



Age and Gender Trends in Prescribing and Utilization of Lipid-Lowering Drugs at a Public Hospital in Alkharj City

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Authors' contributions

This work was carried out in collaboration among all authors. Authors NJA and ZSA designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript and managed the analyses of the study. Authors MAM and MAA managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Aim: Lipid-lowering drugs are used to decrease low-density lipoprotein cholesterol and as a result, they are used in both secondary and primary prevention of cardiovascular diseases. This study aimed to observe the prescribing trend of lipid-lowering drugs and to describe the gender and age-related differences in the outpatient setting of a public hospital in Alkharj city.

Methodology: This is a cross-sectional observational study that was conducted in outpatient setting of a public hospital in Alkharj city and included the review of electronic outpatient prescriptions. The data was collected and analyzed using Excel software; the descriptive data were represented by percentages and numbers.

Results: The most prescribed lipid-lowering drug in the present study was atorvastatin (62.36%)

followed by simvastatin (29.34%). The study found that there are several differences in lipid lowering medications use patterns among different gender and age groups. Therefore, frequent reviews of lipid-lowering drugs use and prescribing pattern are important to optimize patients' treatment.

Conclusion: It is important in the future to make stratified guidelines based on patient characteristics such as age and gender.

Keywords: Age; antihyperlipidemic; gender; lipid-lowering; use.

1. INTRODUCTION

Atherosclerotic cardiovascular disease constituted of the acute coronary syndrome, stable or unstable angina, coronary or other arterial revascularization, history of myocardial infarction, peripheral arterial disease, transient ischemic attack, and stroke. Nearly 370,000 deaths yearly in the USA are associated with coronary heart disease [1]. Hypercholesterolemia has been known as one of the main risk factors for Atherosclerotic cardiovascular disease [2,3] and several trials have proven the clinical benefits of reducing low-density lipoprotein cholesterol [4-8] in both secondary and primary prevention settings [9,10].

Colhoun et al reported that the benefits of statin usage for primary prevention of cardiovascular diseases have been reported in many previous studies [11]. The Collaborative Atorvastatin Diabetes Study stated that there was a significant decrease in cardiovascular events rate in patients having cardiovascular diseases [12]. Certainly, another meta-analysis demonstrated that statins are effective in reducing major coronary events by about 21% and stroke by up to 36% of patients with diabetes [13].

Drug utilization study is considered a great exploratory means to assess the prescribing trends of drugs and the suitability of the prescriptions [14]. Drug utilization research is defined by World Health Organization as the distribution, marketing, prescribing, and usage of medications in society, with special emphasis on the resulting social, medical and economic consequences [15]. Additionally, it helps in managing drug-specific problems and also in improving patient safety and medication quality [14].

There are several differences in the prevalence of disease, comorbidities, and in medication use patterns among different gender and age groups. Therefore, this study aims to observe the prescribing trend of lipid-lowering drugs and to

describe the gender and age-related differences in order to improve the prescribing, dispensing, and use of these medications.

2. METHODOLOGY

A cross-sectional observational study was conducted at the outpatient setting of a public hospital in Alkharj city. The inclusion criteria include the outpatient medical prescriptions for patients receiving a lipid-lowering drug from January until December of 2018. Therefore, the prescriptions that didn't include a lipid-lowering agent, inpatient prescriptions, and prescriptions before or after December of 2018 were excluded.

The data included the age and the gender of the patients who received Antihyperlipidemic agents in 2018, in addition to the age-related differences and the gender-related differences in Lipid lowering agents use patterns in 2018. The data was approved by an official Institutional Review Board with IRB log number 2019 - 0153E.

The data was collected and analyzed using Excel software; the descriptive data were represented by percentages and numbers.

3. RESULTS AND DISCUSSION

In 2018, 518 patients received Lipid lowering agents. The majority of these patients were more than 40 years old (93.05%). The age of the patients is shown in Table 1.

