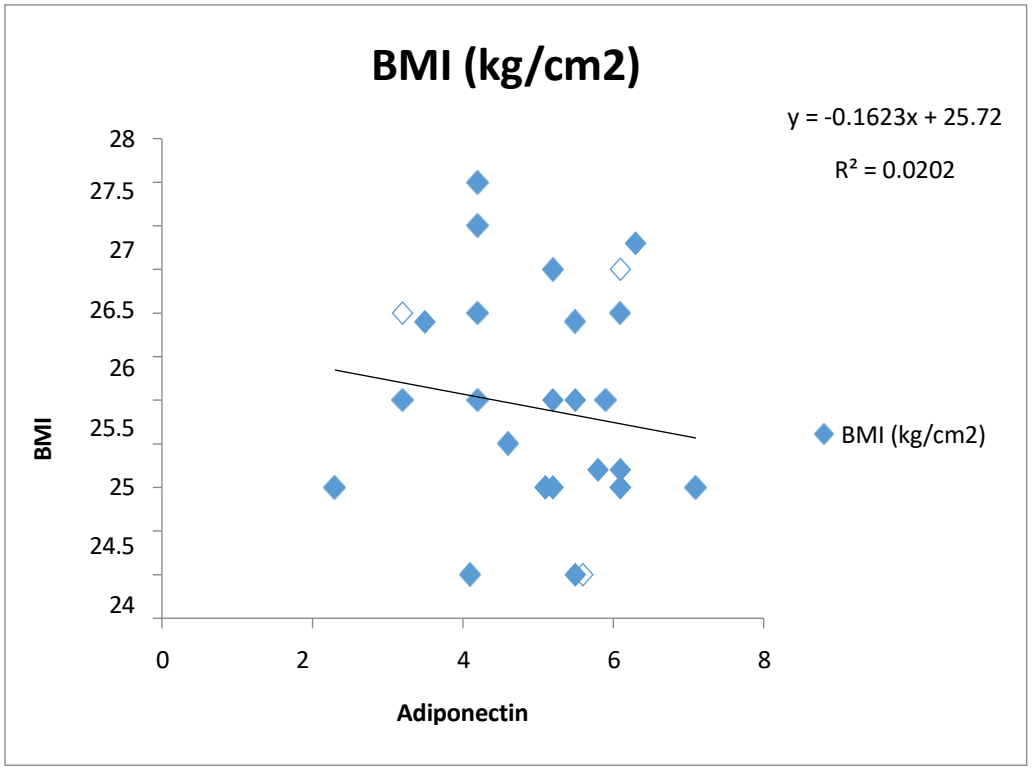
Serum adiponectin levels and other biochemical parameters were analyzed using standard laboratory methods. Glycosylated hemoglobin was estimated to assess long-term glycemic control among diabetic patients. The collected data were entered into Microsoft Excel and analyzed using appropriate statistical software. Quantitative variables were expressed as mean ± standard deviation, while qualitative variables were expressed as frequencies and percentages. Comparison between groups was performed using Student's t-test or Chi-square test wherever applicable. Correlation analysis was used to determine the relationship between adiponectin levels and body mass index. A p-value of less than 0.05 was considered statistically significant.

