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Prescription Patterns of Statins in Ibrahim Malik Teaching Hospital, Khartoum - Sudan

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Abstract

Background: The discovery of antihyperlipidemic drugs, particularly statins, has led to significant progress in both primary and secondary prevention of coronary artery disease. Optimal pharmaceutical usage is critical for achieving excellent healthcare outcomes for patients and mitigating the financial burden.
Aim: The main objective of this study is to assess the prescribing and utilization patterns of statins in the outpatient department of Ibrahim Malik Teaching Hospital in Khartoum, Sudan.
Methods: Three-month observational research was conducted to evaluate statin prescription practices at a university hospital in Sudan. We monitored three different types of statins that were accessible at the hospital. A total of 204 prescriptions from the hospital's outpatient department were included, and the prescribing patterns were subjected to statistical analysis.
Results: The study findings indicated that the majority of consumers were male (52.9%) and had reached the age of 60 (53.4%). Atorvastatin was the most often prescribed statin for hyperlipidemia, with a total of 153 patients receiving it. The initial dose of 20 mg was given to 113 patients, and 115 patients had their dosage adjusted. Statins are administered for disorders other than the ones mentioned.
Conclusion: Despite being aware of the medication's adverse effects, the prescribers at the Sudan teaching hospital were seen to follow the recommended guidelines while prescribing the prescription, demonstrating sound clinical judgement and adherence.

Keywords: Hyperlipidemia, statins, clinical judgment, prescribers

1. Introduction

Hyperlipidemia is a medical disorder characterized by abnormally high amounts of lipids in the body. It encompasses a range of inherited and acquired conditions. Hyperlipidemia is a highly prevalent condition, particularly in the Western Hemisphere but also globally. Hyperlipidaemia can be defined more objectively as having levels of low-density lipoprotein (LDL), total cholesterol, triglycerides, or lipoproteins that are higher than the 90th percentile compared to the general population. It can also be defined as having a high-density

lipoprotein (HDL) level that is lower than the 10th percentile compared to the general population. Lipids often encompass cholesterol levels, lipoproteins, chylomicrons, VLDL, LDL, apolipoproteins, and HDL [1]. Statins are a pharmacological class of medications that lower blood cholesterol levels by inhibiting the liver's cholesterol synthesis. Statins inhibit the liver enzyme 3-hydroxy-3-methylglutaryl-coenzyme A reductase, which is involved in cholesterol synthesis. Statins encompass widely recognized medications, including atorvastatin, simvastatin, lovastatin, pravastatin, rosuvastatin, Fluvastatin, and other others. In large-scale clinical trials, the effectiveness of statins in reducing cardiovascular disease in individuals without diabetes has been extensively documented. HMG-CoA reductase inhibitors' positive effects are typically attributed to their ability to decrease cholesterol production within the body by competitively blocking the primary enzyme responsible [2]. According to the most recent Progress Surveillance report by the World Health Organization (WHO) in 2017, non-communicable diseases (NCDs) are responsible for the highest number of deaths globally, accounting for 70% of all mortality. Non-communicable diseases primarily affect 40% of the adult population under the age of 70. These conditions, especially hyperlipidemia, obesity, and hypertension (cardio-metabolic disorders), are prevalent. Diseases are correlated with risk factors related to an unhealthy lifestyle in the population, such as alcohol intake, smoking, consumption of fatty foods, and insufficient physical activity [3]. Dyslipidemia has had a long-standing impact on numerous developed countries. In 2011, a study conducted by the Centers for Disease Control and Prevention found that over 33% of individuals in the United States had high levels of LDL-C. The incidence of dyslipidemia varied between 34% and 50% in Spain, 45.5% in Brazil, and 64.5% in Italy [4]. Multiple investigations and experiments have demonstrated that elevated levels of LDL cholesterol significantly raise the likelihood of developing atherosclerotic plaques and consequent vascular disease. On the other hand, high-density lipoprotein (HDL) plays a role in maintaining cholesterol levels to avoid an imbalance that could raise the likelihood of atherosclerosis in vascular disease. The LDL cholesterol target for each patient is determined by their overall cardiovascular risk. Medical treatment should be customized to suit the specific needs of each patient [1, 5, 6, 7]. The study results will enable Ibrahim Malik Teaching Hospital (IMTH) to assess their prescribing trends and make necessary adjustments to their prescribing guide and clinical practice. This, in turn, would enhance treatment outcomes. This study is noteworthy because there has been little research conducted in Sudan to evaluate statin prescribing trends.

