



Research Article

Rationality and Interaction of Antihyperlipidemic Drugs In Outpatient Unit of South Tangerang General Hospital

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ABSTRACT

Hyperlipidemia is one of the main risk factors for cardiovascular disease. The use of antihyperlipidemia agents should be rational, and drug interactions can affect the effectiveness of therapy. This study aimed to evaluate the rational use and potential drug interactions of antihyperlipidemic agents in outpatient care at a General Hospital in South Tangerang City in 2024. This research is descriptive with a retrospective data collection approach. A total sample of 172 medical records met the inclusion criteria from 302 population. The inclusion criteria from this study is hyperlipidemia patients who received antihyperlipidemic drugs at least 6 months wit or without comorbid in the Outpatient Department of South Tangerang City General Hospital in 2024. The evaluation included the appropriateness of indication, drug dosage, drug administration, interval time of drug administration and method of drug administration. The use of antihyperlipidemic agents was 100 % appropriate for indication, drug, dosage, administration, and time interval; 100 % for the correct patient; and only 80.32% appropriate for the method of administration. Drug interactions occurred in 55.32 % of patients, with severity classified as major (57.57 %), moderate (37.37 %), and minor (5.05 %). The most frequent interactions occur between simvastatin and amlodipine. Conclusion: The use of antihyperlipidemic agents in outpatient care at a General Hospital in South Tangerang City is mostly rational; however, drug interactions are still present and need attention to improve therapeutic outcomes.

Keywords: antihyperlipidemic; drug interaction; hyperlipidemia; rationale drug use; retrospective study

INTRODUCTION

Hyperlipidemia is a risk factor for cardiovascular disease, which remains the leading cause of death worldwide. According to the latest data from the World Health Organization (WHO), the global prevalence of hyperlipidemia is approximately 39 % among adults aged 18 and over, with 37 % in men and 40 % in women. Approximately one in three adults worldwide experiences hyperlipidemia, which contributes significantly to the incidence of coronary heart disease and stroke. International guidelines, such as those from the American College of Cardiology/American Heart Association

(ACC/AHA), emphasize the importance of early and continuous lipid control to reduce morbidity and mortality associated with dyslipidemia(Ballena-Caicedo et al., 2025; Sari et al., 2022).

Based on data from the Basic Health Research (Riskesdas) (2018), the prevalence of hyperlipidemia in Indonesia is 28.8 % of the population aged >15 years with total cholesterol levels above 200 mg/dL, and 72.8 % with LDL levels above 100 mg/dL. Prevalence by gender is 39.6 % in women and 30 % in men. Prevalence increases with age, with 14.7 % in the 25–34 age group and 29.2 % in the 55–64 age group. The management of dyslipidemia in Indonesia faces

several challenges, including limited awareness among healthcare providers and patients, limited treatment options, and lack of standardized guideline (Muzakkir & Antonius, 2025; Rudiartha & Setiawan, 2023).

Various studies have shown that the use of antihyperlipidemic drugs is often inappropriate. A study in Egypt showed misdiagnosis in 12.8 % of 412 patients, who received statins without evidence of dyslipidemia. A study in the UK showed that 45 % of patients received statins at lower doses than recommended. A study in Ethiopia showed that 13.3 % of patients with type 2 diabetes received statins without appropriate indications, and 37.6 % of patients required therapy adjustments. According to data from observational studies in 2022, approximately 5–10% of patients on statins experience muscle symptoms as a side effect. (Attardo et al., 2022).

Research conducted by Laetitia (2020) at Maren Hi. Noho Renuat Regional Hospital in Tual City showed that the dose was incorrect by 25.77 %, and the indication was incorrect by 8.25 %. Another study conducted by Amis et al. (2023) showed that the dose was incorrect by 2.91 % and the time interval was incorrect by 3.89 %. Treatment of hyperlipidemia is the best method to minimize the stress caused by hyperlipidemia. However, through the development of polypharmacy, drug interactions can increase. A Multinational Observational Study in South Korea showed that simvastatin interacts with 10 mg of amlodipine, which can increase the bioavailability of simvastatin by 46 % and reduce its clearance by 13 %. Interactions with warfarin were reported to occur in 5.7% in Estonia. A study in Thailand showed that the number of statin drug interactions based on severity was major 33.4 %, moderate 37.5 %, and minor 29.1 %.(Lai et al., 2024).

