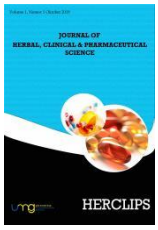

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Analysis of Self-Medication of Cholesterol Drugs in Type 2 DM Patients at Pharmacy X Sidoarjo

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Abstract

Type 2 diabetes mellitus (T2DM), often accompanied by dyslipidemia, accounts for 85–90% of diabetes cases in Indonesia. Because hypercholesterolemia symptoms are often mild or nonspecific, many patients practice self-medication. However, inappropriate self-medication may pose risks, particularly in T2DM patients receiving antidiabetic therapy. This study aimed to describe self-medication practices for cholesterol-lowering drugs among T2DM patients at Pharmacy X, Sidoarjo, and to analyze their association with lipid levels. A cross-sectional study was conducted from May to July 2025 involving 60 purposively selected T2DM patients who purchased cholesterol medications without a prescription. Data were collected using structured questionnaires assessing self-medication behavior and the appropriateness of indication, patients, medicine, dosage and patient awareness towards side effects. Data analysis was performed using descriptive statistics and Spearman correlation. A total of 65% of patients exhibited good self-medication behavior, 21.7% fair behavior, and 13.3% poor behavior. Based on WHO criteria for the rational use of medicines, most patients correctly identified appropriate indications (88.3%) and appropriate patient suitability (91.7%). However, only 68.3% selected appropriate medications, 63.3% used correct dosages, and 58.3% were aware of potential side effects. Self-medication behavior was significantly negatively correlated with triglyceride levels (ρ = -0.333, p = 0.009) and total cholesterol (ρ = -0.533, p < 0.001). The majority of T2DM patients at Pharmacy X demonstrated good self-medication practices. A significant negative correlation between self-medication behavior and lipid levels suggests that better self-medication practices are associated with lower triglyceride and total cholesterol levels.

[**Keywords**: diabetes mellitus, drug utilization, lipid profile, patient behavior]

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Introduction

The most common case of diabetes is non-insulin-dependent diabetes mellitus (NIDDM) or referred to as type 2 diabetes mellitus, which generally has a background disorder in the form of insulin resistance. According to (Simon, 2010), type 2 diabetics are the most common among other types of DM. Previous study stated that type 2 diabetics in Indonesia account for 85-90% of the total diabetics. Based on the 2023 Indonesian Health Research, East Java Province ranks among the regions with the highest number of diabetes cases, placing sixth nationally with a total of 854,453 patients (Dinas Kesehatan Jawa Timur, 2023). In 2024, Sidoarjo is one of the cities with the highest number of diabetes cases, reaching 77,877 cases (Dinas Kesehatan Sidoarjo, 2024). For this reason, efforts to control type 2 DM are needed, especially through efforts to prevent and overcome risk factors for type 2 DM (Banday et al., 2020; Poznyak et al., 2020).

Long-term diabetic complications can be divided into three types: microvascular, macrovascular, and peripheral neuropathy. Microvascular can lead to retinopathy, glomerulosclerosis, and nephropathy. Macrovascular disease refers to atherosclerosis with the development of coronary artery disease, stroke, peripheral vascular disease, and increased risk of infection. Peripheral vascular disease and neuropathy can lead to the onset of foot gangrene in diabetics (Aboelmaaty et al., 2025; Forbes & Fotheringham, 2017; Wu et al., 2022).

Diabetes mellitus is usually accompanied by dyslipidemia. Dyslipidemia is a disorder of lipid metabolism characterized by an increase or decrease in the lipid fraction in plasma. Dyslipidemia is also closely related to atherosclerosis, which is a major risk factor for atherosclerosis (Aboelmaaty et al., 2025; Bereda, 2022). In diabetes, disorders of fat metabolism (dyslipidemia) that arise are usually in the form of lipid triads, namely hypertriglyceridemia, hypercholesterolemia, especially small / dense LDL cholesterol and low levels of HDL cholesterol (Kalra & Raizada, 2024).

Hypercholesterolemia usually does not show typical symptoms, often someone just found out about hypercholesterolemia when they do a health check to health services or because of other complaints. It's just that the symptoms that are often encountered are frequent dizziness in the back of the head, the nape and shoulders feel sore, often aching, tingling in the hands and feet and some even complain that the left chest feels painful like being stabbed (Mehta et al., 2021; Meihartati, 2020).

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Self-medication is a person's attempt to treat symptoms of a disease without consulting a doctor first. The selection and use of these drugs are intended to overcome minor illnesses and symptoms (Aljinović-Vučić, 2025). Self-medication efforts are carried out by the community as the first action if they feel symptoms of pain that are considered mild such as flu, headache, cough, digestive complaints and pain (Manihuruk et al., 2024). Some of the symptoms that occur in hypercholesterolemia are often misinterpreted by the public and assume that some of the symptoms experienced are cholesterol without doing a medical check-up first at the nearest health service. This can also be risky especially in patients who have been taking anti-diabetic drugs on an ongoing basis.

