**OTJHS**
**Online Turkish Journal of Health Sciences**

**e-ISSN:** 2459-1467

**OTSBD**
**Online Türk Sağlık Bilimleri Dergisi**

*Online Turkish Journal of Health Sciences 2024;9(1):55-60* *Online Türk Sağlık Bilimleri Dergisi 2024;9(1):55-60*

# Reason for Discontinuing the Drug in Patients Using Statins

# Statin Kullanan Hastalarda İlacın Kesilme Nedeni

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**ABSTRACT**

**Objective:** In recent years, there has been a lot of news about the negative effects of statin use on patients. Our study aimed to investigate the reasons for drug discontinuation in patients with indications for statin use.

**Materials and Methods:** 180 patients who were indicated to start statin treatment for any reason were included in the study. Demographic and clinical characteristics of the patients, cardiovascular disease risk factors, and lipid levels at admission were determined.

**Results**: It was determined that 81.1% of the patients were started on statin treatment. It was observed that patients using regular medication had lower LDL (low-density lipoprotein) and total cholesterol levels than those who did not use medication regularly ($p<0.05$). It was suggested that the most common reason for patients who had previously started statin treatment to stop taking the medication was discontinuation by the doctor.

**Conclusions:** Hyperlipidemia is still a significant cause of coronary artery disease today. Our study has shown that treatment compliance in patients, contrary to popular belief, is due to the influence of the physician on the patient rather than the influence of the media.

**Keywords:** Cardiovascular disease risk factors, hyperlipidemia, statin, statin treatment to stop

**ÖZ**

**Amaç:** Son yıllarda statin kullanımının hasta üzerindeki olumsuz etkisine dair birçok haber yapılmaktadır. Çalışmamızda, statin kullanma endikasyonu olan hastalarda ilacın bırakılma nedenlerinin ne olduğunun araştırılması amaçlandı.

**Materyal ve Metot:** Çalışmaya herhangi bir nedenle statin tedavi başlama endikasyonu konulan 180 hasta dahil edildi. Hastaların demografik ve klinik özellikleri, kardiyovasküler hastalık risk faktörleri, başvuru esnasındaki lipid düzeyleri belirlendi.

**Bulgular:** Hastaların %81,1'ine statin tedavisi başlandığı saptandı. Düzenli ilaç kullanan hastaların düzenli ilaç kullanmayanlara göre daha düşük LDL (düşük dansiteli lipoprotein) ve total kolesterol düzeylerine sahip olduğu görüldü ($p<0,05$). Daha önce statin tedavisi başlanan hastaların en sık ilaç bırakma gerekçesi olarak doktor tarafından kesilmesi ileri sürüldü.

**Sonuç:** Hiperlipidemi halen günümüzde önemli bir koroner arter hastalığı sebebidir. Çalışmamız, hastalardaki tedavi uyumunun sanılanın aksine medya etkisinden çok hekimin hasta üzerindeki etkisinden kaynaklandığını göstermiştir.

**Anahtar Kelimeler:** Kardiyovasküler hastalık risk faktörleri, hiperlipidemi, statin, statin tedavisinin durdurulması

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**Yayın Bilgisi / Article Info:**
Gönderi Tarihi/ Received: 30/11/2023
Kabul Tarihi/ Accepted: 26/02/2024
Online Yayın Tarihi/ Published: 11/03/2024

**Atıf / Cited:** Tatar S and et al. Reason for Discontinuing the Drug in Patients Using Statins. *Online Türk Sağlık Bilimleri Dergisi* 2024;9(1):55-60. doi: 10.26453/otjhs.1398594

## INTRODUCTION

Cardiovascular diseases remain one of the leading causes of death globally. Recently, lipid metabolism has been adversely affected due to deteriorating eating habits and food additives. Elevated levels of cholesterol lead to coronary artery disease, which directly affects multiple vascular systems. Hyperlipidemia is among the preventable risk factors for the development of cardiovascular diseases. Tight lipid control has significant contributions to mortality and morbidity in individuals with risk factors.[1]

