

## Abstract

**Institution/department:** Charles University, Faculty of Pharmacy in Hradec Králové, Department of Social and Clinical Pharmacy

**Title of diploma thesis:** Selected aspects of the rationality of drug treatment in older age (II.)

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**Introduction:** Cardiovascular diseases are the most common cause of morbidity and mortality in geriatric patients worldwide. With the aging of the population, higher prevalence of polypharmacy and polymorbidity, with prevailing cardiovascular and metabolic diseases are closely associated.

HMG-CoA reductase inhibitors, also known as statins are used for secondary prevention of atherosclerotic diseases, in tertiary prevention for already manifest cardiovascular diseases and in high-risk patients also in the primary prevention. Their main mechanism of action is lowering serum cholesterol levels by inhibiting endogenous cholesterol synthesis in the liver. Other effects (non-lipid-related) also contributing to the prevention and treatment of atherosclerosis include stabilization of atherosclerotic plaques, anti-inflammatory, anti-radical and antiplatelet effects. Statins should be considered among the most commonly indicated drug classes for all risky groups of patients, including seniors. However, they may be underutilized or overutilized in some clinical situations, especially in polymorbid older patients with polypharmacy.

The aim of this study was to determine the prevalence of statin use in seniors in long-term care facilities participating in the European project START/MED/093 and to describe the basic aspects of statin use (appropriate selection, dosing, timing, prevalence of drug interactions and use of statines in patients at different stages of cardiovascular risk and in different types of cardiovascular prevention).

**Methodology:** Data for the purposes of this diploma were obtained using a questionnaire method as part of the European project START/MED/093. The project took place between 2021 and 2024 in four European countries: Czech Republic, Croatia,

Slovakia and Bulgaria. In the Czech Republic, data collection was organized in long-term care facilities (LTCF) from January to December 2022 and in three different regions: Prague, Brno, and Chrudim. A similar study design (three regionally distinct long-term care facilities) was chosen in the other countries as well. The study was approved by the Ethics Committee of the Faculty of Pharmacy, Charles University and all geriatric patients in the selected healthcare facilities aged 65 and over who were willing to sign informed consent participated in the study. Patients unable to communicate were excluded from the study (e.g., those with severe dementia or significant hearing impairment), as they would not be able to independently answer questions of researchers.

Patients acutely hospitalized at the time of the study or severely clinically decompensated (shortly after returning from intensive care) were examined later or if they were unable to participate in the study due to long-term indisposition they were also excluded from the study. For the purposes of this research, patients were assessed using the comprehensive assessment tool interRAI-LTCF (version for long-term care facilities) which allowed us to conduct a validated and standardized assessment of the comprehensive health status of geriatric patients. The assessment included patient sociodemographic characteristics, diagnoses, selected clinical and functional assessments, symptoms, patient's health and nutritional status, medications taken, services provided, contact with informal social workers and selected laboratory results. For analyses in this study were used only basic clinical and medication characteristics in a pilot descriptive statistical analysis. Statistical analysis was performed using R-software with chi-square and Fisher's tests at a significance level of  $p < 0.05$ .

**Results:** A total of 876 seniors aged 65 and older were monitored, of those 225 seniors in the Czech Republic, 226 in Croatia, 225 in Slovakia and 200 in Bulgaria. In the overall sample were 71,4 % women and 28,6 % men with a predominance of patients in the age group 75-84 years, accounting for 43,4 % of the patients examined. Widowed patients were most commonly represented in long-term care facilities. Among cardiovascular diseases, arterial hypertension, ischemic heart disease and dyslipidemia had the highest prevalence in the overall sample. Most of the examined patients (43,3 %) were taking 5 to 9 medications. Out of the total sample of 876 patients, 23,2 % of seniors were using a monocomponent statin or a fixed combination of a statin with another active substance, with only 1,3 % of all patients using the fixed combination. The most commonly used statin was atorvastatin, taken by 13,8 % of patients, followed by rosuvastatin (6,1 %), simvastatin (1,8 %), and fluvastatin (0,1 %). Atorvastatin,

rosuvastatin and simvastatin were most commonly used at a daily dose of 20 mg. Fluvastatin was taken at a dose of 80 mg daily. Duration of statin therapy was unknown in 62,3 % of all assessed seniors. Seniors with known duration of therapy were most commonly (12,6 %) treated with statins for 5 years or more. Drug interactions occurred in 12,6 % of patients treated with statins, but did not represent contraindicated combinations. The majority of patients (57,1 %) had a very high risk of cardiovascular events and only 25 % of seniors at a very high cardiovascular risk were treated with statins. Most of the assessed seniors (50,5 %) fell into the category of tertiary prevention, but only 15,2 % of these were treated with statins.

**Conclusion:** This thesis found that the majority of seniors were taking atorvastatin and rosuvastatin which are statins suitable for the older patients. The occurrence of drug interactions with statins and other medications was rare. It is crucial to pay attention to preventing cardiovascular events, rational prescribing of medications, safety and treatment efficacy in geriatric patients. However, a large portion of patients in primary, secondary, and tertiary prevention were not treated even with low doses of statins. In facilities providing nursing care, statins were administered by healthcare personnel, indicating that evaluated seniors had a high level of treatment adherence.

**Keywords:** statins, seniors, nursing home, rational pharmacotherapy, cardiovascular diseases, non-adherence, dosing

**Ethical Approval:** The study was approved by the Ethics Committee of the Faculty of Pharmacy in Hradec Králové, Charles University, Czech Republic (number UKFaF/297850/2022). Participants were informed about the intention of the study, objectives, and outcomes prior to recruitment and all participants received written participant information sheets. Data were collected and stored anonymously using specific codes and the study followed the European Union General Data Protection Regulation (EU GDPR) anonymity and confidentiality rules.

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