## RESULT

**Table-1** Comparison of Plasma Adiponectin, BMI and HbA1c in coronary artery diseases with and without Diabetes

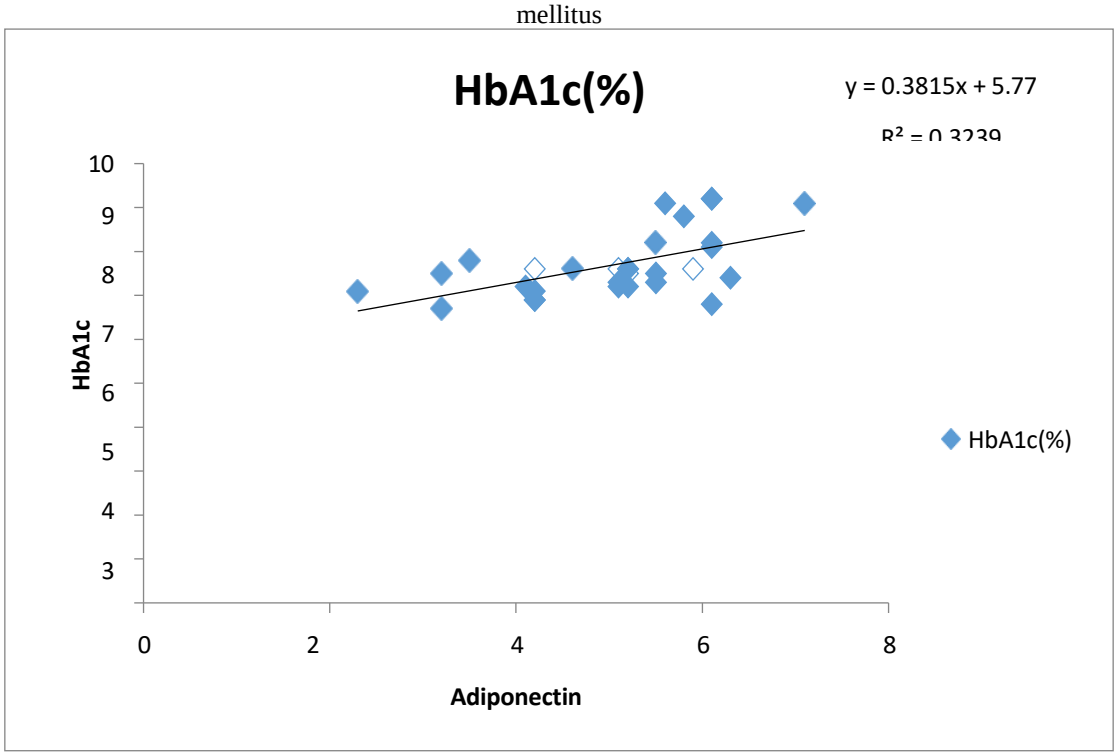
| Baseline Characteristic | CAD with Diabetes (Mean ± SD) | Diabetes mellitus (DM) (Mean ± SD) | *P-Value* |
|---|---|---|---|
| Adiponectin | 5.05±1.08 | 8.4±0.93 | 0.0001** |
| Body mass index (BMI) | 24.9±1.24 | 29.56±1.38 | 0.0001** |
| HbA1c | 7.69±0.72 | 8.4±0.93 | 0.0001** |