2.Motheds

Study design

The study was a descriptive, cross-sectional, hospital-based study done at the IMTH in Khartoum, Sudan, Outpatient Department for three months. During this period, prescription screening took place.

Sampling Size

The study was carried out in the Internal Medicine outpatient department of Ibrahim Malik Teaching Hospital, situated in the Khartoum locality, where it offers healthcare services to individuals of all age groups. The study included individuals from Khartoum, Sudan, who had hyperlipidemia and were treated with several types of statins.

Sampling technique and Sample size calculation

The data was acquired using a rigorous random sampling procedure. Following verbal consent from patients who visited the outpatient department, the prescriptions were recorded. Currently, there are no prevalence statistics for the prescription of statins in Sudan. Statin utilization is determined by analyzing diverse prevalence data from Asian populations, revealing an approximate rate of 5% among patients with any medical issues. The sample size is determined using a formula that takes into account a 5% prevalence rate, a 95% confidence interval, and a 5% margin of error.

$n = Z^2 P (1 – P)/d^2$

where n = sample size

Z = Z statistic for a level of confidence = 1.96 (CI = 95%)

P = expected prevalence or proportion = 5% = 0.05 d = precision = 0.05 (margin of error = 5%).[8].

A total of 1400 prescriptions were evaluated, and the sample size was determined to be 204 using the formula mentioned above. Hence, the total sample size collected for analysis amounted to 204. Determine the appropriate sample size to assess the prevalence of statin usage in the IMTH. The calculations were made using the Raosoft sample calculator. According to the provided formula, the sample size is 73. Nevertheless, the sample size is duplicated for data collection, resulting in a 30% improvement in the study's precision. 40% of the sample was gathered in surplus to mitigate the risk of missing data. Hence, the total sample size collected for analysis amounted to 204. According to IMTH's Statistics Department, the outpatient department is expected to have a maximum estimated patient population of 10,000 per month.

Data Collection

A total of 1400 prescriptions underwent screening for various medications, such as statins, antidiabetic medications, antihypertensive drugs, and others. We assessed all categories of prescribed statins while excluding other types of lipid-lowering drugs (such as fibrates) due to their unavailability and lack of relevance to our objectives. We specifically examined the specific type of statin, the process of up-titration or equivalent dose, and the daily dosage in milligrams per day. As per the 2017 ACC/AHA guideline, statins were categorized into three levels of dose intensity according to their effectiveness in reducing LDL (low-intensity, moderate-intensity, and high-intensity statins). (1) Low-intensity statins include atorvastatin at a dosage of less than 10 mg

per day, rosuvastatin at a dosage of less than 5 mg per day, simvastatin at a dosage of less than 20 mg per day, and lovastatin at a dosage of less than 40 mg per day. (2) Statins with moderate intensity include atorvastatin at a daily dose between 10 mg and less than 40 mg, rosuvastatin at a daily dose between 5 mg and less than 20 mg, simvastatin at a daily dose between 20 mg and less than 80 mg, and lovastatin at a daily dose of 40 mg or more. (3) High-intensity statins include atorvastatin at a daily dose of 40 mg or higher, rosuvastatin at a daily dose of 20 mg or higher, and simvastatin at a daily dose of 80 mg or higher. The prescriptions were looked at to see things like disease patterns, the specific hypolipidemic drugs prescribed for those diseases, the daily dosage at which the drugs were prescribed (PDD), and the ratio of the drugs' PDD to their defined daily dosage (DDD). The World Health Organization has established the Anatomical Therapeutic Chemical (ATC) classification and the daily defined dosage (DDD) for hypolipidemic medicines. In adults, the daily defined dose (DDD) refers to the average dose of a medication that is typically used for its main purpose. On the other hand, the prescribing daily dose (PDD) represents the average dose given based on the number of prescriptions filled, indicating the quantity of medication supplied. The prescription included many doses of hypolipidemic medications, and the PDD (Prescribed Daily Dose) was calculated as the average of the daily doses for these medications. The PDD/DDD ratio was calculated to assess the appropriateness of the dosage [9].

