E-ISSN: 3025-6437
International Journal of Health Sciences
Vol. 3 Issue 1 (2025) September

The Relationship Between Fasting Blood Glucose Levels and Lipid Profiles in Type 2 Diabetes Mellitus Patients at the Abdalas Padang Community Health Center

Arniat Christiani Telambanua[1*]

[1]Applied Bachelor Study Program, Medical Laboratory Technology, Syedza Saintika University

**Applied Bachelor's Study Program, Medical Laboratory Technology*

Syedza Saintika University, Indonesia, christianiarniat@gmail.com

Submission date: 20-09-2025; Date received: 27-09-2025

Abstract

Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disease characterized by impaired glucose and lipid metabolism, increasing the risk of dyslipidemia, which contributes to cardiovascular complications. This study aims to determine the relationship between fasting blood glucose (FBG) levels and lipid profiles in T2DM patients at Andalas Padang Community Health Center. This study used an analytical design with a cross-sectional approach based on medical record data. The study sample consisted of 88 randomly selected T2DM patients. Data were analyzed using the Spearman correlation test. The results showed that the majority of patients had high FBG levels (83.0%), normal total cholesterol (77.3%), low HDL (81.8%), high triglycerides (71.6%), and high LDL (38.6%). Bivariate analysis showed a significant relationship between FBG and triglycerides ($p = 0.036$) and LDL ($p = 0.055$). Meanwhile, there was no significant relationship between FBG and total cholesterol ($p = 0.097$) or HDL ($p = 0.102$). This study concludes that there is a relationship between GDP levels and triglycerides and LDL in type 2 DM patients. Suggestions, health workers are expected to increase monitoring of lipid profiles, especially LDL, in type 2 DM patients. Patients are also advised to comply with diet, physical activity, and drug therapy.

Keywords: Fasting blood glucose, lipid profile, type 2 diabetes mellitus.

E-ISSN: 3025-6437
International Journal of Health Sciences
Vol. 3 Issue 1 (2025) September

Introduction

Nearly one in eleven adults worldwide has type 2 diabetes mellitus, and approximately 75% of diagnosed diabetes patients live in developing countries (Widiasari et al., 2021). Type 2 diabetes mellitus is a disease caused by insulin not working properly due to reduced or altered insulin receptors in cells, resulting in limited glucose entry into the cells, a condition known as insulin resistance (Rahayu, 2020).

According to the World Health Organization (WHO), in 2022, there were 830 million adults worldwide aged 18 years and over who had diabetes mellitus (DM) (Annisa 2021). The latest data on the incidence of diabetes mellitus (DM) in West Sumatra in 2023 showed an increase in prevalence compared to previous years. Based on the 2023 Health Survey (SKI), the prevalence of diabetes mellitus in West Sumatra reached 1.6%. Padang, the provincial capital, is the city with the highest number of diabetes mellitus cases in West Sumatra, with 44,280 cases (Anisha et al., 2023). Preliminary data obtained from the Padang City Health Office ranks DM as the sixth most prevalent disease, and Andalas Community Health Center ranks first for the highest number of cases.

High blood glucose concentrations can disrupt fat metabolism by causing increases in total cholesterol, triglycerides (TG), and low-density lipoprotein (LDL), as well as decreases in high-density lipoprotein (HDL) levels (Kesehatan et al., 2024). One of the long-term problems of diabetes mellitus is metabolic disorders, such as problems with the production and elimination of lipoproteins in the plasma, known as dyslipidemia. Insulin resistance is a key factor influencing diabetes mellitus and is closely linked to hypertension and dyslipidemia. Dyslipidemia is a condition characterized by an imbalance in blood lipid levels, including total cholesterol, low-density lipoprotein (LDL), triglycerides, and HDL. Elevated lipid levels can lead to narrowing of the arteries, or atherosclerosis (Saragih, 2020). Diabetic patients often exhibit characteristic signs of dyslipidemia, which is closely linked to an increased risk of cardiovascular disease. Conversely, triglyceride levels exceeding normal limits, combined with low HDL levels, can disrupt glucose metabolism and potentially lead to hyperglycemia (Supriati, 2020).

In patients with type 2 diabetes, dyslipidemia is a common condition, characterized by elevated triglyceride levels and decreased HDL levels. Previous studies

have shown a relationship between HbA1c and lipid profiles, particularly cholesterol and triglyceride levels. A 2023 study by Dian Handayani et al. found a correlation between HbA1c and lipid profiles in patients with type 2 diabetes mellitus at M. Yunus Hospital (Handayani et al., 2023). Other research suggests that HbA1c can serve as an indicator of dyslipidemia (a condition characterized by abnormal lipid levels in the blood) in addition to being an accurate measure of glycemic control (Pramono, 2024).