Dyslipidemia has negative effects on the vascular system. Despite this, compliance with treatment is still inadequate in most patients.[2] In addition to diet and lifestyle changes, lifelong statin treatment is recommended, especially in patients diagnosed with coronary artery disease.[3] In a study conducted in Turkey, it was shown that the use of statins for secondary protection in very high-risk group patients with an indication for statin use due to coronary artery disease was not at an effective dose, and the target cholesterol levels of the patients were not reached.[4] There are many reasons for this. Mainly due to some news in the written and visual media and news on social media, such as the negative effects of statin treatments, the treatment is either not started at all or is interrupted before the target value is reached. This situation increases the likelihood of new coronary events and the risk of stent restenosis, especially in individuals with coronary artery disease. It has been observed that the rate of remyocardial infarction in patients with previous coronary artery disease and using statins is reduced by 20%.[5-6] In the cardiovascular disease prevention guide published by the European Society of Cardiology (ESC), the target low-density lipoprotein (LDL) level in individuals at very high risk was reduced from 70 mg/dl to 55 mg/dl.[3] This shows that patients at risk of experiencing vascular events should have a strict LDL target value.

Our study aimed to investigate the factors affecting treatment compliance in patients with indications for receiving statin therapy in line with the recommendations of current guidelines.

## MATERIALS AND METHODS

***Ethical Statement:*** The study was conducted in our hospital's cardiology outpatient clinic. Ethics Committee approval was received from Necmettin Erbakan University for the study (Date: 2/4/2021, decision no: 221-3186). The study was carried out following the international declaration, guidelines, etc.

***Subject and Study Design:*** According to the SCORE risk classification, patients with a risk of ≥ 10% were evaluated in the "very high risk" group. Patients with an LDL value of ≥55 mg/dl were considered as an indication for drug initiation. Patients who were prescribed statins anytime between 2015 and 2020 took them regularly in the past year, stopped using them in the previous five years and were diagnosed. Patients with hearing and vision problems advanced Alzheimer's, or dementia who refused to participate or missed regular check-ups were excluded from the study.

***Evaluation of Data:*** For the study, which was conducted in an observational, descriptive style, the current European Society of Cardiology Dyslipidemia guidelines were taken as an example.[7] In the study, patients were grouped based on their demographic and clinical characteristics. The participants were asked about their medical history and whether they had any conditions, such as smoking, diabetes mellitus, hypertension, peripheral artery disease, or cerebrovascular accident, which could be associated with cardiovascular disease. Patients who had been taking regular statin therapy for the past year were considered compliant with their treatment. Those who stopped taking the medication were asked about the reasons behind their decision. After fasting for 12 hours, the patients' blood lipid levels were measured.

***Statistical Analysis:*** Data analysis was done using the SPSS 20 statistical program. Chi-square and Student's t-test were used with descriptive statistics. Results with a P value <0.05 were considered significant.

## RESULTS

A total of 180 patients, 79 (43.9%) women and 101 (56.1%) men, with an average age of 62.9±12.3 years, were included in the study. It was determined that 81.1% of the patients had previously been diagnosed with dyslipidemia and started statin treatment. All patients participating in the study were literate. 78.3% of the patients had primary school-level education. While 85% of the patients continued statin treatment for any reason, 27 did not use any medication. 18.9% of the patients did not have any additional risk factors. While 20% of the patients using statins had a reason for using statins other than a history of coronary artery disease, 80% of the patients were using statins due to coronary artery disease. The average LDL cholesterol levels of the patients participating in the study were 93±46 mg/dl, and total cholesterol levels were 169±59 mg/dl. Table 1 shows the patients' clinical, demographic and laboratory characteristics grouped by gender.