The PDD/DDD ratio is used to assess the disparities between the recommended dose and the defined daily dose. This ratio directly reflects the difference between these two doses, as well as the magnitude of the ratio.

Ethical Considerations

The project has received approval from the medical director of Ibrahim Malik Teaching Hospital (IMTH) in Khartoum, Sudan. The study obtained approval from the ethical committee of the Ministry of Health, Sudan (approval code: 02-02-2021) before being conducted at IMTH.

Statistical analysis

The data analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 25.0. An analysis was conducted that involved describing and examining one variable at a time. All statistical tests were conducted at a significance level of 5%. We used discrete data sets that have no relationship or dependence on each other. The T-test was employed to compare the average values among different groups, while Pearson's chi-squared test was utilized to examine the proportions between groups. In cases where any of the cells had an anticipated frequency of five or below, Fisher's exact test was used. Variable categories with low frequencies were merged accordingly. To analyze the association between the study variables and the prescription of statins, logistic regression was employed. The criteria for inclusion

In the logistic regression model, a significance level of $p<0.20$, or established clinical importance, was used.

3. Results

A total of 204 prescriptions were included. Hypolipidemic medications were predominantly administered to individuals with dyslipidemia, regardless of their specific lipid profile, likely reflecting primary and secondary prevention strategies for cardiovascular problems. Most patients prescribed hypolipidemics had hyperlipidemia with additional comorbidities.

Patient Demographics

Among the 204 prescriptions, 52.9% of patients were male and 47.1% female. Table 1 show the age distribution. Most patients (53.4%) were aged ≥60 years, followed by 41.2% aged 40–59 years. Only 11 prescriptions were for patients aged 30–39 years.

Table 1: Patient age groups

Age group	30-39 years	40-49 years	50-59 years	60-69 years	Above 70 years
Number of patients	11	38	46	41	68

Types of Statins Prescribed

Three statins were prescribed: atorvastatin, simvastatin, and rosuvastatin (Table 2). Atorvastatin was most frequent, accounting for 75% (n=153) of screened statins, followed by simvastatin (19.6%, n=40) and rosuvastatin (5.4%, n=11).

Table 2: Type of Statins used by participants

Statin Type	Frequency	Percentage (%)	Cumulative (%)
Atorvastatin	153	75.0	75.0
Simvastatin	40	19.6	94.6
Rosuvastatin	11	5.4	100.0
Total	204	100.0	

Diagnosis of Hyperlipidemia

Table 3 shows that 98.5% of prescriptions (n=201) were for treating hyperlipidemia. Only three prescriptions were for non-hyperlipidemia diagnoses: one atorvastatin and two simvastatin prescriptions.

Table 3: Presence of hyperlipidemia diagnosis

Statin Type	No Hyperlipidemia Diagnosis	Yes Hyperlipidemia Diagnosis	Total
Atorvastatin	1 (0.7%)	152 (99.3%)	153
Simvastatin	2 (5.0%)	38 (95.0%)	40
Rosuvastatin	0 (0.0%)	11 (100.0%)	11
Total	3 (1.5%)	201 (98.5%)	204

Initial and Adjusted Statin Doses

Table 4 displays initial prescribed doses. The most common was atorvastatin 20 mg (55.4%, n=113). Other atorvastatin doses included 10 mg (n=14), 30 mg (n=3), and 40 mg (n=23). Simvastatin was most often prescribed at 20 mg (11.8%, n=24), followed by 10 mg (5.4%, n=11) and 40 mg (2.5%, n=5). Rosuvastatin 10 mg (2.9%, n=6) was used more frequently than 20 mg (2.5%, n=5).