In the Framingham Heart Study, patients with diabetes mellitus (DM) were twice as likely to experience hypertriglyceridemia and decreased HDL cholesterol levels. Furthermore, 20% of men with DM and 25% of women with DM had very low HDL cholesterol levels. According to research conducted by Taqwin, of 108 DM patients, 37 (34.26%) had hyperlipidemia. The types of hyperlipidemia identified included low HDL (81.08%), elevated LDL (70.30%), and elevated triglyceride levels (54.50%). A 2023 study at Moh. Ridwan Meuraksa Hospital found a relationship between fasting blood glucose (FBG) and triglyceride levels.

Andalas Community Health Center (Puskesmas) is a healthcare facility located in Padang City. Data on patients with diabetes mellitus in the Andalas Community Health Center's coverage area continues to grow annually. In 2023, there were 266 cases of diabetes mellitus. In 2024, this number increased to 982.

Based on the above background, the researcher will conduct a study on "The Relationship Between Fasting Blood Glucose Levels and Lipid Profiles in Type 2 Diabetes Mellitus Patients at Andalas Community Health Center, Padang."

Method

1. Research design

This study employs an analytical observational approach using a cross-sectional data collection method, aiming to provide an overview of fasting blood glucose levels and lipid profiles in type 2 diabetes mellitus patients at the Andalas Padang Health Center.

2. Setting and samples

The research was conducted at Andalas Padang Health Center from November 2024 to July 2025. The population consisted of all patients suffering from type 2 Diabetes Mellitus who underwent blood glucose level examination along with lipid profile at Andalas Padang Health Center between January and December 2024. A total of 982

patients were recorded as having type 2 Diabetes Mellitus. The sampling technique was random sampling at Andalas Padang Health Center. The calculation results obtained a sample size of 88 people.

3. Measurement and data collection

The data collection process is through documentation studies, namely by researching and documenting secondary data from medical records of Type 2 Diabetes Mellitus patients at the Andalas Padang Health Center, and through direct measurement of fasting blood glucose levels and lipid profiles (total cholesterol, triglycerides, HDL, LDL) were measured directly in DM patients.

4. Data analysis;

For data analysis, univariate and bivariate analyses were carried out, univariate to describe the frequency distribution of gender, GDP levels, total cholesterol levels, HDL cholesterol levels, LDL cholesterol levels, and triglyceride levels, and bivariate analysis to determine the relationship between variables.

Results

A. Characteristics of Type 2 Diabetes Mellitus Patients

Table 1
Characteristics of Type 2 Diabetes Mellitus Patients at Andalas Padang Community Health Center

Respondent Characteristics	Amount (n)	(%)
Age		
40-47	10	11,3
48-54	12	33,6
55-61	23	26,1
62-70	43	48,8
Amount	88	100
Sex		
Male	24	27,2
Female	64	72,7
Amount	88	100

E-ISSN: 3025-6437
International Journal of Health Sciences
Vol. 3 Issue 1 (2025) September

B. Analysis Results

a. Univariate Analysis

Table 2
Average fasting blood glucose levels in type 2 diabetes mellitus patients at Andalas Padang Health Center

Variable	N	Average ± SD
Level of fasting blood glucose	88	185,98 ± 62,630

Based on the results of Table 2, the average fasting blood glucose level of type 2 diabetes mellitus patients at the Andalas Padang Community Health Center was 185.98 mg/dl with a standard deviation of 62.630. The lowest blood glucose level was 99 mg/dl, while the highest was 350 mg/dl. This indicates a large variation between subjects in terms of fasting blood glucose levels. Most respondents had glucose levels that fell into the diabetes category, indicating that this population tends to have poor glycemic control.

Table 3
Average total cholesterol levels in type 2 diabetes mellitus patients at Andalas Padang Health Center

Variable	N	Average ± SD
Total cholesterol levels	88	234,33 ± 43,760

Based on the results in Table 3, the average total cholesterol level in type 2 diabetes mellitus patients was 234.33 mg/dl with a standard deviation of 43.760. The lowest cholesterol level was 119 mg/dl, while the highest was 344 mg/dl. These results indicate that most patients had hypercholesterolemia, meaning total cholesterol levels above normal.

Table 4
Average High-Density Lipoprotein (HDL) cholesterol levels in patients with type 2 diabetes mellitus at Andalas Community Health Center, Padang

Variable	N	Average ± SD
Levels of High-Density Lipoprotein (HDL) cholesterol	88	45,86 ± 8,231

Table 4 shows that the average HDL cholesterol level in type 2 diabetes patients was 45.86 mg/dl with a standard deviation of 8.231. The lowest HDL cholesterol level was 25 mg/dl, while the highest was 59 mg/dl. These results indicate that most patients had HDL levels that did not reach the protective limit, and some were even in the low category, which increases the risk of cardiovascular complications.