**Table 1.** Grouping of clinical, demographic and laboratory characteristics by gender.

| Characteristics | | Female | Male | General |
|---|---|---|---|---|
| **Age,** Mean± SD | | 64,.3±10.8 | 61.9±13.3 | 62.9±12.3 |
| **Gender,** n **(%)** | | 79 (43.9) | 101 (56.1) | 180 (100) |
| **Educational background,** n **(%)** | Primary school | 72 (91.1) | 69 (68.3) | 141 (78.3) |
| | Middle school | 3 (3.8) | 5 (5) | 8 (4.4) |
| | High school | 3 (3.8) | 21 (20.8) | 24 (13.3) |
| | University | 1 (1.3) | 6 (5.9) | 7 (3.9) |
| **Treatment duration**, n (%) | Not using | 16 (20.3) | 11 (10.9) | 27 (15) |
| | <3 months | 9 (11.4) | 8 (7.9) | 17 (9.4) |
| | 3-6 months | 2 (2.5) | 5 (5) | 7 (3.9) |
| | 6-12 months | 1 (1.3) | 5 (5) | 6 (3.3) |
| | 12-24 months | 11 (13.9) | 20 (19.5) | 31 (17.2) |
| | >24 months | 40 (50.6) | 52 (51.5) | 92 (51.1) |
| **Risk factors,** n (%) | No | 14 (17.7) | 20 (19.8) | 34 (18.9) |
| | Diabetes mellitus | 4 (5.1) | 7 (6.9) | 11 (6.1) |
| | Hypertension | 11 (13.9) | 30 (29.3) | 41 (22.8) |
| | Chronic renal failure | 1 (1.3) | 0 (0) | 1 (0.6) |
| **Coronary artery disease,** n (%) | No | 22 (27.8) | 14 (13.9) | 36 (20) |
| | Acute coronary syndrome | 1 (1.3) | 3 (3) | 4 (2.2) |
| | Stent applied | 23 (29.1) | 45 (44.6) | 68 (37.8) |
| | Medical follow-up | 16 (20.3) | 10 (9.9) | 26 (14.4) |
| | Coronary bypass surgery | 17 (21.5) | 29 (28.7) | 46 (25.6) |
| **Lipid level,** mg/dl, Mean± SD | Triglyceride | 185±104 | 181±137 | 183±123 |
| | Total cholesterol | 182±63 | 159±53 | 169±59 |
| | LDL | 101±53 | 86±39 | 93±46 |
| | HDL | 43±11 | 39±10 | 41±10 |

HDL: Density Lipoprotein.

While the LDL cholesterol level was 80±32 mg/dl in patients using regular medication, it was 120±59 mg/dl in patients not ($p<0.001$, t value t:-4.902). While the total cholesterol value was 155±46 mg/dl in patients using regular medication, it was 199±70 mg/dl in patients not using regular medication ($p<0.001$, t:-4.396). Table 2 shows the distribution of cholesterol parameters according to drug use.

A total of 58 of the patients stopped using medication, and among them, the most common reason for quitting was discontinuation by the doctor. The doctor stopped the drug of 14 patients (24.1%). Among those who stopped taking the medication, one patient (1.7%) was influenced by the news in the media and stopped taking the drug. Table 3 shows the reasons for stopping the medication.

**Table 2.** Distribution of cholesterol parameters according to drug use.

| Characteristics | Regular user | Not regular user | p | t |
|---|---|---|---|---|
| **LDL,** mg/dl, Mean± SD | 80±32 | 120±59 | **0.001** | **-4.902** |
| **HDL,** mg/dl, Mean± SD | 40±11 | 41±10 | 0.799 | -0.255 |
| **Triglyceride,** mg/dl, Mean± SD | 167±90 | 217±170 | 0.041 | -2.082 |
| **Total cholesterol,** mg/dl, Mean± SD | 155±46 | 199±70 | **0.001** | **-4.396** |

LDL: Low-Density Lipoprotein; HDL: High-Density Lipoprotein.

**Table 3.** Reasons for stopping the drug.

| Reasons for quitting | Data |
|---|---|
| **I think the medicine is unnecessary,** n (%) | 6 (10.3) |
| **I think the medicine is damaging my kidneys,** n (%) | 4 (6.9) |
| **I think diet and exercise are enough,** n (%) | 6 (10.3) |
| **I used too much medication, that's why I quit,** n (%) | 12 (20.7) |
| **I am having trouble obtaining the medicine,** n (%) | 9 (15.5) |
| **My doctor cut it off,** n (%) | 14 (24.1) |
| **I am affected by the news in the media,** n (%) | 1 (1.7) |
| **Other reasons,** n (%) | 6 (10.3) |

While 88.5% of patients using regular medication came for regular check-ups, 11.5% did not come for regular check-ups. While 67.3% of the patients who did not use regular medication came for a check-up within one year, 29.3% did not come for a routine check-up. While 82.8% of the patients came for regular check-ups, 17.2% did not come for regular check-ups. Table 4 shows the relationship between medication use and frequency of check-ups.

When we look at the reasons for stopping medication by gender, the most common reason for stopping medication in women is seen as discontinuation by the doctor. In contrast, the most common reason for stopping medication in men is seen as the difficulty in obtaining the drug. Among men, no patient is affected by the news in the media and stops taking the medication. Figure 1 shows the reasons for stopping medication by gender.