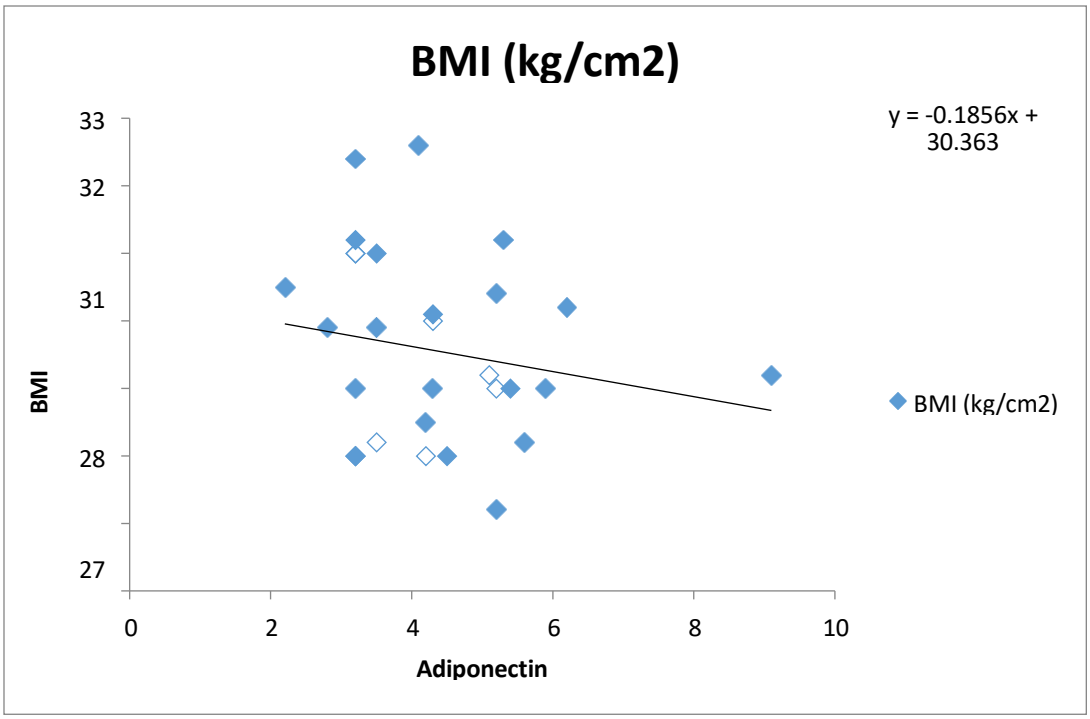


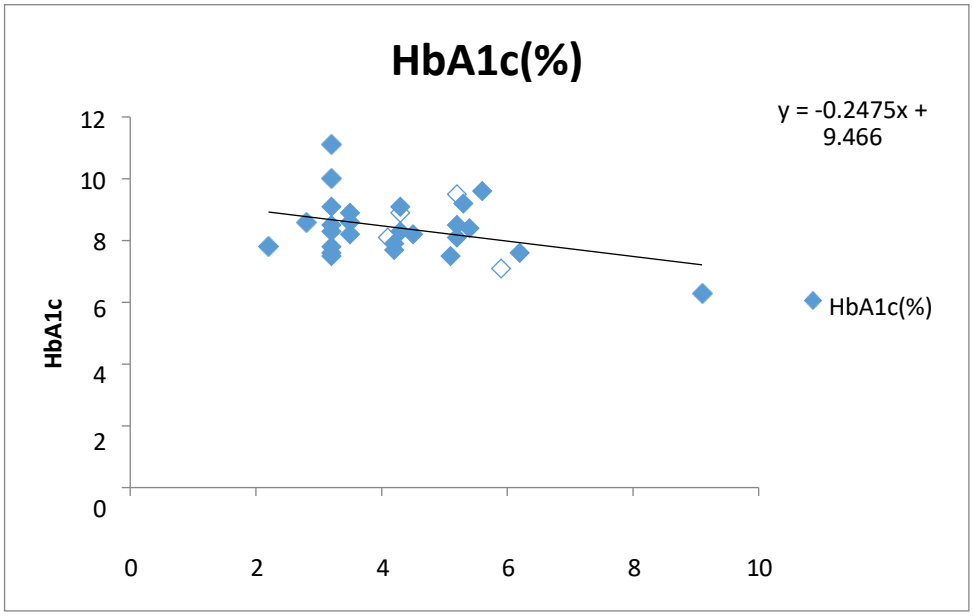

**Graph-2** Relationship between Plasma Adiponectin and BMI in coronary artery diseases with Diabetes mellitus
**Graph-3** Relationship between Plasma Adiponectin and HbA1c in coronary artery diseases with Diabetes

mellitus




**Graph-4** Relationship between Plasma Adiponectin and BMI in Diabetes Mellitus




**Graph-5** Relationship between Plasma Adiponectin and HbA1c in Diabetes Mellitus

**Table: - 2**- Correlation analysis between Adiponectin with BMI and HbA1c

| Independent variables | CAD with Diabetes (r value) **BMI** | Diabetes mellitus (r value) **HbA1c** |
|---|---|---|
| Adiponectin | -0.14 | -0.18 |
| | 0.56 | -0.36 |

## DISCUSSION

The present study evaluated the relationship between adiponectin, body mass index (BMI), and glycosylated hemoglobin (HbA1c) among patients with coronary artery disease (CAD) with and without type II diabetes mellitus. The findings of the study demonstrated significant alterations in adiponectin levels in association with obesity and poor glycemic control, suggesting its important role in metabolic and cardiovascular disorders.