E-ISSN: 3025-6437
International Journal of Health Sciences
Vol. 3 Issue 1 (2025) September

Table 5
Average Low-Density Lipoprotein (LDL) cholesterol levels in type 2 diabetes mellitus patients at Andalas Padang Health Center

Variable	N	Average ± SD
Levels of Low-Density Lipoprotein (LDL) Cholesterol	88	154,38 ± 40,114

Table 5 shows the average LDL cholesterol level in type 2 diabetes sufferers is 154.38 mg/dl with a standard deviation of 40.114. The lowest LDL cholesterol level is 58 mg/dl, while the highest level is 264 mg/dl. This indicates that many respondents are at risk of heart and blood vessel disease due to high LDL levels.

Table 6
Results of Triglyceride Level Analysis in Type 2 Diabetes Mellitus Patients at Andalas Padang Community Health Center

Variable	N	Average ± SD
Triglyceride levels	88	147,66 ± 68,051

The analysis results of Table 6 show that the average triglyceride level of type 2 diabetes patients who participated in the study was 147.66 mg/dl with a standard deviation of 68.051. The lowest triglyceride level was 54 mg/dl, while the highest level was 467 mg/dl, indicating that there were respondents with very low and very high triglyceride levels.

b. Bivariate Analysis

Table 7 Relationship between fasting blood glucose levels and total cholesterol levels in type 2 diabetes mellitus patients at Andalas Padang Health Center

Variable	Total Cholesterol	Value	Interpretation
Fasting Blood Glucose	*R*	0,178	Very weak correlation
	p-value	0,097	No correlation

The results of the analysis of Table 7 show the relationship between fasting blood glucose levels and total cholesterol levels in type 2 diabetes mellitus patients at Andalas Padang Community Health Center. The correlation value (R) obtained was 0.178, which means there is a positive relationship, but the strength of the correlation is very weak. This means that the higher the GDP level, the tendency is followed by an increase in total cholesterol levels, but the relationship is not strong. The p-value = 0.097, greater than the significance limit ($\alpha = 0.05$). This indicates that the relationship found is not statistically significant, so the study can be concluded that there is no significant relationship between fasting blood glucose levels and total cholesterol levels in type 2 diabetes mellitus patients at Andalas Padang Community Health Center.

Table 8
Relationship between fasting blood glucose levels and HDL cholesterol levels in type 2 diabetes mellitus patients at Andalas Padang Health Center

Variable	HDL Cholesterol	Value	Interpretation
Fasting Blood Glucose	*R*	0,175	Very weak correlation
	p-value	0,102	No correlation

The analysis results of Table 8 between Fasting Blood Glucose (FBS) and High-Density Lipoprotein HDL cholesterol show a very weak negative relationship between fasting blood glucose levels and HDL cholesterol levels. This means that when blood glucose levels increase, HDL levels tend to decrease slightly, but this relationship is very weak. The p-value = 0.102 (p> 0.05), which means the relationship is not statistically significant.

Table 9
The relationship between fasting blood glucose levels and LDL cholesterol in type 2 diabetes mellitus patients at Andalas Padang Health Center

Variable	LDL Cholesterol	Value	Interpretation
Fasting Blood Glucose	*R*	0,206	Very weak correlation
	p-value	0,055	No correlation

The analysis of Table 9 between Fasting Blood Glucose (FBS) and Low-Density Lipoprotein (LDL) cholesterol shows a positive, weak correlation. This means that as FBS levels increase, LDL cholesterol levels tend to increase, although the correlation is very weak. The p-value is 0.055 (p>0.05), so the relationship is not statistically significant.

Table 10
Relationship between fasting blood glucose levels and triglycerides in type 2 diabetes mellitus patients at Andalas Padang Health Center

Variable	Triglycerides	Value	Interpretation
Fasting Blood Glucose	*R*	0,224	Very weak correlation
	p-value	0,036	No correlation

The analysis of Table 10 between fasting blood glucose and triglycerides shows a positive, weak correlation. This means that higher fasting blood glucose levels tend to be followed by higher triglyceride levels, although the correlation strength is still low. The p-value is 0.036 (p<0.05), indicating a statistically significant correlation.

Discussion

A. Characteristics of Type 2 Diabetes Mellitus Patients

Based on the characteristics data in Table 1, it can be seen that 10 people aged 40-47 (11.3%), 12 people aged 48-58 (33.6%), 23 people aged 55-61 (26.1%), and 43

people aged 62-70 (48.8%). Based on the Characteristics of Type 2 Diabetes Mellitus Patients, this is in line with the theory that the risk of developing type 2 diabetes mellitus increases with age. The aging process causes a decline in pancreatic β-cell function and increases insulin resistance, making blood glucose levels more difficult to control.

Based on gender, the majority of respondents were women (72.7%) compared to men (27.2%). This condition may be influenced by hormonal factors, particularly the decline in estrogen in postmenopausal women, which plays a role in glucose metabolism and insulin sensitivity. Furthermore, lifestyle, physical activity, and body fat distribution also contribute to the tendency for women to develop type 2 diabetes mellitus more frequently.

