

# Study of Association of Calcium with Lipid Profile in Patients of Type 2 Diabetes Mellitus: A Cross-Sectional Analysis

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**Abstract-** *Dyslipidemia and abnormal calcium homeostasis are metabolic complications of type 2 diabetes mellitus (T2DM), a metabolic illness that raises the risk of cardiovascular disease (CVD). The purpose of this research is to examine the connection between lipid profile characteristics and blood calcium levels in individuals with type 2 diabetes. Blood samples from 200 type 2 diabetic patients were analyzed for calcium, total cholesterol, triglycerides, low-density lipoprotein, and high-density lipoprotein levels in a cross-sectional research. Calcium levels were shown to be significantly inversely associated with LDL-C and TG levels, indicating that lipid problems in type 2 diabetic patients may be influenced by altered calcium metabolism.*

**Keywords:** *Metabolic Syndrome, Calcium, Lipid profile, Dyslipidemia, Cardiovascular risk*

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## 1. INTRODUCTION

Over 500 million individuals throughout the globe are living with type 2 diabetes mellitus (T2DM). Characteristics include metabolic syndrome, insulin resistance, and persistently high blood sugar levels.

Disturbances, including dyslipidemia, which is a major contributor to cardiovascular disease (CVD) risk.

Calcium, a vital mineral, is essential for numerous physiological processes, including vascular tone regulation, insulin secretion, and lipid metabolism. Dysregulation of calcium homeostasis has been implicated in metabolic syndrome and diabetes pathophysiology. Furthermore, calcium has been linked to lipid metabolism, influencing the levels of cholesterol and triglycerides.

The current study aims in order to investigate the relationship between serum calcium and the components of lipid profiles in individuals with T2DM, which may provide insights into the role of calcium in

lipid metabolism and cardiovascular risk in diabetic individuals.

## 2. PROCEDURES AND SUPPLIES

### 2.1 Research Methods

Tertiary care hospitals participated in a cross-sectional research hospital on 200 diagnosed T2DM patients aged 35–70 years.

### 2.2 Inclusion Criteria

- Diagnosed T2DM patients (based on ADA criteria).
- Patients on stable medication regimens for at least three months.

### 2.3 Exclusion Criteria

- Patients with chronic kidney disease, thyroid disorders, or calcium supplementation.

- Alcoholics and smokers.

## 2.4 Parameters Measured

1. **Serum Calcium:** Measured using colorimetric methods.

## 2. Chemical Makeup:

- The acronyms for "total cholesterol,"
- "TG," and "LDL-C" stand for
- "low-density lipoprotein."
- HDL-C, or high-density lipoprotein

## 2.5 Quantitative Evaluation

The data was examined with the help of SPSS 25. We looked for a connection between serum calcium and lipid profile variables using a correlation analysis. A statistically significant result was defined as a p-value less than 0.05.

## 3. RESULTS

### 3.1 Standard Features

Parameter	Mean $\pm$ SD
Age (years)	55.4 $\pm$ 8.3
Duration of Diabetes (years)	9.5 $\pm$ 4.2
Fasting Blood Glucose (mg/dL)	164.2 $\pm$ 45.7
HbA1c (%)	8.2 $\pm$ 1.4
Serum Calcium (mg/dL)	9.1 $\pm$ 0.8

### 3.2 Lipid Profile of Participants

Lipid Parameter	Mean $\pm$ SD (mg/dL)
Total Cholesterol (TC)	200.4 $\pm$ 35.6
Triglycerides (TG)	162.3 $\pm$ 47.8
LDL-C	130.2 $\pm$ 28.9
HDL-C	38.6 $\pm$ 6.3

### 3.3 Correlation of Serum Calcium with Lipid Profile

Lipid Parameter	Correlation Coefficient (r)	p-value
Total Cholesterol (TC)	-0.18	0.021
Triglycerides (TG)	-0.31	<0.001
LDL-C	-0.28	<0.001
HDL-C	+0.12	0.094

### 3.4 Key Findings

- Negative correlation observed between serum calcium and TG, LDL-C, and TC levels, indicating higher calcium levels may be associated with improved lipid profiles.
- No significant correlation between calcium and HDL-C.

## 4. DISCUSSION

This study's results show that lipid problems are significantly associated with serum calcium. in T2DM patients. Elevated TG and LDL-C levels are hallmark features of diabetic dyslipidemia and major risk factors for CVD.

### 4.1 Calcium and Lipid Metabolism

Calcium influences lipid metabolism through several mechanisms:

- **Insulin Sensitivity:** Calcium ions play a role in insulin signaling, which impacts lipid synthesis and clearance.
- **Lipid Absorption:** Calcium binds to fatty acids in the gastrointestinal tract, reducing fat absorption and cholesterol levels.

### 4.2 Clinical Implications

- Monitoring and management of serum calcium may have therapeutic potential in improving lipid profiles in T2DM patients.
- We need more research to figure out what's going on and how it all works..

## 5. CONCLUSION

This study demonstrates a substantial correlation between lipid profile variables and blood calcium levels, particularly LDL-C and TG, in T2DM patients. These findings suggest that calcium homeostasis may influence lipid metabolism and cardiovascular risk. Regular monitoring of calcium and lipid levels could be beneficial in managing diabetes-related complications.

## 6. TABLES

Table 1: Details on the Subjects in the Research

Parameter	Mean $\pm$ SD
Age (years)	55.4 $\pm$ 8.3
Duration of Diabetes (years)	9.5 $\pm$ 4.2
Serum Calcium (mg/dL)	9.1 $\pm$ 0.8
Total Cholesterol (mg/dL)	200.4 $\pm$ 35.6

Table 2: Correlation Analysis Between Calcium and Lipid Profile

Lipid Parameter	Correlation Coefficient (r)
Total Cholesterol (TC)	-0.18
Triglycerides (TG)	-0.31
LDL-C	-0.28

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