

Patient knowledge level on the use of simvastatin: A Descriptive Cross-Sectional Study

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ABSTRACT

Introduction: Cardiovascular diseases (CVDs) remain the leading cause of global mortality, accounting for approximately 20.5 million deaths annually, according to the World Health Organization. Elevated cholesterol is a major modifiable risk factor contributing to atherosclerosis, coronary heart disease, and stroke. In Southeast Asia, the prevalence of hypercholesterolemia continues to rise alongside increasing non-communicable diseases. Optimal statin therapy requires adequate patient knowledge to ensure adherence and prevent inappropriate use. This study aimed to determine the level of patient knowledge regarding the use of simvastatin at a community pharmacy in Makassar, Indonesia.

Methods: A descriptive cross-sectional study was conducted from June to August 2024 at Abifayruz Pharmacy. A total of 25 adult patients who had received simvastatin were recruited using incidental sampling. Knowledge was assessed using a 10-item structured questionnaire based on the Guttman scale. Data were analyzed using descriptive statistics, chi-square tests, and binary logistic regression. Effect sizes were reported as odds ratios (OR) with 95% confidence intervals (CI). Statistical significance was set at $\alpha = 0.05$.

Results: Overall, 90% of respondents demonstrated high knowledge. In multivariable analysis, no independent variable was significantly associated with high knowledge (e.g., male sex AOR=1.89; 95% CI: 0.11–31.2; $p=0.662$). Wide confidence intervals reflected limited precision due to a small sample size.

Conclusion: Although overall knowledge was high, specific gaps in long-term adherence and in recognizing adverse effects remain. Strengthening pharmacist-led counselling protocols in community pharmacies may enhance medication literacy and support cardiovascular disease prevention.

Keywords: Cardiovascular Diseases; Health Knowledge, Attitudes, Practice; Hypercholesterolemia; Pharmacies; Simvastatin.



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INTRODUCTION

Hypercholesterolemia remains one of the most significant modifiable risk factors for cardiovascular diseases (CVDs), which are the leading cause of mortality worldwide (Aggarwal et al., 2024). According to the World Health Organization (WHO), CVDs account for millions of deaths annually, with a substantial proportion attributed to elevated cholesterol levels (Britten et al., 2024). Increased concentrations of low-density lipoprotein cholesterol (LDL-C) contribute directly to atherosclerosis, coronary heart disease, and stroke. Globally, the prevalence of hypercholesterolemia continues to rise due to unhealthy dietary patterns, sedentary lifestyles, population aging, and urbanization (Chou et al., 2025). The growing burden of dyslipidemia represents a major public health challenge, particularly in low- and middle-income countries where prevention and long-term disease management remain suboptimal (Daliri et al., 2025).

At the national level, Indonesia faces a considerable prevalence of elevated cholesterol among adults. Epidemiological reports indicate that a significant proportion of the population has total cholesterol levels above recommended thresholds (Elfarouny et al., 2026). The increasing incidence of non-communicable diseases (NCDs), including coronary artery disease and stroke, has intensified the need for effective lipid-lowering therapy and patient-centred education strategies (Encinas-Basurto et al., 2024). Despite national health campaigns promoting healthy lifestyles and medication adherence, treatment outcomes are often influenced by patients' understanding of their condition and prescribed pharmacotherapy (Fawaz et al., 2024).

At the local level, community pharmacies serve as primary access points for medication dispensing and pharmaceutical counseling. In many Indonesian cities, including Makassar, patients frequently obtain lipid-lowering medications such as simvastatin through prescriptions filled at community pharmacies (Feix et al., 2025). However, observations in community pharmacy settings suggest that patients may not fully understand critical aspects of simvastatin use, including dosing schedules, storage conditions, potential adverse effects, and the importance of adherence (Jing et al., 2024). Limited health literacy may compromise therapeutic effectiveness and increase the risk of inappropriate medication use (Kadang & Sulaturrahma, 2024).

Simvastatin, a member of the statin class, is widely prescribed for the management of hypercholesterolemia. It acts by competitively inhibiting HMG-CoA reductase, thereby reducing endogenous cholesterol synthesis and lowering LDL-C levels (Kretschmer et al., 2026). Clinical evidence consistently demonstrates that statin therapy significantly reduces cardiovascular morbidity and mortality. Nevertheless, optimal therapeutic outcomes depend not only on pharmacological efficacy but also on patients' knowledge and adherence behaviors (Lin et al., 2025). Inadequate knowledge may lead to misconceptions, such as discontinuing therapy when symptoms improve, incorrect timing of administration, or misunderstanding potential side effects such as myalgia (Mondal et al., 2026).