The increasing burden of non-communicable diseases due to epidemiological transition, sedentary lifestyle, and changing dietary habits has resulted in a rising prevalence of obesity, diabetes mellitus, and coronary artery disease worldwide [12]. Adipose tissue is now recognized as an active endocrine organ that secretes several adipokines involved in inflammation, insulin sensitivity, and atherosclerosis. Among these adipokines, adiponectin has attracted major clinical interest because of its anti-inflammatory, anti-diabetic, and anti-atherogenic properties [13].

In the present study, the mean BMI was significantly different between the study groups. Patients with diabetes mellitus had higher BMI values compared to CAD patients with diabetes mellitus, and the difference was statistically significant (p=0.001). Obesity is strongly associated with insulin resistance and endothelial dysfunction, both of which contribute to the development of cardiovascular disease. Increased adipose tissue accumulation, especially visceral fat deposition, is known to reduce adiponectin secretion and promote systemic inflammation [14]. The observed association between higher BMI and altered adiponectin levels in this study supports the role of obesity as an important risk factor for metabolic and cardiovascular complications.

The study also demonstrated significantly elevated HbA1c levels among diabetic patients, indicating poor glycemic control. Chronic hyperglycemia is associated with oxidative stress, endothelial injury, and accelerated atherosclerosis, thereby increasing the risk of coronary artery disease [15]. The statistically significant difference in HbA1c levels between the study groups indicates the strong metabolic burden associated with diabetes mellitus. Similar findings have been reported in previous studies where poor glycemic control was associated with reduced adiponectin levels and increased cardiovascular risk [16].

In the current study, adiponectin showed a significant negative correlation with BMI in CAD patients with diabetes mellitus (r = -0.14), indicating that adiponectin levels decrease with increasing body mass index. This inverse relationship has been reported in several earlier studies and may be attributed to adipocyte dysfunction and insulin resistance associated with obesity [17]. Adiponectin is believed to improve insulin sensitivity, reduce

vascular inflammation, and inhibit atherogenesis; therefore, reduced levels may predispose individuals to metabolic syndrome and coronary artery disease.

The study also demonstrated a positive correlation between adiponectin and HbA1c (r = 0.56) among CAD patients with diabetes mellitus. Although adiponectin is generally considered protective, altered secretion patterns may occur in chronic inflammatory and metabolic states. Hotta et al. previously demonstrated significantly lower plasma adiponectin levels in patients with coronary artery disease and type II diabetes mellitus, suggesting that hypoadiponectinemia may be linked to insulin resistance and obesity [18]. Similarly, Mohan et al. reported that lower adiponectin levels were strongly associated with metabolic syndrome components such as diabetes, dyslipidemia, and obesity in Asian populations [19].

The findings of the present study support the growing evidence that adiponectin may serve as an important biomarker for cardiovascular and metabolic risk assessment. Measurement of adiponectin levels, along with BMI and HbA1c, may help identify individuals at increased risk for coronary artery disease and diabetes-related cardiovascular complications. However, larger multicentric studies are needed to further establish the prognostic significance of adiponectin in cardiovascular disease.

## CONCLUSION

The present study demonstrated a significant association between adiponectin levels, body mass index, and glycosylated hemoglobin in patients with coronary artery disease with and without type II diabetes mellitus. Reduced adiponectin levels were associated with increased BMI and poor glycemic control, indicating its role in obesity, insulin resistance, and cardiovascular risk. The findings suggest that adiponectin may serve as a useful biomarker for assessing metabolic dysfunction and cardiovascular disease severity in diabetic and non-diabetic coronary artery disease patients.

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