**Table 4.** The relationship between medication use and frequency of check-ups.

| Frequency of check-up | Regular medication use | No regular medication use | General |
|---|---|---|---|
| **0-3 months,** n (%) | 27 (22.1) | 9 (15.5) | 36 (20) |
| **3-6 months,** n (%) | 22 (18) | 16 (27.6) | 38 (21.1) |
| **6-12 months,** n (%) | 12 (9.8) | 2 (3.4) | 14 (7.8) |
| **Once a year,** n (%) | 41 (33.6) | 12 (20.7) | 53 (29.4) |
| **Every 2 years,** n (%) | 6 (4.9) | 2 (3.4) | 8 (4.4) |
| **Irregular,** n (%) | 14 (11.5) | 17 (29.3) | 31 (17.2) |

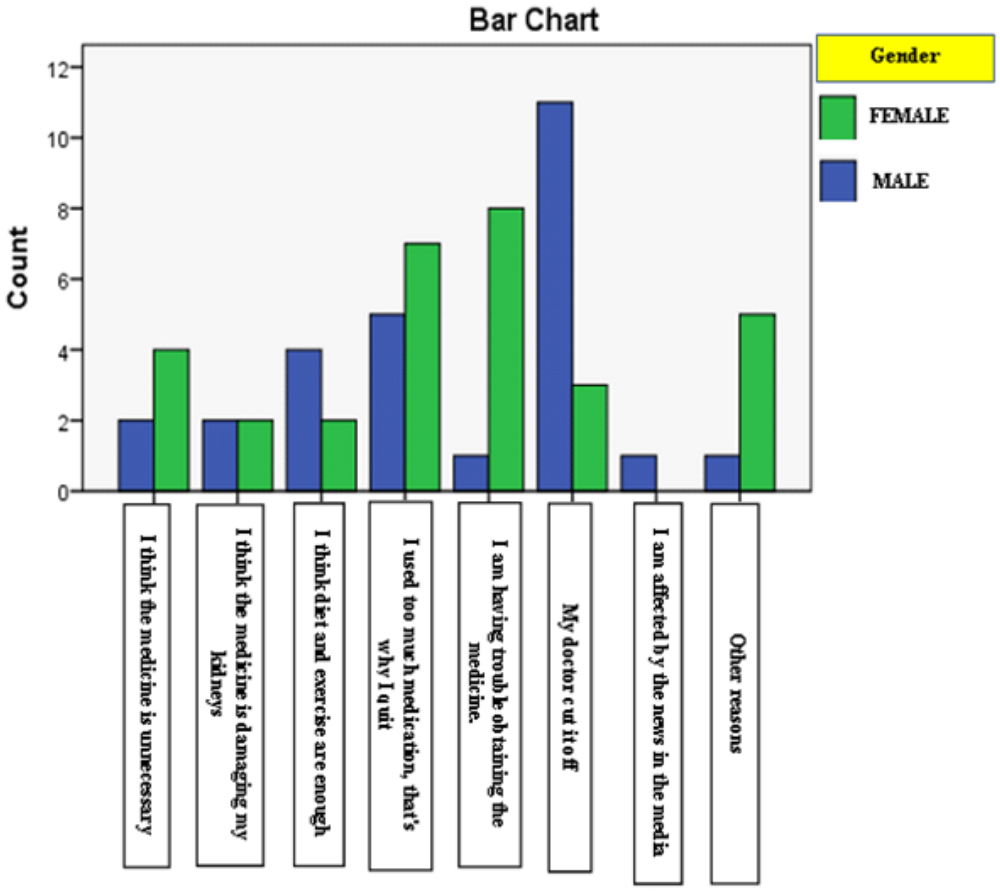


**Figure 1.** Reasons for stopping medication by gender.

## DISCUSSION AND CONCLUSION

Atherosclerosis is an important problem in developing cardiovascular diseases and other vascular diseases. Many studies are highlighting the importance of statin treatments in preventing coronary artery disease. Although many studies have emphasized reducing LDL cholesterol levels, the desired treatment targets have still not been achieved in real-life data.[5-8] Dyslipidemia continues to be an important health problem in our country. Kayıkçıoğlu et al[9] In a meta-analysis conducted by et al., in the adult patient group, hypercholesterolemia was found in 3 out of every 10 people, hypertriglyceridemia in 1 out of every 3 people, and low HDL cholesterol in 1 out of every 2 people. Although scientific data on the necessity of using cholesterol-lowering drugs is increasing daily, some patients still do not understand its importance. Even in patients with a history of coronary artery disease and acute coronary syndrome who underwent stenting, noncompliance with the use of cholesterol-lowering drugs continues. A study by Kahraman et al.[10] showed that the rate of statin use was lower, and the incidence of cardiovascular events was higher in patients with stable coronary artery disease. Cardiovascular mortality and morbidity rates that may develop in patients with high medication compliance are reduced, and the costs imposed on the healthcare system are also reduced. In a study conducted by Dinçer et al.,[11] they claimed that many of the patients who were previously prescribed statins discontinued the drug due to the influence of written and visual media. In a study conducted by Golder et al.[12], due to the news on social media, patients claimed that the harm of statin use outweighed its benefits. However, our study differs from the results of this study. In our study, a very small number of patients stated that the news influenced them in the media as a reason for stopping the medication. Most patients in our patient group stated that the doctor stopped their medication. Due to the high literacy rate of our patient group, we think that the media effect in previous studies is ineffective in our patient group.