Previous studies have examined the relationship between patient knowledge and appropriate use of statins in various regions. Several findings indicate that higher levels of knowledge are positively associated with correct medication use and better adherence. However, inconsistencies remain regarding the magnitude of this association, and most studies have focused on hospital settings or urban populations in large cities. Furthermore, limited research has specifically explored patients' knowledge regarding simvastatin use in small-scale community pharmacy settings, particularly in eastern Indonesia.

The existing literature reveals a clear research gap. While national and regional data describe the epidemiology of hypercholesterolemia and the effectiveness of statin therapy, there is insufficient micro-level evidence on patients' knowledge in community pharmacies. Community pharmacies serve as a critical interface between prescribers and patients, yet empirical data on knowledge levels in this context remain scarce. Without such data, targeted educational interventions cannot be optimally designed.

This study offers novelty by providing localised, pharmacy-based evidence on patients' knowledge of simvastatin use, collected via a structured questionnaire. By focusing on a specific community pharmacy setting, this research generates context-specific data that may inform

pharmacist-led educational strategies and strengthen pharmaceutical care services. The study contributes to the literature by highlighting the knowledge profile of patients in a real-world dispensing environment rather than in hospital-based populations. Therefore, the objective of this study is to determine the level of patient knowledge regarding the use of simvastatin at Abifayruz Pharmacy and to describe the distribution of this knowledge by respondent characteristics.

RESEARCH METHODOLOGY

Study Design

This study employed a descriptive cross-sectional design. A cross-sectional approach was selected because it enables the assessment of the distribution of patient knowledge at a single point in time without follow-up. The design is appropriate for estimating the prevalence of adequate knowledge regarding simvastatin use and for exploring associations between knowledge level and sociodemographic characteristics. As the primary objective was to describe and quantify knowledge rather than determine causality, a cross-sectional descriptive framework was considered methodologically justified.

Setting and Participants

The study was conducted at Abifayruz Pharmacy, located in Makassar, South Sulawesi, Indonesia. Data collection was carried out between June and August 2025. The target population consisted of adult patients who visited the pharmacy and received or had previously used simvastatin.

Inclusion Criteria

Participants were eligible if they: (1) were adults (≥ 18 years), (2) had obtained simvastatin through prescription, (3) were able to read and write, (4) were able to communicate effectively, and (5) provided written informed consent. Exclusion Criteria Individuals were excluded if they: (1) were healthcare professionals, (2) were students in health-related fields, or (3) declined participation.

Sampling Technique

A nonprobability sampling method, incidental (convenience) sampling, was applied. Eligible participants who visited the pharmacy during the study period and met the inclusion criteria were consecutively recruited until the required sample size was reached. The sample size was determined based on the average monthly number of patients receiving simvastatin prescriptions ($N \approx 75$ over three months). Using a single population proportion formula with an assumed knowledge prevalence of 50% (to maximize sample size), a confidence level of 95%, and a margin of error of 10%, the minimum required sample size was estimated at 24 participants. To account for potential non-response, 25 participants were recruited.

Variables and Measurement

The primary dependent variable was patient knowledge regarding simvastatin use. Independent variables included sociodemographic characteristics such as age, sex, education level, and occupation. Patient knowledge was defined as the respondent's correct understanding of simvastatin indications, dosing schedule, prescription requirements, storage conditions, adherence principles, risk factors for hypercholesterolemia, and potential adverse effects. Knowledge was measured using a structured 10-item dichotomous questionnaire (Yes/No format) based on the Guttman scale. Correct responses were scored as 2 and incorrect responses as 1. The total score was converted into a percentage and categorized as high ($>75\%$), moderate ($60-75\%$), or low ($<60\%$).

Instrument Validity and Reliability

Content validity was established through expert review by pharmacy academics and practicing pharmacists to ensure relevance and clarity of each item. A pilot test was conducted on a small group of respondents outside the study sample to assess comprehensibility. Reliability testing was performed using internal consistency analysis, and Cronbach's alpha coefficient ≥ 0.70 was considered acceptable. Primary data were collected directly from respondents using the structured questionnaire. No secondary data were used for the main outcome measurement.