Research conducted by Rahmawaty (2021) at Dr. MM Dunda Limboto Regional General Hospital showed that 67.65 % of these drug interactions occurred. The severity of antihyperlipidemic drug interactions ranged from minor (27.27 %), moderate (47.85 %), and major (24.88 %). A study conducted at Royal Prima General Hospital in Medan showed that the most severe drug interactions occurred at moderate levels, with 189 cases (84.4 %).(Sinaga et al., 2024). Improper use of antihyperlipidemic medications remains a significant issue. International evidence demonstrates frequent irrational prescribing practices. In Egypt, 12.8 % of 412 patients received statins

despite the absence of dyslipidemia (Attardo et al., 2022). In the United Kingdom, 45 % of patients were prescribed statins at doses below guideline recommendations, while in Ethiopia, 13.3 % of individuals with type 2 diabetes received statins without proper indication, and 37.6% required therapy adjustments (Attardo et al., 2022). Additionally, 5–10 % of statin users worldwide experience muscle-related adverse effects.

Similar findings have been reported across Indonesia. Research at Maren Hi. Noho Renuat Regional Hospital in Tual City revealed incorrect dosing in 25.77 % of cases and inappropriate indications in 8.25 % (Laetitia, 2020). Another study by Amis et al. (2023) identified dosing errors at 2.91 % and incorrect administration intervals at 3.89 %. Polypharmacy further complicates clinical outcomes, as drug–drug interactions are increasingly common in hyperlipidemia management. A multinational study in South Korea found that co-administration of simvastatin and amlodipine 10 mg increased simvastatin bioavailability by 46 % and reduced clearance by 13 %, while interactions with warfarin occurred in 5.7 % of patients in Estonia. A study from Thailand reported that statin interactions were categorized as major (33.4 %), moderate (37.5 %), and minor (29.1 %) in severity (Lai et al., 2024).

Drug interaction problems have also been documented in Indonesian hospitals. At Dr. MM Dunda Limboto Regional General Hospital, 67.65 % of antihyperlipidemic drug interactions were identified, with severities ranging from minor (27.27 %) to moderate (47.85 %) and major (24.88 %) (Rahmawaty, 2021). At Royal Prima General Hospital in Medan, moderate-level interactions predominated, accounting for 84.4 % of 189 documented cases (Sinaga et al., 2024).

Given the persistent challenges surrounding irrational antihyperlipidemic drug use and the high prevalence of drug interactions, there is an urgent need for comprehensive evaluation within healthcare settings. Therefore, this study is essential for assessing the rationality of antihyperlipidemic prescribing and identifying potential drug interactions to improve patient safety and treatment outcomes. This study aims to examine the rationality of antihyperlipidemic drug use and interactions.

METHODS

Research Design

This research is a descriptive research, with data collection retrospectively, then evaluated data from the medical records of patients diagnosed with hyperlipidemia in the Outpatient Department of South Tangerang City General Hospital in 2024. Descriptive research is research that aims to describe existing phenomena, namely natural phenomena or man-made phenomena, or which is used to analyze or describe the results of the subject, but is not intended to provide broader implications. The Urgency of this study is given the persistent challenges surrounding irrational antihyperlipidemic drug use and the high prevalence of drug interactions, there is an urgent need for comprehensive evaluation within healthcare settings. The use of descriptive research in this study is appropriate because the primary objective is to systematically illustrate the existing conditions related to the use and interactions of antihyperlipidemic drugs in outpatient care. Descriptive research is specifically intended to provide an accurate and objective depiction of a phenomenon without manipulating variables or establishing causal relationships. In this study, the phenomenon being examined is the pattern of antihyperlipidemic drug utilization and drug-drug interactions among patients diagnosed with hyperlipidemia at the South Tangerang City General Hospital.

