

# Relationship Between HbA1c Levels and Lipid Profile in Type 2 Diabetes Melitus in Jambi Hospital

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## Introduction

Diabetes mellitus type 2 is a major global health issue with a rising prevalence. Indonesia ranks fifth globally, with approximately 19.5 million cases. Type 2 diabetes mellitus is a chronic metabolic disorder characterized by hyperglycemia due to impaired insulin secretion or action. Glycated hemoglobin (HbA1c) is more reliable than random blood glucose levels, because it reflects the average blood glucose level over the past 2–3 months, is not affected by short-term factors such as fasting or stress, and provides a more accurate assessment of long-term glycemic control and the risk of diabetic complications. Poor glycemic control in type 2 DM is often linked to elevated total cholesterol, LDL, and triglycerides, and decreased HDL. Chronic hyperglycemia contributes to dyslipidemia, increasing the risk of cardiovascular complications. HbA1c may serve as an indirect marker for predicting dyslipidemia. The aim of this study was to observe the relationship between glycated haemoglobin (HbA1c levels) and dyslipidemia measured by using lipid profile in patients with type 2 diabetes melitus.

## Materials and Methods

This analytical cross-sectional study was conducted in 2024 to 2025 on 82 patients with type 2 diabetes melitus. The data used consists of HbA1c, total cholesterol, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL), and triglycerides. Data were obtained from laboratory results on type 2 diabetes melitus medical records in jambi Hospital. The data was analyzed with SPSS version 27.0. The mean, SD, median(Q1-Q3) and Correlation (Pearson's) test was used to interpret the results. Statistical analysis was performed to evaluate the relationship between HbA1c levels and lipid profile parameters.

## Results

The normality test indicated that HDL ( $p = 0.247$ ) and total cholesterol ( $p = 0.061$ ) were normally distributed, while LDL ( $p = 0.000$ ), triglycerides ( $p = 0.000$ ), and HbA1c ( $p = 0.000$ ) were not normally distributed. Therefore, normally distributed data were presented as mean  $\pm$  SD, and non-normally distributed data were expressed as median (Q1-Q3) (Table 1). The correlation analysis between HbA1c and lipid profile showed a significant positive correlation between HbA1c and triglyceride levels ( $r = 0.248$ ,  $p = 0.025$ ), indicating that higher HbA1c levels were associated with elevated triglycerides. Meanwhile, no significant correlation was found between HbA1c and HDL ( $r = 0.062$ ;  $p = 0.579$ ) or LDL ( $r = 0.007$ ;  $p = 0.954$ ). A weak positive correlation was observed between HbA1c and total cholesterol ( $r = 0.202$ ;  $p = 0.069$ ) (Table 2).

Table 1. Data Distribution Based on Normality Test

Variable	$\bar{x}$
HDL (mg/dL)	54.78 $\pm$ 13.74
LDL (mg/dL)	155.9 (106.2 – 205.6)
Triglyceride (mg/dL)	180.5 (139.5 – 221.5)
Total Cholesterol (mg/dL)	239.67 $\pm$ 51.84
HbA1c (%)	8.75 (7.1 – 10.4)

Table 2. Correlation between HbA1c and Lipid Profile of type 2 Diabetes Melitus

Variable		HDL	LDL	TG	TC
HbA1c	Pearson	.062	.007	.248*	.202
	Correlation (r)				
	Sig. (2-tailed) (p)	.579	.954	.025*	.069

\* $p < 0.05$

## Conclusion

Most type 2 diabetes patients showed poor glycemic control with dyslipidemia. A significant positive correlation between HbA1c and triglyceride levels indicates that poor glycemic control is linked to dyslipidemia and high atherogenic lipids. HbA1c can serve as an additional indicator for predicting dyslipidemia risk in type 2 diabetes melitus. HbA1c can be used as a preventive for the progression of cardiovascular disease in patients with type 2 diabetes melitus.