Based on the explanation above, it is known that there is a risk of self-medication behavior using anti-cholesterol drugs carried out by patients with type 2 diabetes mellitus. Therefore, it is necessary to know more about the self-medication of cholesterol drugs in type 2 DM patients.

Material and Methods

This study combined a survey method with a cross-sectional design. This study was carried out at one of the pharmacies in Sidoarjo Regency between May and July of 2025. Purposive sampling was used to choose study samples in accordance with the inclusion criteria. Participants in this study had to be between the ages of 20 and 65, have type 2 diabetes mellitus, purchase cholesterol medications from pharmacies without a prescription (self-medication), and be able to read, write, and communicate. There were sixty respondent samples.

A questionnaire with five sections, namely respondent identity, self-medication behavior profile, cholesterol levels, side effects, and compliance was the tool utilized in this study. Gender, age, occupation, and most recent level of education make up the respondent's identity. The questions on self-medication behavior profiles included self-medication habits as well as profiles of medication compliance, cholesterol, and side effects. There were twenty-five statements on the questionnaire, and the responses "Yes" and "No" were worth one and zero, respectively. The correlation test was used to statistically process the data and calculate the percentage of each variable in order to ascertain the relationship between the type 2 diabetes patients' cholesterol levels and their self-medication habits.

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Results and Discussion

Respondent Characteristics

A total of 60 patients from Pharmacy X, aged 26-65 years, were included in this study. Table 1 shows the patient's characteristic observed during the study. The majority of respondents were male (57%), while female participants accounted for 43%. In terms of age, most respondents were in the 56-65 years age group (48%), followed by those aged 46-55 years (25%), 36-45 years (13%), 26-35 years (9%), and over 65 years old (5%). Age and gender are factors associated with dyslipidemia in patients with type 2 diabetes. Women typically demonstrate a more favorable lipid profile compared to men, which is partly attributed to the influence of estrogen (Palmisano et al., 2018; Sharma et al., 2022). This finding is in line with study conducted at hospital in Michigan, Among 2,448 participants included in the study, 57,6% participants were male and the mean age of participants was 64 ± 12,9 years old at the time of the study (Chang et al., 2023).

Table 1 Patients' Characteristics

Respondent Characteristics	Number of Respondents (N=60)	Percentage (%)
Gender		
Male	34	57%
Female	26	34%
Total	60	100%
Age		
26-35	5	9%
36-45	8	13%
46-55	15	25%
56-65	29	48%
>65	3	5%
Total	60	100%

Data on cholesterol levels and dosage regimentation used by respondents are shown in Table 2.

Table 2 Cholesterol Drug Dosage Regimentation

HDL	LDL	CholesterolTotal	Trigliserida	Therapy	Dosage
50	160	195	106	Atorvastatin	10 mg
58	161	210	107	Atorvastatin	10 mg
57	153	220	274	Atorvastatin	10 mg
39	153	221	286	Atorvastatin	10 mg
50	172	221	238	Atorvastatin	10 mg
53	176	230	184	Atorvastatin	20 mg
50	162	230	161	Atorvastatin	20 mg

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49	176	233	212	Atorvastatin	20 mg
46	164	243	253	Atorvastatin	20 mg
49	199	244	158	Atorvastatin	20 mg
39	112	244	869	Atorvastatin	20 mg
63	171	245	208	Atorvastatin	20 mg
50	178	253	249	Atorvastatin	20 mg
47	196	260	191	Atorvastatin	20 mg
51	230	294	240	Atorvastatin	20 mg
44	246	313	1676	Atorvastatin	20 mg
36	137	200	214	Fenofibrat	145 mg
60	148	221	205	Fenofibrat	145 mg
46	176	229	172	Fenofibrat	145 mg
51	165	203	128	Gemfibrozil	600 mg
40	89	210	523	Gemfibrozil	600 mg
74	149	218	68	Gemfibrozil	600 mg
41	163	220	174	Gemfibrozil	600 mg
54	101	138	65	Simvastatin	10 mg
47	92	142	143	Simvastatin	10 mg
62	157	143	254	Simvastatin	10 mg
44	42	147	185	Simvastatin	10 mg
45	102	148	103	Simvastatin	10 mg
39	95	150	155	Simvastatin	10 mg
50	104	155	161	Simvastatin	10 mg
55	104	158	131	Simvastatin	10 mg
84	100	161	45	Simvastatin	10 mg
68	108	170	72	Simvastatin	10 mg
53	136	175	89	Simvastatin	10 mg
36	131	176	155	Simvastatin	10 mg
43	137	181	149	Simvastatin	10 mg
52	147	183	74	Simvastatin	10 mg
35	119	185	211	Simvastatin	10 mg
54	119	185	87	Simvastatin	10 mg
32	133	187	205	Simvastatin	10 mg
51	153	188	73	Simvastatin	10 mg
42	132	189	139	Simvastatin	10 mg
40	143	191	176	Simvastatin	10 mg
51	147	193	131	Simvastatin	10 mg
46	152	194	132	Simvastatin	10 mg
56	152	194	175	Simvastatin	10 mg
55	96	195	316	Simvastatin	10 mg
56	147	196	115	Simvastatin	20 mg
47	171	196	75	Simvastatin	20 mg
43	163	199	104	Simvastatin	20 mg
55	163	205	104	Simvastatin	20 mg
42	143	206	217	Simvastatin	20 mg
45	140	212	267	Simvastatin	20 mg
70	161	213	96	Simvastatin	20 mg