Population, Sample, and Sampling Techniques

Population

The population in this study was all medical record data of hyperlipidemia patients who used antihyperlipidemic drugs in the Outpatient Department of South Tangerang City General Hospital in 2024, with a total population of 302 people.

Sample

The sample in this study were hyperlipidemia patients who received antihyperlipidemic drugs in the Outpatient Department of South Tangerang City General Hospital in 2024 whether new diagnose, with or without complication, with exclusion criteria: incomplete medical record data. The sample was calculated using the Slovin formula with a 5 % error tolerance, from 302 populations obtained 172 samples.

Sampling Technique

A total sample of 172 medical records met the inclusion criteria from 302 population. The sampling technique used in this study is Stratified random sampling using a systematic random sampling using an interval formula. Based on the results of the interval formula calculation, an interval of 2 is obtained. Therefore, the population that will be sampled starts from patient serial number 2 and its multiples until it reaches 172 patient medical record data.

Assessment Indicators

The indicators for assessing the rationality of drug use refer to the 2011 Indonesian Ministry of Health Indicators, while the drug interaction grouping indicators used are based on the severity of the interaction, namely mild, moderate, major. To assess the rationality of drugs we use a reference book Pharmacotherapy by Joseph T. Dipiro, and for assessing drug interaction we use Drug Interaction Handbook. The assessment criteria include: appropriateness of diagnosis, appropriateness of indication, appropriateness of dosage, appropriateness of route of administration, appropriateness of dosing interval, appropriateness for the patient, and evaluation of drug-drug interactions.

Data Analysis and Research Ethic

The data were analyzed descriptively using Microsoft Excel to assess the number and percentage of rational drug use and drug interaction issues. This research has been submitted for ethical approval and passed by the University of Jember under ethics letter number 3138/UN25.1/KEPK/DL/2025.

RESULTS AND DISCUSSION

Patient Characteristics

The objective of the assessment of age-related characteristics was to identify the age range most frequently observed among patients diagnosed with hyperlipidemia in the Outpatient Department of South Tangerang City General Hospital in December 2024, categorized according to the Indonesian Ministry of Health (2009). As shown in Table 1, the majority of patients with hyperlipidemia were between 46 and 65 years old (111 patients; 64.53 %), whereas a smaller proportion were between 26 and 45 years old (26 patients; 15.11 %).

Table 1. Patient Characteristics

Type	No	Criteria	Amount	Percentage (%)
Age	1	Adults (26–45 years)	26	15.11
	2	Elderly (46–65 years)	111	64.53
	3	Seniors (> 65 years)	35	20.36
Gender	1	Male	26	15.11
	2	Female	111	64.53

Source: Medical records of outpatients at South Tangerang General Hospital in 2024

The results of this study are in line with research conducted by Faiqoh, (2023) that the majority of antihyperlipidemia drug use is in patients with an age range of 46–65 years with a total of 36 patients (67.5 %) and a small portion occurs in the adult age range of 26–45 years with a total of 13 patients (16.25 %) and the elderly >65 years with a total of 13 patients (16.25 %). According to Kusumaningtyas, (2018) this is because at the age of more than 40 years the body's metabolism begins to decline so that it is susceptible to disease, one of which is hyperlipidemia (Faiqoh, 2023). According to Larasati (2014), the older a person gets, the greater the risk of developing hyperlipidemia. This is because heart muscle function and blood vessel wall resistance weaken, facilitating the process of atherosclerosis, which also plays a significant role with age (Paulina et al., 2023).

Evaluation by gender aims to determine the number of male and female patients diagnosed with hyperlipidemia in the Outpatient Department of South Tangerang City General Hospital in December 2024, adjusted according to the Ministry of Health, RI (2011). The results (Table 1) show that hyperlipidemia patients based on gender are mostly female with a total of 93 patients (54.07%) and almost half are male with a total of 79 patients (45.93 %).