B. Univariate Analysis

Average Fasting Blood Glucose Levels in Type 2 Diabetes Mellitus Patients at Andalas Public Health Center, Padang

Based on the frequency distribution, 73 respondents were classified as diabetic (≥126 mg/dL), 14 were prediabetic (100−125 mg/dL), and 13 were normal (<100 mg/dL). These results indicate that most patients do not yet have optimal glycemic control.

In type 2 diabetes mellitus, fasting blood glucose levels tend to increase due to insulin resistance and impaired insulin secretion, which prevent cells from optimally utilizing glucose, while the liver continues to produce glucose even at high levels. This condition leads to persistent fasting hyperglycemia, as shown in this study, where the majority of respondents (83.0%) had high FBG levels. This hyperglycemia carries the risk of metabolic and cardiovascular complications.

These findings are supported by research by Widiasari et al. (2021), which found that the majority of patients with type 2 diabetes had FBG levels above 126 mg/dL. Researchers assume that the high average fasting blood glucose levels in type 2 DM patients are caused by insulin resistance and impaired insulin secretion, which is exacerbated by diet, lack of physical activity, low therapy compliance, and long-term diabetes.

Lipid Profile Levels in Type 2 Diabetes Mellitus Patients at Andalas Padang

Community Health Center

Most respondents had high total cholesterol levels, abnormally high HDL, high LDL, and high triglycerides. This indicates that the majority of type 2 diabetes patients in this study had dyslipidemia, primarily characterized by high LDL and low HDL. These results align with Taqwin's (2023) study, which reported that in type 2 diabetes patients, the prevalence of dyslipidemia is quite high, with the dominant features being elevated triglycerides (54.5%), elevated LDL (70.3%), and decreased HDL (81.08%). The researchers assumed that the high rate of dyslipidemia in the patients in this study was due to poor glycemic control, as evidenced by the high FBG levels (83.0%). This chronic hyperglycemia condition causes changes in lipid metabolism, resulting in increased triglycerides and LDL and decreased HDL. Furthermore, lifestyle factors such as a high-fat and carbohydrate diet, lack of physical activity, and prolonged diabetes exacerbate lipid profile abnormalities**.**

1) **Average Total Cholesterol Levels in Type 2 Diabetes Mellitus Patients at Andalas Padang Community Health Center**

   Based on the frequency distribution, 15 respondents had normal cholesterol levels (<200 mg/dL), 35 respondents were classified as moderate (200−239 mg/dL), and 38 respondents were classified as high (≥240 mg/dL). This indicates that the majority of patients had hypercholesterolemia and were at high risk for cardiovascular disease.

   In type 2 diabetes mellitus, insulin resistance increases lipolysis, resulting in excess free fatty acids being converted by the liver into lipoproteins and cholesterol. This finding is supported by Handayani et al. (2023), who stated that impaired glycemic control is directly proportional to increased total cholesterol.

   The researcher assumes that in type 2 diabetes mellitus patients at Andala Padang Community Health Center, total cholesterol tends to increase due to insulin resistance, which triggers increased lipid synthesis in the liver and decreased lipoprotein breakdown. This total cholesterol level reflects the interaction of blood glucose and lipid metabolism and has the potential to increase cardiovascular complications.

2) **Average High-Density Lipoprotein (HDL) Cholesterol Levels in Type 2 Diabetes Mellitus Patients**

The study results showed that no respondents had HDL levels in the normal category (>60 mg/dL), while 68 respondents were in the abnormal category (40–59 mg/dL), and 20 respondents were in the poor category (<40 mg/dL). Low HDL levels reduce the body's ability to remove cholesterol from peripheral tissues to the liver, thereby increasing the risk of atherosclerosis and cardiovascular complications. Rizqy et al. (2021) also found a negative correlation between blood glucose levels and HDL, meaning that the higher the glucose level, the lower the HDL level.

The researchers hypothesize that type 2 diabetes mellitus is influenced by a combination of internal and external factors. Internally, insulin resistance and chronic hyperglycemia disrupt lipid metabolism, reducing HDL formation. Externally, a diet high in saturated fat, lack of physical activity, and poor patient compliance with treatment also contribute to low HDL levels.

3) **Average Low-Density Lipoprotein (LDL) Cholesterol Levels in Type 2 Diabetes Mellitus Patients**

The study results showed that the majority of patients had high LDL levels, which is a major risk factor for coronary heart disease. High LDL levels in patients with type 2 diabetes are a major risk factor for cardiovascular complications.

Research by Rizqy et al. (2021) also showed a negative correlation between blood glucose levels and HDL, meaning that the higher the blood glucose, the lower the HDL levels. Researchers assume that hyperglycemia and insulin resistance in patients with type 2 diabetes directly or indirectly cause increased LDL levels. Therefore, in addition to controlling blood sugar levels, patients also need to monitor and manage LDL levels through a diet low in saturated fat, exercise, and, if necessary, lipid-lowering drug therapy.