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60	168	215	105	Simvastatin	20 mg
75	140	215	97	Simvastatin	20 mg
47	171	217	156	Simvastatin	20 mg
57	178	219	131	Simvastatin	20 mg
50	148	219	199	Simvastatin	20 mg
60	215	271	88	Simvastatin	20 mg

Table 2 shows various cholesterol drug dosage regimentation in this study. Most patients took 10–20 mg doses of Simvastatin (37 patients), followed by 10–20 mg doses of Atorvastatin (16 patients), Gemfibrozil (4 patients) and Fenofibrate (3 patients). Variation in lipid levels was observed among the patients. Triglycerides ranged from 45 to 1676 mg/dL, total cholesterol from 138 to 271 mg/dL, HDL from 32 to 84 mg/dL, and LDL from 42 to 230 mg/dL. This variability reflects individual differences in lipid profiles, which may be influenced by gender, age, and adherence to medication therapy (Azim et al., 2025; Lokpo et al., 2022).

Assesment of patient's knowledge in cholesterol lowering drug use based on WHO criteria's rational use of medicine

Table 3 Patient's Knowledge based on WHO criteria rational use of medicine

Knowledge	Right (%)	False (%)
Right indication	88.3%	11.7%
Right patient	91.7%	8.3%
Right medicine	68.3%	31.7%
Right dose	63.3%	36.7%
Aware of potential side effects	58.3%	41.7%

Table 3 shows patient knowledge about the appropriateness of indications, patients, medicine, dosage, and awareness of side effects. The highest proportion of appropriate behavior was observed in the right patient category (91,7%), followed by right indication (88,3). This indicates that most patients were aware of the appropriate condition for using cholesterol lowering drugs (LLDs). However, only 63,3% of patient knew the correct dosage of LLD, and 68,3% were aware of the appropriate choice of medication. In addition, only 58,3% of patients were aware of the potential side effects associated with LLD use.

This finding suggest that gaps remain in medication selection, dosing and awareness of side effects, despite generally good understanding of indications. Factor such as education level, source of information, and personal experiences may contribute to the patient's knowledge

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about appropriate use of drug, which in turn affected patient's behavior (Octora, 2022). These results underline the necessity of focused health education and interventions to enhance type 2 diabetes patients' self-medication practices in order to maximize cholesterol control and lower the risk of complications.

Self-medication Behavior Data

Table 4 Self-Medication Behaviour Data

Behavior	N	Presentage (%)
Good	39	65%
Fair	13	21,7%
Poor	8	13,3%
Total	60	100%

Table 4 presents the distribution of patients' self-medication behavior in the use of cholesterol lowering drugs. Among the 60 patients included in the study, the majority demonstrated good behavior (65%). This was followed by patients with fair behavior (21,7%), while a smaller proportion exhibited poor behavior (13,3%).

Spearman Correlation Test Analysis

Table 5 Relationship between Self-Medication Behaviour and Total Cholesterol and Triglycerides

Variable X	Variable Y	ρ	p-value	Description	Relationship
Self-medication behavior	Total cholesterol	-0,533	0,000	Significant	Negative
	Triglycerides	-0,333	0,009	Significant	Negative

Based on Spearman correlation analysis in Table 5, there is statistically significant negative relationship between self-medication behavior and total cholesterol and triglyceride levels ($p < 0.05$), indicating that better self-medication behavior is associated with lower total cholesterol and triglyceride levels. This finding is in line with the Tromsø study conducted in Norway, which reported a significant association between low-density lipoprotein (LDL) cholesterol levels and adherence to cholesterol lowering drugs (β=0,12, $p<0,001$). Patients with poor adherence to cholesterol lowering drugs tended to have higher LDL cholesterol levels (Pedersen et al., 2022).

These findings suggest that less appropriate self-medication is associated with higher lipid levels, whereas patients who practice better self-medication tend to have lower levels of

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triglycerides and total cholesterol. This result highlights the important role of proper self-medication practices in the management of lipid profiles among patients with type 2 diabetes.

Therefore, improving patient education and promoting appropriate self-medication may contribute to better lipid control and help reduce the risk of cardiovascular complications.

Conclusion

In coclusion, most patients with type 2 diabetes at Pharmacy X Sidoarjo demonstrated good to fair self-medication behaviour. A statistically significant negative correlation was found between self-medication behavior and lipid levels, indicating that better self-medication practices are associated with lower total cholesterol and tryglyceride levels. These findings highlight the importance of promoting appropriate self-medication to support improved lipid control and reduce the risk of cardiovascular complications

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