Table 4: Initial Dose of Statin prescribed

Dose (mg)	Frequency	Percentage (%)	Cumulative (%)
Atorvastatin 10	14	6.9	6.9
Atorvastatin 20	113	55.4	62.3
Atorvastatin 30	3	1.5	63.7
Atorvastatin 40	23	11.3	75.0
Simvastatin 10	11	5.4	80.4
Simvastatin 20	24	11.8	92.2
Simvastatin 40	5	2.5	94.6
Rosuvastatin 10	6	2.9	97.5
Rosuvastatin 20	5	2.5	100.0
Total	204	100.0	

Table 5 shows dose adjustments. Atorvastatin 20 mg remained the most frequently prescribed adjusted dose (56.4%, n=115). Simvastatin 20 mg was the most common adjusted dose for that drug (10.3%, n=21). Rosuvastatin doses remained unchanged in all prescriptions, possibly due to cost factors.

Table 5: Changed Dose of Statin prescribed

Dose (mg)	Frequency	Percentage (%)	Cumulative (%)
Atorvastatin 10	30	14.7	14.7
Atorvastatin 20	115	56.4	71.1
Atorvastatin 40	8	3.9	75.0
Simvastatin 10	16	7.8	82.8
Simvastatin 20	21	10.3	93.1
Simvastatin 30	1	0.5	93.6
Simvastatin 40	2	1.0	94.6
Rosuvastatin 10	6	2.9	97.5
Rosuvastatin 20	5	2.5	100.0
Total	204	100.0	

Association with Gender

Table 6 show the distribution of statin types by gender. Among atorvastatin users, 58.8% (n=90) were male and 41.2% (n=63) female. For simvastatin, 65.0% (n=26) were female. Rosuvastatin was also more frequently prescribed to females (63.6%, n=7). The p-value of 0.012 indicates a statistically significant association between statin type and patient gender ($p < 0.05$). Females were more likely to be prescribed simvastatin and rosuvastatin, while males were more likely to receive atorvastatin.

Table 6: Types of Statins prescribed according to gender (Chi-Square output implied)

Statin Type	Male	Female	Total
Atorvastatin	90 (58.8%)	63 (41.2%)	153 (100.0%)
Simvastatin	14 (35.0%)	26 (65.0%)	40 (100.0%)
Rosuvastatin	4 (36.4%)	7 (63.6%)	11 (100.0%)
Total	108 (52.9%)	96 (47.1%)	204 (100.0%)

Table 7 shows additional diagnoses alongside hyperlipidemia. Coronary heart disease (CHD) was the most common comorbidity (10.8%, n=22). Others included hypertension (2.5%, n=5), thyroid disorders (2.0%, n=4), asthma (1.5%, n=3), COPD (1.0%, n=2), and single cases of gout, peptic ulcer, and arthritis. Most prescriptions (80.9%, n=165) were solely for hyperlipidemia without other diagnoses.