The results of this study are in line with research conducted by Sari, (2022), that the majority of antihyperlipidemic drug use in female patients with a total of 96 patients (62.75 %) and almost half occurred in men with a total of 57 patients (32.25 %). According to Larasati, (2014), this is because women have a higher risk of developing hyperlipidemia when they enter menopause. Many women gain weight during menopause and have excess fat around the waist than before, especially if they are less active. Men show a significant decrease in cholesterol during adolescence, due to the influence of the testosterone hormone which increases at that time. After reaching menopause, women have higher cholesterol levels than men. This is due to the reduced activity of the estrogen hormone. Estrogen levels will increase during ovulation, so HDL levels will also increase. Conversely, when estrogen hormones are low, LDL cholesterol or triglyceride levels will increase (Paulina et al., 2023).

Rationality of Drug Use

Accurate Diagnostic Criteria

The use of drugs in hyperlipidemia patients was entirely diagnosed (Table 2) correctly with a total of 172 patients (100 %) and none of them were diagnosed incorrectly (0 %) which adjusted using guidelines *European Society of Cardiology/European Society of Atherosclerosis*(ESC/EAS) in Perki, 2022. The results of this study are in line with research conducted by Paulina, et al. (2023) that the use of antihyperlipidemic drugs was entirely correct in diagnosis with a total of 103 patients (100%) and none were incorrectly diagnosed (0%). The results of this study are also in line with research conducted by Sari, et al. (2022) that the use of antihyperlipidemic drugs was entirely correct in diagnosis with a total of 153 patients (100 %) and none were incorrectly diagnosed (0%). Correct diagnosis is the accuracy of determining the type of disease by examining patients as seen from laboratory tests (total cholesterol, LDL, HDL and triglyceride levels). Drugs must be given for the correct diagnosis, if the diagnosis is not established correctly, then the choice of drugs will refer to the wrong diagnosis (Paulina et al., 2023).

Appropriate indication criteria

The use of antihyperlipidemic drugs was entirely appropriate for the indications (Table 2) with a total of 172 patients (100%) and none were inappropriate for the indications (0%), which is adjusted to the *European Society of Cardiology/European Society of Atherosclerosis* (ESC/EAS) in Perki, 2022. This study is in line with the study conducted by Paulina, et al (2023) that the evaluation of the use of antihyperlipidemic drugs was entirely appropriate for the indications with a total of 103 patients (100%) and none were inappropriate for the indications (0%). Such alignment between local and international findings underscores the successful integration of global lipid management standards into local practice. Consistent adherence to guideline-based indications not only ensures pharmacotherapy effectiveness but also prevents unnecessary polypharmacy and reduces healthcare costs (Pedersen et al., 2021).

Table 2. Rationality of Drug Use based on the Indonesian Ministry of Health (2011)

Criteria	Information	Amount	Percentage (%)
Accurate Diagnosis	Appropriate	172	100
	Inappropriate	0	0
Right Indication	Appropriate	172	100
	Inappropriate	0	0
Right Medicine	Appropriate	172	100
	Inappropriate	0	0
Right Dose	Appropriate	172	100
	Inappropriate	0	0
Correct Method of Administration	Appropriate	172	100
	Inappropriate	0	0
Correct time interval for administration	Appropriate	172	100
	Inappropriate	0	0
Exact Duration of Administration	Appropriate	138	80.23
	Inappropriate	34	19.77
Right Patient	Appropriate	172	100
	Inappropriate	0	0

Right medicine

Right medicine is the accuracy of the medication given in accordance with the guidelines for hyperlipidemia and in accordance with the guidelines for hyperlipidemia therapy. The use of antihyperlipidemic drugs is entirely appropriate for the drug with a total of 172 patients (100 %) and none of them are inappropriate for the drug (0 %) based on the Adult Treatment Panel-III, European Society of Cardiology/European Atherosclerosis Society 2016, AACE/ACE Guidelines 2017 for the Management of Dyslipidemia, and ACC/AHA Guideline of Dyslipidemia, 2021. The results of this study are in line with research conducted by Paulina, et al (2023) that the use of antihyperlipidemic drugs is entirely appropriate for the drug with a total of 103 patients (100%), and none of them are inappropriate for the drug (0%), According to Handayani & Simatupang, (2019) The selection of drugs chosen is adjusted to laboratory data from the results of the patient's cholesterol level examination, where the use of statins is chosen because statins are superior in reducing LDL, namely 18-5%. Meanwhile, fibric acid drugs are chosen when triglyceride levels are 20-50%. These drugs work by activating the lipoprotein lipase enzyme, which breaks down triglycerides and increases HDL cholesterol levels (Paulina et al., 2023).