Table 1. Age of patients who received Lipid lowering agents in 2018

Age	Number (N)	Percentage
20-29	7	1.35%
30-39	29	5.60%
40-49	100	19.31%
50-59	148	28.57%
≥ 60	234	45.17%
Total	518	100%

Table 2. Age-related differences in Lipid lowering agents use patterns in 2018

Drug	20-29 N =	30-39 N =	40-49 N =	50-59 N =	≥ 60 N =	Total N =
Simvastatin	2 (1.31%)	10 (6.58%)	29(19.08%)	47(30.92%)	64(42.11%)	152
Rosuvastatin	1 (2.70%)	4(10.81%)	9(24.32%)	8(21.62%)	15(40.54%)	37
Fenofibrate	0 (0.00%)	0(0.00%)	2(33.33%)	4(66.67%)	0(0.00%)	6
Atorvastatin	4 (1.24%)	15(4.64%)	60(18.58%)	89(27.55%)	155(47.99%)	323

Shao et al reported that a majority of coronary events occur in the elderly and are associated with high mortality rates and that with advancing age, there is an increase in the tendency to have atherogenic dyslipidemia, including elevations in LDL cholesterol levels [16].

More than 42% of the patients who received simvastatin were more than 59 years old and 30.92% were between 50-59 years old. About 47.99% of the patients who received atorvastatin were more than 60 years old and 27.55% were between 50-59 years old. The -related differences in lipid lowering agents use patterns in 2018 are shown in Table 2.

The most prescribed lipid-lowering drug in the present study was atorvastatin (62.36%) followed by simvastatin (29.34%). Gupta et al showed that shows atorvastatin was the most commonly prescribed type of statin (74.1%), followed by rosuvastatin (29.2%) [17]. In contrast to the results of the present study, numerous previous studies stated that simvastatin was the most prescribed lipid-lowering drug among patients with cardiovascular diseases [18-20].

Lipid-lowering drugs are prescribed commonly for patients with cardiovascular diseases. Panchaksharimath et al reported that for ischemic heart disease patients, antiplatelet drugs (100%) followed by lipid-lowering drugs (96%) were most commonly prescribed. He stated that for patients with ischemic heart disease, 96.5 % of patients aging 18-59 and 97.7% of patients more than 59 years old were received a lipid-lowering drug [14]. Mahabadi et al stated that coronary artery disease patients ≥ 75 years of age receive lower doses of statin therapy and reach slightly lower LDL-C levels than patients below 75 years [21].

The percentage of male and female patients were approximately similar, 50.58 % of the patients were females. The number and percentage of lipid-lowering agents by gender of patients is shown in Table 3.

Table 3. Gender of patients who received lipid lowering agents in 2018

Gender	Number N =	Percentage
Male	256	49.42%
Female	262	50.58%

Simvastatin was prescribed mainly for female patients (68.42%). Additionally, about 73 % of patients receiving rosuvastatin were females. In contrast to that, atorvastatin was prescribed mainly for male patients (60.06%). The gender-related differences in lipid lowering agents using patterns are shown in Table 4.

Panchaksharimath et al reported that for ischemic heart disease patients, about 96.6 % of the male patients received lipid-lowering drugs and about 98.1 % of females received lipid-lowering drugs [14]. Gibson et al stated that there is an age- and gender-related differences in the pharmacokinetics of atorvastatin but it is unclear whether these differences in the atorvastatin pharmacokinetics will be clinically important or no. they also said that more safety and efficacy trials are needed to clarify the clinical significance of these pharmacokinetic differences [22].

Additionally, Karlson et al reported that Statin leads to an improvement in lipid profile in women patients more than in men and that the improvements in lipid profile are greater in those aged ≥70 years compared with patients aged <70 years [23].

Table 4. Gender-related differences in Lipid lowering agents use patterns in 2018

Drug	Male N =	Female N =	Total
Simvastatin	48 (31.58%)	104 (68.42%)	152
Rosuvastatin	10 (27.03%)	27 (72.97%)	37
Fenofibrate	4 (66.67%)	2 (33.33%)	6
Atorvastatin	194 (60.06%)	129 (39.94%)	323

Pavanello and Mombelli reported that there many differences between the 2 genders in their response to statins. They reported that the efficacy of statins is different in women and men and that women are more likely to have poor lipid control [24]. Moreover, Pavanello and Mombelli reported that some studies found a different occurrence of adverse events in women versus men and that females seem to be at greater risk of statin-induced rhabdomyolysis than males [24].

4. CONCLUSION

There were age and gender-related differences were observed in drug utilization and prescribing pattern of lipid-lowering drugs. Several studies confirm the differences between the 2 genders and between different age levels in the efficacy and safety of these medications. Frequent reviews of lipid-lowering drug use and prescribing patterns are important to optimize patients' treatment. It is important in the future to make stratified guidelines based on patient characteristics such as age and gender.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline, patients' consent and ethical approval have been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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