4) **Average Triglyceride Levels in Type 2 Diabetes Mellitus Patients**

Research results showed that more than three-quarters of patients in this study experienced elevated triglyceride levels above normal.

In patients with type 2 diabetes mellitus, triglyceride levels generally increase due to insulin resistance, which causes excessive lipolysis in adipose tissue. This

condition results in large amounts of free fatty acids entering the liver and being converted into triglycerides and VLDL. Furthermore, research by Supriati (2020) also emphasized that high triglycerides are an early sign of atherogenic dyslipidemia, which is common in people with diabetes. Researchers assumed that physiologically, high fasting blood glucose levels contribute to decreased HDL levels, primarily through the mechanisms of insulin resistance and impaired lipid metabolism. However, in the context of the analyzed data, this relationship was not statistically strong, so it cannot be used as a conclusive basis for the assumption that increased FBG is always followed by decreased HDL. These results demonstrate the importance of considering other factors in interpreting HDL levels, as well as the need for a multidisciplinary approach in managing dyslipidemia in diabetic patients.

C. Bivariate Analysis

1. The Relationship Between Fasting Blood Glucose and Total Cholesterol in

The results of the bivariate analysis of the sperm correlation test showed a weak positive correlation between GDP and total cholesterol ($p = 0.178$) with an r value of 0.097 ($p > 0.05$). This means that higher fasting blood glucose levels tend to increase total cholesterol levels, although this relationship was not statistically significant.

Theoretically, chronic hyperglycemia due to insulin resistance causes lipid metabolism disorders, including increased cholesterol synthesis in the liver. This mechanism occurs because the HMG-CoA reductase enzyme becomes more active and the number of LDL receptors decreases, preventing optimal cholesterol clearance from the blood.

Studies by Saragih (2020) and Handayani et al. (2023) support this finding, noting that patients with high glucose levels tend to have higher total cholesterol. However, the non-significant results suggest that other factors, such as diet, statin therapy, and physical habits, also contribute. The researchers speculated that high GDP contributes to increased total cholesterol, although this study did not find a statistically significant relationship.

2. **The Relationship Between Blood Glucose Levels and High-Density Lipoprotein (HDL) Cholesterol in Type 2 Diabetes Mellitus Patients**

   The results of the sperm correlation test concluded that there was no statistically significant relationship between fasting blood glucose (FBG) levels and HDL cholesterol levels in patients with type 2 diabetes mellitus. A very weak positive r value indicates that the relationship between the variables is weak and not scientifically meaningful. Insulin resistance, the main characteristic of type 2 diabetes, affects lipid metabolism, including reducing HDL levels. One mechanism is through decreased activity of the enzyme LCAT (Lecithin Cholesterol Acyltransferase), which is responsible for cholesterol esterification and the formation of mature HDL particles. Furthermore, there is increased activity of CETP (Cholesteryl Ester Transfer Protein), which causes cholesterol transfer from HDL to VLDL and LDL, resulting in rapid HDL removal from circulation.

   These findings align with research by Nurdin et al. (2022) and Rizqy et al. (2021), which reported that patients with high blood glucose levels generally have low HDL levels. They emphasized that chronic insulin resistance causes HDL dysfunction in both quantity and quality. However, the results of these studies did not show a statistically significant relationship. Researchers assumed that physiologically, high fasting blood glucose levels contribute to decreased HDL levels, primarily through insulin resistance and impaired lipid metabolism. However, in the context of the analyzed data, this relationship was not statistically strong, so it cannot be used as a conclusive basis that increased GDP is always followed by decreased HDL. These results demonstrate the importance of considering other factors in interpreting HDL levels.

3. **Relationship between Fasting Blood Glucose and Low-Density Lipoprotein (LDL) Cholesterol in Type 2 Diabetes Mellitus Patients**

   The results of the semen correlation test showed that higher GDP levels tended to increase LDL levels. In diabetes, insulin resistance leads to increased production of VLDL in the liver, which is converted to LDL in the circulation. Furthermore, high blood glucose causes a decrease in the number and function of LDL receptors in the liver, which prolongs the time LDL remains in the

blood.

These results align with research by Marina Ludong (2024) and Rahayu (2020), which found that patients with type 2 diabetes often exhibit elevated LDL levels, and a correlation with GDP is often found, although not always strong. These findings align with the results of this study, which showed a significant but weak correlation. It can be assumed that fasting blood glucose levels are related to LDL levels. The higher the fasting blood glucose level, the greater the tendency for LDL levels to increase due to insulin resistance and impaired lipid metabolism. However, this relationship may also be influenced by other factors such as age, gender, duration of diabetes, diet, physical activity, and medication therapy.