Table 7: Other diagnoses of prescriptions

Diagnosis	Frequency	Percent (%)	Cumulative (%)
Hypertension	5	2.5	2.5
Coronary Heart Disease	22	10.8	13.2
Gout	1	0.5	13.7
Asthma	3	1.5	15.2
COPD	2	1.0	16.2
Peptic ulcer	1	0.5	16.7
Arthritis	1	0.5	17.2
Thyroid disorder	4	2.0	19.1
No other diagnosis	165	80.9	100.0
Total	204	100.0	

4. Discussion

The findings demonstrate that atorvastatin 20 mg was consistently recommended more frequently than other statins (55.4% of prescriptions). This prescribing pattern aligns significantly with American College of Cardiology (ACC) and American Heart Association (AHA) guidelines [10]. While simvastatin was most commonly prescribed in Hong Kong (2004–2015), our results show atorvastatin as most frequent at IMTH. Similarly, atorvastatin had the highest prescription rates among new statin users in Taiwan (2002–2011). Atorvastatin, simvastatin, and rosuvastatin were also the most commonly prescribed statins in other Asian countries and Norway, closely matching our statistical findings [11–13]. Atorvastatin 20 mg was also the most frequently selected statin for dose adjustment at IMTH. A 2010 analysis by the Institute of Healthcare Informatics revealed atorvastatin as the top-selling medicine in the United States, with $7.2 billion in sales [14, 15].

Comparing our Sudanese results with a study from Ethiopia (n=323), where 55.7% received statins for primary CVD prevention, the most prescribed statins were simvastatin (37.2%), atorvastatin (32.8%), and rosuvastatin (15.6%). In our study, atorvastatin was most common, followed by simvastatin, with a smaller difference between the two. The primary indication in both studies was CVD prevention. In the Ethiopian study, statin prescriptions were 27.8% low-dose, 46.1% moderate-dose, and 26.1% high-intensity, with 60.6% achieving target cholesterol levels. These findings align with our analysis, confirming that hyperlipidemia treatment and CVD prevention are the main reasons for statin prescribing at IMTH [16].

Most studies on determinants of prescribing behavior have been conducted in Western countries, where doctor-patient communication often emphasizes fairness. In Sudan, prescribing is primarily doctor-driven, though patients may influence decisions. In Southeast Asia, paternalistic communication (doctor-dominant) is more common, reflecting cultural norms that maintain interpersonal space. Our study results are consistent with 10-year statin utilization trends from Taiwan's National Health Insurance Research Database (over 10,000 patients), which concluded that atorvastatin was the most commonly prescribed agent (28.4–36.7% of prescriptions). At IMTH, atorvastatin comprised up to 75% of screened statin prescriptions. Patients with a

history of CVD were more likely to receive higher-intensity statins compared to those without CVD [17, 18].

5. Conclusions

This study describes statin use at IMTH in Sudan, showing that despite ongoing debates about primary prevention, statins remain the preferred treatment for hyperlipidemia. Physicians demonstrate good adherence to guideline-recommended dosages and statin types. However, widespread statin use drives high pharmaceutical spending and raises sustainability concerns. The benefit-risk balance varies by patient group, highlighting the need for ongoing analysis of real-world prescribing patterns to inform the debate.

Recommendations

Based on the study findings, it is recommended that a locally adapted prescribing guideline, consistent with American Heart Association/American College of Cardiology standards, be developed and implemented; that pharmacist-led patient education and adherence programs be launched; that periodic prescription audits be conducted using WHO drug use indicators; that the underlying causes of the observed gender differences in statin prescribing be investigated; that multicenter studies be conducted across Sudan to obtain nationally representative data; that cost and availability barriers be addressed, particularly for rosuvastatin; and that long-term cardiovascular outcomes be monitored to assess the effectiveness of current outpatient prescribing practices.

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Data Availability
All data relevant to this study are presented in this manuscript. Additional datasets are available from the corresponding author upon reasonable requests.

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Conflicts of interest
The authors declare that there are no conflicts of interest.