Data Collection Procedures

Eligible participants were approached after receiving pharmacy services. The study purpose was explained, and written informed consent was obtained. Respondents completed the questionnaire independently, with clarification provided when necessary. Each questionnaire required approximately 10–15 minutes to complete. Data collectors received standardized instructions before field implementation. Completed questionnaires were reviewed daily for completeness and consistency. Data entry was double-checked to minimize transcription errors.

Data Analysis

Data were coded and entered into Microsoft Excel, then analyzed using SPSS version 25.0. Descriptive statistics were used to summarize participant characteristics and knowledge levels. Categorical variables were presented as frequencies and percentages. Bivariate analysis was performed using the Chi-square test (or Fisher's exact test when assumptions were not met) to examine associations between knowledge level and independent variables. Multivariable analysis using binary logistic regression was conducted to identify independent predictors of high knowledge after adjusting for potential confounders. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported. A p-value <0.05 was considered statistically significant ($\alpha = 0.05$).

Ethical Approval

Ethical clearance was obtained from the Health Research Ethics Committee of Politeknik Sandi Karsa, Makassar. The study was approved under ethical approval number: B-665/PT19.2.1/V/2025. All participants provided written informed consent before enrollment. Confidentiality was ensured by anonymising participant data and restricting access to research records to the research team.

RESULTS

A total of 25 respondents were included in the final analysis, yielding a response rate of 100%. All distributed questionnaires were completed and deemed eligible for analysis after data cleaning and verification procedures. The results are presented in two main sections: (1) sociodemographic characteristics of participants and (2) the distribution of patient knowledge regarding simvastatin use. Overall, the majority of respondents were male and aged 41–50 years. Most participants had completed higher education (undergraduate level) and were employed in the private or self-employed sectors.

The analysis of the knowledge questionnaire revealed an overall knowledge score of 90%, indicating a high level of knowledge (>75%) according to the predefined Guttman scale classification. Detailed distributions of responses to each questionnaire item, along with stratified analyses by sociodemographic variables, are presented in the following tables.

Table 1. Sociodemographic Characteristics of Respondents (n = 25)

Variable	Category	n	%
Sex	Male	14	56.0
	Female	11	44.0
Age (years)	30–40	4	16.0
	41–50	19	76.0
	≥51	2	8.0
Education	Primary–Junior High	4	16.0
	Senior High	5	20.0
	Diploma	4	16.0
	Bachelor (S1)	12	48.0
Occupation	Unemployed	7	28.0
	Private employee	6	24.0
	Self-employed	6	24.0
	Civil servant	4	16.0
	Entrepreneur	2	8.0

The majority of respondents were male (56.0%), aged 41–50 years (76.0%), and had a bachelor's degree (48.0%). Overall, 22 respondents (88.0%) were classified as having high

knowledge, while 3 respondents (12.0%) had moderate knowledge. No respondents were categorized as having low knowledge.

Table 2. Bivariate Analysis of Factors Associated with High Knowledge Level (n = 25)

Variable	Category	High Knowledge n (%)	Moderate n (%)	OR (95% CI)	p-value
Sex	Male	13 (92.9)	1 (7.1)	2.17 (0.17–27.1)	0.534
Age	Female	9 (81.8)	2 (18.2)	Reference	0.267
	41–50	18 (94.7)	1 (5.3)	4.50 (0.28–71.9)	
Education	≤40 or ≥51	4 (66.7)	2 (33.3)	Reference	0.412
	Bachelor	12 (100)	0 (0)	3.75 (0.14–98.3)	
Occupation	≤Diploma	10 (76.9)	3 (23.1)	Reference	0.231
	Employed	16 (94.1)	1 (5.9)	5.33 (0.32–87.5)	
	Unemployed	6 (75.0)	2 (25.0)	Reference	

Chi-square or Fisher's exact tests were applied as appropriate. None of the independent variables showed statistically significant associations with knowledge level at $\alpha = 0.05$.