4. **Relationship between Fasting Blood Glucose Levels and Triglyceride Levels in Type 2 Diabetes Mellitus Patients**

The Spearman correlation test results showed a weak positive relationship, meaning that higher fasting blood glucose levels tend to be accompanied by increased blood triglyceride levels. Physiologically, elevated triglyceride levels in patients with type 2 diabetes are caused by insulin resistance, a condition in which insulin is unable to optimally suppress lipolysis in adipose tissue. This results in increased release of free fatty acids into the bloodstream. These free fatty acids are then metabolized by the liver into triglycerides, which are released as very low-density lipoprotein (VLDL).

This finding aligns with research by Oka Jaya et al. (2024), which showed that high fasting blood glucose levels are significantly associated with elevated triglyceride levels in diabetic patients.

The researchers in this study assumed that high FBG levels would increase the risk of hypertriglyceridemia through impaired lipid metabolism pathways caused by insulin resistance. Although the correlation strength is relatively weak, the statistically significant relationship indicates that controlling fasting blood glucose levels should be a priority in the management of type 2 DM patients, to reduce the risk of more severe dyslipidemia.

Conclusion

1. Fasting Blood Glucose (FBS) Levels: Most respondents in this study had high fasting blood glucose levels. This indicates that the majority of patients have not achieved optimal glycemic control.
2. Lipid Profile Levels: Most respondents experienced lipid profile disorders. As many as 43.2% of respondents had conditions common to type 2 diabetes patients at the study site.
3. Relationship between Fasting Blood Glucose Levels and Lipid Profiles: Bivariate test results showed a statistically significant relationship. The correlation between the two variables was weak and not statistically significant. Overall, this study demonstrates that controlling fasting blood glucose levels is crucial in reducing the risk of lipid profile disorders, particularly LDL and triglycerides, which are major risk factors for cardiovascular disease in type 2 diabetes mellitus patients.

Conflict of Interest

No conflict of interest.

References

1. Alisa, F. Andika, M., Refti, Y., Allam, A., Nursuari, H., Valentina, P., & Rahmawati, D. (2022). Pengaruh Active Lower Range of Motion Terhadap Nilai Ankle Branchial Index (ABI) Pada Pasien Diabetes Mellitus Tipe II. Jurnal Keperawatan Muhammadiyah, 7(2), 82–88.
2. Anisha, F., Dodi Vionanda, Nonong Amalita, & Zilrahmi. (2023). Application of Random Forest for The Classification of Diabetes Mellitus Disease in RSUP Dr. M. Jamil Padang. UNP Journal of Statistics and Data Science, 1(2), 45–52. 0
3. Annisa, B. S., Puspitasari, C. E., & Aini, S. R. (2021). Profil penggunaan obat antidiabetes pada pasien diabetes mellitus tipe 2 di instalasi rawat jalan RSUD Provinsi NTB tahun 2018. Sasambo Journal of Pharmacy, 2(1), 37–41.
4. Anwar, T., & Bahri. (2020). Dislipidemia Sebagai Faktor Resiko Jantung Koroner. Fakultasa Kedokteran Sumatera Utara, January 2004, 1–10.
5. Caesarnoko, M. A., & Marina Ludong. (2024). Gambaran Profil Lipid Pasien Dengan Diabetes Melitus Tipe 2 di RSUD Cengkareng Jakarta Barat.

Tarumanagara Medical Journal, 6(1), 99–108.