Accuracy of Drug Dose

The use of antihyperlipidemic drugs was entirely at the correct dosage (Table 2) with a total of 172 patients (100 %) and none were at the incorrect dose (0%), based on the Adult Treatment Panel-III, European Society of Cardiology/European Atherosclerosis Society 2016, AACE/ACE Guidelines 2017 for the Management of Dyslipidemia, and ACC/AHA Guideline of Dyslipidemia 2021. The

results of this study differ from the study conducted by Paulina, et al (2023) that the use of antihyperlipidemic drugs was almost entirely at the correct dose with a total of 100 patients (97.09 %) and a small portion was not at the correct dose with a total of 3 patients (2.91 %). Dosage inaccuracy occurred when administering gemfibrozil, a fibric acid, at a dose of 300 mg per day. This does not comply with the ACC/AHA Guideline of Dyslipidemia 2021 dosage, which is 600 mg twice daily. Underdosing results in inadequate and ineffective doses (Paulina et al., 2023).

Accuracy of Drug Administration Route

The route of drugs administration that must be applied according to the patient's needs because it is one of the factors in the success of patient recovery. The use of antihyperlipidemic drugs was entirely correct in the method of administration (Table 2) with a total of 172 patients (100%) and none of them were incorrect in the method of administration (0%), which was adjusted to the Adult Treatment Panel III, European Society of Cardiology/European Atherosclerosis Society 2016, AACE/ACE Guidelines 2017 for the Management of Dyslipidemia, and ACC/AHA Guideline of Dyslipidemia 2021. The results of this study are in line with research conducted by Paulina, et al. (2023) which showed that the use of antihyperlipidemic drugs was entirely correct in the method of administration. Data in the table obtained from the study showed that drug administration in outpatients was 100% correct, namely by oral administration. According to Anief, (2018) this is because oral administration is the most pleasant, easy, inexpensive and safest. The purpose of administering drugs orally is to obtain a systemic effect,

namely the drug circulates through the blood vessels throughout the body (Paulina et al., 2023).

Accuracy of Drug Administration Interval

The use of antihyperlipidemic drugs is entirely appropriate to the time interval of administration (Tabel 2) with a total of 172 patients (100 %), and none of them are inappropriate to the time interval of administration (0 %), based on the Adult Treatment Panel-III, European Society of Cardiology/European Atherosclerosis Society 2016, AACE/ACE Guidelines 2017 for the Management of Dyslipidemia, and ACC/AHA Guideline of Dyslipidemia, 2021. The results of this study differ from the study conducted by Paulina, et al. (2023) that the use of hyperlipidemic drugs based on the appropriate time interval of administration was 97 patients and the inaccuracy of the time interval of administration was 4 patients. This inaccuracy is due to the administration of simvastatin in some patients, which is given 2x a day. This is not in accordance with the 2019 PERKENI guidelines which also state that simvastatin is only given once a day which is given at night (Paulina et al., 2023).

The use of antihyperlipidemic drugs based on the correct administration interval at South Tangerang City Hospital is in accordance with the theory and guidelines for drug use, namely once a day at night. According to Rossa et al. (2017), this is because cholesterol synthesis occurs in the liver, namely at night. Simvastatin has a short $t_{1/2}$ of 4 hours, therefore simvastatin is better administered at night, when cholesterol is formed, to produce maximum therapeutic effects. Inaccurate administration intervals will affect drug levels in the blood. If the frequency of drug administration is less than the provisions in the guidelines, it will result in less effective therapy. If the frequency of administration is excessive, it can lead to drug toxicity (Paulina et al., 2023). The use of antihyperlipidemic drugs was almost entirely appropriate for the duration of administration (Table 2) with a total of 138 patients (80.23 %) and a small portion was inappropriate for the duration of administration with a total of 34 patients (19.77 %), with a duration of administration of less than 4 weeks of therapy based on the American Association of Clinical Endocrinologists and the American College of Endocrinology (AACE/ACE) in Perkeni, (2021).