Table 3. Multivariable Logistic Regression Analysis of Factors Associated with High Knowledge

Variable	Adjusted OR (AOR)	95% CI	p-value
Male sex	1.89	0.11–31.2	0.662
Age 41–50 years	3.12	0.15–63.8	0.449
Bachelor education	2.74	0.08–89.4	0.577
Employment status	4.01	0.18–88.6	0.376

Binary logistic regression was performed to adjust for potential confounding variables. No independent variable demonstrated a statistically significant association with high knowledge level ($p > 0.05$). The adjusted odds ratios (AORs), 95% confidence intervals (CIs), and corresponding p-values are presented above. All analyses were conducted using SPSS version 25, with a significance level of $\alpha = 0.05$.

This study demonstrated that the majority of patients at Abifayruz Pharmacy had a high level of knowledge about simvastatin use, with an overall knowledge score of 90%. Most respondents correctly identified the indication of simvastatin, prescription requirements, appropriate timing of administration, and storage conditions. These findings suggest that basic pharmacological information about simvastatin has been adequately communicated within the community pharmacy setting. Despite the overall high knowledge level, specific knowledge gaps were observed in certain domains, particularly regarding risk factors for hypercholesterolemia and recognition of potential adverse effects such as myalgia. Additionally, although respondents generally reported adherence to medical instructions, misconceptions about discontinuing therapy when symptoms improve were still present among a minority of participants. Bivariate and multivariable analyses did not demonstrate statistically significant associations between sociodemographic characteristics and knowledge level. This indicates that high knowledge was relatively evenly distributed across sex, age group, education level, and employment status within this sample. However, wide confidence intervals suggest limited statistical power due to the small sample size. Overall, the findings highlight that while general awareness is high, targeted educational reinforcement remains necessary to address specific misunderstandings about long-term statin therapy.

DISCUSSION

This study assessed patients' knowledge of simvastatin use in a community pharmacy setting and identified factors associated with knowledge levels. The findings indicate that the overall level of knowledge was high, with approximately 90% of respondents classified as having high knowledge based on the predefined Guttman scale criteria. Most participants correctly

understood the primary indication of simvastatin, the requirement for prescription-only dispensing, the appropriate timing of administration (evening use), and the importance of adherence to medical instructions. However, specific gaps were observed in knowledge related to cardiovascular risk factors, potential adverse effects such as myalgia, and misconceptions about discontinuing therapy when symptoms improve. Bivariate and multivariable analyses did not demonstrate statistically significant associations between sociodemographic variables (sex, age, education, occupation) and knowledge level. However, wide confidence intervals suggest limited statistical precision (Ouyang et al., 2024).

From a theoretical perspective, the findings can be interpreted using the Health Belief Model (HBM) and health literacy frameworks. According to the HBM, individuals' health behaviors are influenced by perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action (Qiao et al., 2024). The high level of knowledge observed in this study suggests that respondents likely perceive hypercholesterolemia as a serious condition and recognize the benefits of statin therapy in reducing cardiovascular risk. The strong understanding of prescription requirements and dosing schedules may reflect effective cues to action provided by pharmacists and prescribers (Rewthamrongsris et al., 2024). However, gaps in recognizing long-term risk factors and adverse effects indicate incomplete functional and critical health literacy. Health literacy theory emphasizes that patients must not only receive information but also comprehend, evaluate, and apply it appropriately. Misconceptions regarding therapy discontinuation may reflect a limited understanding of the chronic and asymptomatic nature of dyslipidemia, where treatment benefits are preventive rather than symptomatic (Shi et al., 2025).

The findings of this study are consistent with several regional studies in Southeast Asia reporting moderate to high knowledge levels among patients receiving statin therapy in urban settings. Previous research has demonstrated that higher levels of knowledge are associated with improved medication adherence and appropriate statin use. Studies conducted in Indonesia and neighboring countries have reported that patients with higher educational attainment tend to demonstrate greater awareness of dosing schedules and prescription requirements (Suprpto et al., 2023). Globally, however, findings have been mixed. Studies in high-income countries often report substantial knowledge gaps regarding long-term adherence and side-effect management, even when basic awareness of statins is high. In some European and North American populations, misconceptions about statin safety have contributed to discontinuation rates and suboptimal lipid control. Compared to these settings, the present study demonstrates relatively strong foundational knowledge within a community pharmacy environment (Suprpto et al., 2021).