6. Candra Susanto, P., Ulfah Arini, D., Yuntina, L., Panatap Soehaditama, J., & Nuraeni, N. (2024). Konsep Penelitian Kuantitatif: Populasi, Sampel, dan Analisis Data (Sebuah Tinjauan Pustaka). Jurnal Ilmu Multidisplin, 3(1),
7. Erizon, E., & Karani, Y. (2020). Hdl Dan Aterosklerosis. Human Care Journal, 5(4), 1123.
8. Fatmona, F. A., Permana, D. R., & Sakurawati, A. (2023). Gambaran Tingkat Pengetahuan Masyarakat tentang Pencegahan Diabetes Melitus Tipe 2 di Puskesmas Perawatan Siko. MAHESA: Malahayati Health Student Journal, 3(12), 4166–4178.
9. Fulyani, F., Pramono, A., Gizi, M. I., Gizi, D. I., Kedokteran, F., Diponegoro, U., & Tengah, J. (2024). TINJAUAN MINI EFEK SPIRULINA PLATENSIS TERHADAP. 13(September), 359–367.
10. Harini, I. M., Setyanto, M. R., Gumilas, N. S. A., & Ernawati, D. A. (2022). Hubungan antara Profil Lipid dengan Kejadian Retinopati Diabetika pada Pasien Diabetes Melitus Tipe 2 di Fasilitas Kesehatan Tingkat Pertama Klinik Tanjung Purwokerto. Jurnal Kesehatan Andalas, 11(1), 14.
11. J., Chrsityawardani, L. S., & Haiti, M. (2024). 73 Lidwina Septie Chrsityawardani, Margareta Haiti Hubungan Kadar Glukosa Darah Puasa dengan Kadar Trigliserida dalam darah. 13(1), 2721–8007.
12. Lestari, Zulkarnain, Sijid, & Aisyah, S. (2021). Diabetes Melitus: Review Etiologi, Patofisiologi, Gejala, Penyebab, Cara Pemeriksaan, Cara Pengobatan dan Cara Pencegahan. UIN Alauddin Makassar, 1(2), 237–241.
13. Mamay Mamay, Lia Mar'atiningsih, Aceng Ali Awaludin, & Regawati Rizkina. (2023). Studi Korelasi Kadar Glukosa Puasa dengan Trigliserida pada Penderita Diabetes Mellitus Tipe 2. Student Scientific Creativity Journal, 2
14. Masal, K. P. (2023). Gambaran Dislipidemia Pada Pasien Diabetes Melitus Tipe 2 di RSUD Doris Sylvanus Palangka Raya. Malahayati Nursing Journal, 5(7),
15. Mellitus, D., Rumah, D., & Konawe, S. (2024). Faktor-Faktor yang Berhubungan Dengan Kejadian Penyakit Diabetes Mellitus Tipe II Pada Pasien Rawat Jalan di Rumah Sakit Konawe Klasifikasi diabetes melitus (DM), Diabetes Association (ADA) dan World Lebih lanjut, data dari Laporan Gizi Global Menuru. 3(3),

202–213.

16. Mingqiang, Z., & Guanping, D. (2023). Diagnosis and management of diabetes mellitus in children. Chinese Journal of General Practitioners, 22(7), 671– 676.
17. Mutmainna, A., & Abrar, E. A. (2024). Analisis Faktor Risiko Kejadian Diabetes Melitus Tipe Ii Pada Pasien Yang Terdiagnosa Diabetes Puskesmas Pampang. 4, 60–64.
18. Nugroho, A. S. (2024). Urgensi Kebijakan Hukum Terkait Asupan Gula (Intake Sugar) Sebagai Upaya Perlindungan Anak Dari Ancaman Penyakit Diabetes Melitus Di Indonesia.Urgency Of Legal Policy Related To Intake of Sugar As An Effort To Protect Children From The Threat Of Diabetes. 6(2), 144–153.
19. Nurdin, N. A., Harun, A. D., Ningsih, S. D., & Ayu Pratiwi, N. E. (2022). Hubungan Kadar High Density Lipoprotein (Hdl) Terhadap Glukosa Darah Sewaktu Pada Penderita Diabetes Mellitus Di Rs Benyamin Guluh Kolaka. Jurnal Analis Kesehatan Kendari, 5(1), 30–34.
20. Oka Kusuma Jaya, I. G., Sukawana, I. W., Sukarja, I. M., & Juniari, N. M. (2024). Gambaran Profil Lipid Pasien Diabetes Melitus Tipe 2. Jurnal Gema Keperawatan, 17(1), 1–10.
21. Pramono, Z. D., Virginia, D. M., Hendra, P., Farmasi, F., Dharma, U. S., & Lipid, P. (2024). Hubungan Kontrol Hba1c Terhadap Profil Lipid Pada Pasien Diabetes Melitus Tipe 2 Di Puskesmas Salah Satu Kecamatan , Yogyakarta. 8(3), 302–309. Putra, S., Syahran Jailani, M., & Hakim Nasution, F. (2021). Penerapan Prinsip Dasar Etika Penelitian Ilmiah. Jurnal Pendidikan Tambusai, 7(3), 27876– 27881.
22. Putri, N. M. S. H., & Hisni, D. (2024). Analisis Asuhan Keperawatan melalui Intervensi Edukasi Kepatuhan Diet DM dan Kadar Glukosa Darah Pada Pasien Ny. I dan Tn. U dengan Diagnosa Medis Diabetes Mellitus Tipe 2 di Rumah Sehat Wilayah Jakarta Timur.
23. Putri, S. I., Jefry, A., Widiyanto, A., & Asiyah, S. (2024). DARMABAKTI Jurnal Pengabdian dan Pemberdayaan Masyarakat Pelatihan Pencegahan Gangguan Metabolisme Kronis Melalui Pemeriksaan Kadar Gula Darah. 02(November), 278–285.
24. Rahayu, P. N. (2020). Hubungan Kadar Gula Darah Puasa dan Profil Lipid Pada Penderita Diabetes Melitus Tipe 2 dengan Kejadian Stroke Iskemik di RSUD