Consent for publication
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References

1. Berthold, Heiner K et al. “Patterns and predictors of statin prescription in patients with type 2 diabetes.” Cardiovascular diabetology vol. 8 25. 13 May. 2009, doi:10.1186/1475-2840-8-25
2. Ellis JJ, Erickson SR, Stevenson JG, Bernstein SJ, Stiles RA, Fendrick AM. Suboptimal statin adherence and discontinuation in primary and secondary prevention populations: should we target patients with the most to gain?. Journal of general internal medicine. 2004 Jun;19(6):638-45.
3. Tewari, Satyendra et al. “Premature coronary artery disease in North India: an angiography study of 1971 patients.” Indian heart journal vol. 57,4 (2005): 311-8.
4. WHO (2010). Use of the World Health Organization Defined Daily Dose in Canadian Drug Utilization and Cost Analyses December (2010). Patented Medicine Prices Medicaments Review Board. Standard Life Centre, ISBN: 978-1-100-17506-5.
5. Ruscica, M et al. “Appropriateness of statin prescription in the elderly.” European journal of internal medicine vol. 50 (2018): 33-40. doi:10.1016/j.ejim.2017.12.011
6. Joyce GF, Carrera M, Goldman DP, Sood N. Physician prescribing behavior and its impact on patient-level outcomes. The American journal of managed care. 2011 Dec 1;17(12):e462.
7. Mohammed, Mohammed A et al. “Patient and other factors influencing the prescribing of cardiovascular prevention therapy in the general practice setting with and without nurse assessment.” Medical decision making : an international journal of the Society for Medical Decision Making vol. 32,3 (2012): 498-506. doi:10.1177/0272989X12437246
8. Charan, Jaykaran, and Tamoghna Biswas. “How to calculate sample size for different study designs in medical research?.” Indian journal of psychological medicine vol. 35,2 (2013): 121-6. doi:10.4103/0253-7176.116232
9. Raja, Sangeetha et al. “Prescription patterns of hypolipidaemic drugs in a tertiary care teaching hospital of southern India.” Journal of clinical and diagnostic research : JCDR vol. 8,4 (2014): HC01-3. doi:10.7860/JCDR/2014/8010.4206
10. Ahmad NM, Hassan DA, El Hussein AM, Abdulhadi NH. Obesity and cardiovascular disease risk factors among adult Sudanese. Sudan Journal of Medical Sciences. 2011;5(4).
11. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. “Executive Summary of The Third Report of The National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, And Treatment of High Blood Cholesterol In Adults (Adult Treatment Panel III).” JAMA vol. 285,19 (2001): 2486-97. doi:10.1001/jama.285.19.2486
12. Teeling, M et al. “The influence of guidelines on the use of statins: analysis of prescribing trends 1998-2002.” British journal of clinical pharmacology vol. 59,2 (2005): 227-32. doi:10.1111/j.1365-2125.2004.02256.x
13. Khanal S, Atwal S, Dutta P. To study the prescription patterns and adequacy of use of statins at a tertiary care center of North India. Journal of Clinical and Preventive Cardiology. 2021 Oct 1;10(4):122-8.
14. Thai, Michele et al. “Prevalence of statin-drug interactions in older people: a systematic review.” European journal of clinical pharmacology vol. 72,5 (2016): 513-21. doi:10.1007/s00228-016-2011-7
15. Svensson, Elisabeth et al. “Statin prescription patterns, adherence, and attainment of cholesterol treatment goals in routine clinical care: a Danish population-based study.” Clinical epidemiology vol. 7 213-23. 26 Feb. 2015, doi:10.2147/CLEP.S78145
16. Sreedevi K, Venkateswara Rao J, Fareedullah Md, Vijayakumar S. A study on prescription pattern of statins in cardiovascular disease. Der Pharm Lett. 2011;3(3):393-6. Available from: http://scholarsresearchlibrary.com/archive.html
17. Papolos, Demitri F et al. “Treatment of Early-Onset Specified and Unspecified Bipolar Disorders: A Systematic Review and Strategies for Identifying and Managing a Thermally Dysregulated Subtype in Children.” Acta psychiatrica Scandinavica vol. 152,3 (2025): 156-179. doi:10.1111/acps.13817

18. Stone, Neil J et al. "2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines." Circulation vol. 129,25 Suppl 2 (2014): S1-45. doi:10.1161/01.cir.0000437738.63853.7a