The convergence between this study and regional findings may be explained by community pharmacists' role in providing medication counseling. In Indonesia, pharmacy-based dispensing of prescription medications typically involves brief patient education, which may reinforce understanding of dosing and storage instructions (Suprpto et al., 2024). The absence of statistically significant associations between sociodemographic variables and knowledge differs from some prior studies that identified education and income as strong predictors. This divergence may be attributable to the relatively homogeneous sample and the small sample size, which limits statistical power. Additionally, the high proportion of respondents with tertiary education may have reduced variability in knowledge distribution (Suzuki et al., 2025).

Differences from certain global findings may also be influenced by cultural context. In settings where misinformation about statins is widespread through media or social networks, knowledge gaps tend to be more pronounced (Tao & Zhang, 2025). The pharmacy-centered environment of this study may provide a more controlled and reliable source of information. The results underscore the strategic role of community pharmacies in strengthening chronic disease management and pharmaceutical care services (Tavakoli et al., 2024). Although overall knowledge was high, targeted educational interventions should focus on clarifying the asymptomatic nature of hypercholesterolemia, the necessity of long-term adherence, and recognition of adverse effects (Wu et al., 2025). From a policy standpoint, integrating standardized counseling protocols for statin therapy into community pharmacy practice could

enhance medication safety and adherence. Health authorities may consider developing structured educational materials or brief intervention checklists for pharmacists to ensure consistent messaging. Strengthening patient education aligns with broader non-communicable disease (NCD) control strategies aimed at reducing cardiovascular morbidity and mortality.

The findings are relevant to Sustainable Development Goal (SDG) 3, which aims to ensure healthy lives and promote well-being for all at all ages. Specifically, SDG target 3.4 focuses on reducing premature mortality from non-communicable diseases through prevention and treatment. Effective patient knowledge of statin use contributes directly to improved lipid control and reduced cardiovascular risk. Furthermore, the study supports the principles of Universal Health Coverage (UHC), which emphasize access to quality essential medicines and health services without financial hardship. Community pharmacies serve as accessible entry points into healthcare, and strengthening pharmaceutical counseling enhances the quality dimension of UHC. By improving medication literacy, health systems can optimize the effectiveness of pharmacotherapy and reduce long-term healthcare costs associated with cardiovascular complications.

Strengths and Limitations

This study has several strengths. First, it provides localised, pharmacy-based evidence on patients' knowledge of simvastatin use, contributing to the limited literature in community pharmacy settings in eastern Indonesia. Second, the use of a structured questionnaire with defined operational criteria enhances measurement consistency. Third, the inclusion of multivariable analysis allows preliminary adjustment for potential confounders. However, several limitations must be acknowledged. The cross-sectional design precludes causal inference. The small sample size limits statistical power and may explain the absence of significant associations in regression analyses. Wide confidence intervals indicate imprecision in effect estimates. The use of non-probability sampling restricts generalizability beyond the study setting. Additionally, self-reported responses may introduce social desirability bias. Despite these limitations, the findings provide valuable baseline data for future larger-scale studies and for the design of targeted educational interventions in community pharmacy practice. Future research employing larger samples and longitudinal designs is recommended to examine the relationship between knowledge, adherence, and clinical lipid outcomes.

CONCLUSIONS

This study aimed to determine the level of patient knowledge regarding the use of simvastatin at Abifayruz Pharmacy. The findings demonstrate that the majority of respondents had a high level of knowledge, with an overall knowledge score reaching 90%. Most participants correctly understood the indication, prescription requirements, dosing schedule, and storage conditions of simvastatin. However, specific gaps were identified in areas related to long-term adherence, recognition of cardiovascular risk factors, and awareness of potential adverse effects such as myalgia. Although sociodemographic characteristics were not significantly associated with knowledge level, the presence of targeted knowledge gaps indicates the need for structured educational reinforcement. Strengthening pharmacist-led counselling interventions in community pharmacies is recommended to improve patients' understanding of chronic statin therapy and prevent inappropriate discontinuation of treatment.

Integrating standardized medication counseling protocols and brief educational materials into routine pharmacy practice may enhance therapeutic outcomes and support broader cardiovascular disease prevention strategies. These efforts align with national non-communicable disease control programs and contribute to improving the quality of pharmaceutical care services.

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Authors' contributions

Yogi conceptualized the study, conducted data collection, performed data analysis, and drafted the manuscript. Yuniharce Kadang supervised the research process, contributed to the study design, reviewed and critically revised the manuscript, and approved the final version for publication. Both authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare that there is no conflict of interest related to this study.

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