25. R.A Basoeni Mojokerto. Jurnal Biosains Pascasarjana, 22(2), 50.
26. Rahmawati Raising, Oktaviarika Dewi Hermawatiningsih, & Wiwi Rumaolat. (2024). Efektivitas Penggunaan Obat Dislipidemia terhadap Kadar LDL pada Pasien Cardiovaskular Penyebab Stroke. INSOLOGI: Jurnal Sains Dan Teknologi, 3(4), 442–448.
27. Rakhmawati, A., Tinggi, S., Kesehatan, I., Cipta, B., & Purwokerto, H. (2024). Korelasi Kadar Glukosa Darah Dengan Kolesterol Total Pada Pasien Diabetes Melitus Tipe 2 Di Puskesmas Purwokerto Selatan. Jurnal Kesehatan Dan Science, XX (2), 858–4616.
28. Relica, C., & Mariyati. (2024). Jurnal Ilmiah Permas: Jurnal Ilmiah STIKES Kendal. Peran Mikronutrisi Sebagai Upaya Pencegahan Covid-19, 14(3), 75–82. ndex.php/PSKM/article/view/1979/1260
29. Rizqy, W., Fakultas, P., Keperawatan, I., Kesehatan, D., Pratiwi, W. R., Hediningsih, Y., Isworo, J. T., Fakultas, A. K., Universitas, K., Semarang, M., Klinik Balai, P., Kesehatan, L., Pengujian, D., Semarang, A., Diii, P., & Universitas, G. (2021). Hubungan Kadar Glukosa Darah Dengan Kadar Hdl (High Density Lipoprotein) Pada Pasien Diabetes Melitus Tipe 2. Jurnal Labora Medika, 5, 29–34.
30. Safitri, A. N., Kusumawati, D., Muhlishoh, A., & Avianty, S. (2024). Association between Fat Intake, Dietary Fiber Intake, Physical Activity with Triglyceride Levels among Type 2 Diabetes Mellitus Patients at Grogol Health Center, Sukoharjo. Amerta Nutrition, 8(1 Special Issue), 55–60.
31. Saputro, A., Sukarmin, Rusidah, Y., & Sa'adah, A. (2024). Analisis Korelasi Antara Kadar HbA1c dan Trigliserida Pada Pasien Diabetes Melitus Tipe 2 di Klinik Srikandi Husada Kudus: Sebuah Studi Observasional. Jurnal Medika Indonesia, 5(2), 40–46.
32. Saragih, A. D. (2020). Terapi Dislipidemia untuk Mencegah Resiko Penyakit Jantung Koroner. Indonesian Journal of Nursing and Health Sciences, 1(1), 15–24.
33. Siregar, F. A., & Makmur, T. (2020). Metabolisme Lipid Dalam Tubuh. Jurnal Inovasi Kesehatan Masyarakat, 1(2), 60–66.
34. Supriati, N. P. E. (2020). Korelasi Antara Kadar Triasilgliserol Dengan Kadar Glukosa Darah Penderita Diabetes Mellitus. International Journal of Applied

Chemistry Research, 1(1), 21.

35. Suriani, N., Risnita, & Jailani, M. S. (2023). Konsep Populasi dan Sampling Serta Pemilihan Partisipan Ditinjau Dari Penelitian Ilmiah Pendidikan. Jurnal IHSAN: Jurnal Pendidikan Islam, 1(2), 24–36.
36. Trisnadi, Reza Adityas, Wibowo, Joko Wahyu, Thomas, S. (2021). DOI: http://dx.doi.org/10.33846/sf12205 Pengaruh Diet Tinggi Kolesterol terhadap Kadar TNF α Reza Adityas Trisnadi. 12(April), 132–134.
37. Umayya, L. I., & Wardani, I. S. (2023). Hubungan Antara Diabetes Melitus Dengan Glaukoma. Jurnal Medika Hutama, 04(01), 3280–3291.
38. Umbu Henggu, K., & Nurdiansyah, Y. (2022). Review dari Metabolisme Karbohidrat, Lipid, Protein, dan Asam Nukleat. QUIMICA: Jurnal Kimia Sains Dan Terapan, 3(2), 9–17.
39. Widiasari, K. R., Wijaya, I. M. K., & Suputra, P. A. (2021). Diabetes Melitus Tipe 2: Faktor Risiko, Diagnosis, Dan Tatalaksana. Ganesha Medicine, 1(2), 114.
40. Wijaya, L. N., & Ayuni Mujahidah Reski Syahbania. (2025). Nilai Gula Darah, Kolesterol Total, Dan Indeks Massa Tubuh Terhadap Kejadian Stroke Lansia Di Yogyakarta. Jurnal Kesehatan Madani Medika, 15(02), 155–162.
41. Yusransyah, Y., Stiani, S. N., & Sabilla, A. N. (2022). Hubungan Antara Kepatuhan Minum Obat Pasien Diabetes Mellitus dan Support yang Diberikan Keluarga. Jurnal Ilmiah Kesehatan Delima, 4(2), 74–77.