In a study conducted by Yeğiner et al.[13] in 2010 on compliance with statin use and reaching the target LDL value, it was observed that 56.2% of the patients discontinued the drug at any stage of the treatment. The main reason for discontinuing treatment was shown to be reaching target LDL values. In our study, 48.9% of the patients stopped using medication within two years, which was similar to the results of this study. In addition, it was observed that 15% of the patients participating in our study did not use medication. 65.6% of the patients with a history of coronary artery disease in our patient group also have a history of acute coronary syndrome, stent, or coronary bypass. According to these results, we can state that patients' medication compliance with a history of cardiac intervention is high. This is especially important in preventing events such as recurrent stent restenosis and stent thrombosis in patients with risk factors such as coronary artery disease.[14-16] In a study conducted by Yeğiner et al.,[13] patients using regular medication were found to have a higher rate of reaching the target LDL value. In our study, the rate of reaching LDL cholesterol and total cholesterol levels in patients using regular medication was more elevated than in patients who did not use medication regularly.

A study conducted by Ingersgaard et al.[14] investigating the reasons for non-adherence to statins showed that high income and education levels positively affected statin use. The results of our study are different from those of this study. While 5.1% of the patients participating in our study had a high school education or above, 26.7% of men had a high school education or above. These results showed us that medication compliance is independent of education level. It was also observed that 50.6% of the female patients participating in the study received regular statin treatment for more than 2 years. Considering that 94.9% of female patients have primary and secondary school education, it can be seen that regular drug use is independent of education level. In a study conducted by Hope et al.[15], they showed that medication compliance was higher as the income level of men increased. Our study is similar to this study. In our study, it is suggested that the main reason for the difficulty in obtaining medication, which is among the reasons why male patients stop taking medication, is financial difficulties. It has been suggested that financial difficulties are the main reason for difficulty in obtaining medication, which is the most common reason for male patients to quit medication. The main reasons for this situation can be listed as the low income level of many families in our country, the fact that men play a major role in financial gain, and the fluctuations in drug prices. A study conducted by Lowenstern et al.[16] showed that clinicians' belief in statin use and adherence to current guidelines were significantly associated with target cholesterol levels. When the results of our study are examined, it is seen that the medication compliance of patients who come to regular physician check-ups is high. While 88.5% of the patients came for regular check-ups, 11.5% did not come for regular check-ups. This shows that the physician's influence on the patient is very high in patients requiring statins and that the physician plays the primary role in the continuity of treatment.

In conclusion, hyperlipidemia is still an important cause of coronary artery disease today. Our study is important in terms of treatment compliance of patients who need to receive statin therapy. Our study

has shown that treatment compliance in patients, contrary to popular belief, is due to the influence of the physician on the patient rather than the influence of the media. Informative training is recommended to ensure continuity of treatment and possible risk assessment in patients with inadequate treatment compliance. Our most important limitations are the low number of patients, the fact that it is a single center, and the nutritional culture of the patients is not clearly known. One of our limitations is that the subgroups of statin drugs used in our patient group are unknown. One of our limitations is that the number of patients using ezetemibe, which has been among the current cardiology guideline recommendations in recent years, was not included in the study.

***Ethics Committee Approval:*** Ethics Committee approval was received from Necmettin Erbakan University for the study (Date: 2/4/2021, decision no: 221-3186). The study was carried out following the international declaration, guidelines, etc.

***Conflict of Interest:*** No conflict of interest was declared by the authors.

***Author Contributions:*** Concept – ST, YA; Supervision – YEY; Materials – IO, ALS, MC; Data Collection and/ or Processing – ST, YA; Analysis and/or Interpretation – ST, IO; Writing –ST.

***Peer-review:*** Externally peer-reviewed.

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