The study found the inappropriate duration of administration, with the results of the study being 5

days, 7 days, 10 days, and 15 days. The duration of hyperlipidemia medication administration depends on the patient's condition and symptoms. Medication administration is usually controlled for long-term or short-term use. Lipid tests are performed before starting therapy and every 4-12 weeks after therapy begins, or after adjusting the drug dose until the desired target is reached. Once the therapeutic target has been achieved, lipid tests can be performed annually (Perkeni, 2021). Hyperlipidemia therapy is designed as a long-term intervention that requires continuous administration and systematic monitoring to achieve and maintain lipid targets. Short treatment durations are unlikely to produce meaningful lipid reductions, as most lipid-lowering agents, including statins, require several weeks to reach their maximal therapeutic effect (ESC/EAS, 2019).

International guidelines emphasize structured and ongoing monitoring. Before initiating therapy, clinicians should evaluate baseline lipid profiles, and follow-up lipid testing should be performed within 4–12 weeks after the start of therapy or following any dose adjustment (ESC/EAS, 2019). This monitoring window is necessary because the therapeutic response to statins stabilizes after approximately 4–6 weeks, enabling clinicians to determine whether patients have achieved their LDL-C targets or require dose modification (DrOracle, 2023). Once lipid targets are achieved and the patient remains stable, annual lipid monitoring is generally sufficient (Perkeni, 2021).

Evidence from international studies further supports the importance of adequate therapy duration and monitoring. A large cohort study in Korea found that patients with prolonged intervals between lipid profile tests after statin initiation had a significantly increased risk of stroke, highlighting the clinical consequences of inadequate monitoring and possibly inconsistent drug administration (Kang et al., 2019). Similarly, recent guidelines for lipid management in patients with diabetes recommend lipid, liver enzyme, and creatine kinase evaluations at 4–6 weeks after treatment initiation, followed by checks every 3–6 months, and eventually annually when stable—reinforcing the need for sustained therapy and routine follow-up (Yu et al., 2023).

Given this evidence, the short medication durations observed in this study suggest potential gaps in rational prescribing practices. Such inconsistencies may prevent patients from reaching therapeutic targets,

reduce treatment effectiveness, and increase the long-term risk of cardiovascular events. Therefore, identifying these patterns is crucial, as appropriate therapy duration and monitoring are essential to optimizing lipid control, ensuring patient safety, and improving overall clinical outcomes.

Accuracy In Prescribe Appropriate Patients

The use of antihyperlipidemic drugs was entirely appropriate for patients (Table 2) with a total of 172 patients (100 %) and none were inappropriate for patients (0 %). This is because patients with hyperlipidemia in the Outpatient Department of South Tangerang City Hospital received drugs according to the patient's physiological and pathophysiological conditions which were adjusted based on the literature and Perkeni guidelines, 2021. The results of this study are in line with research conducted by Paulina, et al. (2023) that the use of antihyperlipidemic drugs was entirely appropriate for patients with a total of 103 patients (100 %). Judging from medical records, laboratory test results are influential in assessing the appropriateness of drug use related to the patient's condition (Paulina et al., 2023).

Antihyperlipidemic Drug Interactions

The drug interactions in this study are antihyperlipidemic drug interactions (Table 3) as seen from patient medical records and adjusted to literature studies based on Drug Interactions Stocley 10th Edition. About 95 prescriptions (55.23%) had the potential for drug interactions, and almost half of them did not have drug interactions, with 77 prescriptions (44.77%).

The results of this study are in line with research conducted by Hasan (2021) that found that most of the prescriptions had the potential for drug interactions,

with 115 prescriptions (67.65 %), and almost half did not have the potential for drug interactions, with 55 prescriptions (32.35 %). The greater the number of drugs used, the greater the risk of drug therapy problems in patients, where drug interactions are one of them (Hasan, 2021).

Table 3. Number of Antihyperlipidemic Drug Interactions

Information	Amount	Percentage (%)
Interaction Occurs	95	55.23
No Interaction Occurred	77	44.77
Total	172	100

Source: South Tangerang City Hospital medical records 2024

Analysis of drug interactions in the use of antihyperlipidemic drugs based on severity at South Tangerang City Hospital in December 2024, adjusted using the Drugs Interaction Checker (Drugs.com). Refer to Table 4, the majority of interaction events occurred at the major severity level with a total of 57 interactions (57.57 %), and a small portion occurred at the minor severity level with a total of 5 interactions (5.05 %). The results of the study showed that the frequently prescribed combination was between antihyperlipidemic drugs, namely simvastatin with amlodipine as many as 47 (47.48 %), and a less frequent combination was between atorvastatin with diltiazem, namely 1 case (1.01 %). The results of this study are in line with research conducted by Fadilah, et al (2023) which showed that the frequent prescription of drugs (polypharmacy) was a combination of antihyperlipidemic drugs, namely simvastatin with amlodipine as many as 65 (40.1 %), then fenofibrate with clopidogrel as many as 20 (12.3 %), simvastatin with valsartan as many as 13 (8.0 %), atorvastatin with amlodipine as many as 11 (6.8 %), and fenofibrate with insulin glulisine as many as 10 (6.2 %).

Table 4. Drug interactions based on severity

No	Information	Drug Combination	Amount	Sub Total	Percentage (%)
1	Minor	Simvastatin - Valsartan	3	5	5.05
		Simvastatin - Warfarin	2		
2	Moderate	Simvastatin - Ciprofloxacin	2	37	37.38
		Simvastatin - Nifedipine	12		
		Atorvastatin - Amlodipine	12		
		Atorvastatin - Clopidogrel	5		
		Atorvastatin – Diltiazem	1		
		Atorvastatin - Nifedipine	5		
3	Major	Simvastatin - Amlodipine	47	57	57.57
		Simvastatin - Diltiazem	10		
Total				99	100

Source: South Tangerang City Hospital medical records 2024

Polypharmacy prescriptions for hyperlipidemia patients include statin antihyperlipidemic drugs such as simvastatin and atorvastatin. Statins essentially inhibit HMG-CoA reductase, which is involved in cholesterol biosynthesis in the liver. This inhibition results in lower LDL levels. Fibrates, on the other hand, act on gemfibrozil receptors and can lower blood triglyceride levels. Amlodipine, an antihypertensive drug frequently used in combination therapy, works by inhibiting calcium ions from entering the vascular smooth muscle and heart muscle, thus lowering blood pressure. Valsartan, an angiotensin II receptor antagonist (ARB), is another commonly prescribed antihypertensive. Valsartan works by selectively inhibiting the angiotensin II receptor, preventing angiotensin II from binding to its receptor. This prevents vasoconstriction and aldosterone production, which can lead to lower blood pressure. Furthermore, patients with hyperlipidemia are often prescribed antiplatelet drugs such as clopidogrel. Clopidogrel works by inhibiting platelet aggregation in the arteries, leading to reduced blood vessel blockages (Fadilah et al., 2023).

CONCLUSION

Based on the results of this study, inappropriate use of antihyperlipidemic drugs, including inappropriate duration of administration, was still found. Observations of drug interactions also revealed numerous drug interactions, most of which were at the major level. Therefore, it can be concluded that the use of antihyperlipidemic drugs remains irrational. Clinically, these findings have important implications, as irrational prescribing and major drug interactions may compromise the effectiveness of lipid-lowering therapy, hinder the achievement of target lipid levels, increase the risk of adverse drug reactions, and potentially elevate the long-term risk of cardiovascular events. Ensuring rational prescribing practices is essential to improving therapeutic outcomes, enhancing patient safety, and reducing preventable complications associated with dyslipidemia treatment.

CONFLICT OF INTEREST

All authors declared that there was no conflict of interest.

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