

## **ABSTRACT**

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

**Title of diploma thesis:** Evaluation of the rationality of prescribing of selected potentially inappropriate medications in ambulatory geriatric patients (II.)

**Diploma thesis supervisor:** Assoc. Prof. Daniela Fialova, PharmDr. Ph.D.

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**Introduction:** The percentage of geriatric patients in the population is constantly increasing, thus the importance and need for knowledge of rational geriatric pharmacotherapy in everyday clinical practice is also on the rise. Polymorbidity and polypharmacotherapy are very common in geriatric patients, for this reason it is also necessary to regularly review drug regimens in older age and address potential drug-related problems. Criteria for potentially inappropriate medications in the aged (PIMs) have been defined by expert groups as a helpful tool to improve the rationality of drug prescribing in older adults. The risks of PIMs in older patients often outweigh their benefits or there is insufficient scientific evidence of adequate efficacy/safety of these drugs in older adults, for which reason the use of PIMs in older patients should be limited and their rationality of prescribing regularly monitored.

This diploma thesis continues in the effort of the diploma thesis of R. Lestina entitled „Evaluation of the rationality of prescribing of selected potentially inappropriate medications in ambulatory geriatric patients“ (defended 09/2021), which dealt with common drug problems in the 10 most frequently prescribed PIMs in the Geriatric outpatient clinic of the University Hospital in Hradec Kralove. It updates the data of the previous diploma thesis with the prevalence rates determined in the whole cohort of examined patients and extends the theoretical and practical part with further knowledge regarding the rationality of use of other 10 frequently prescribed PIMs in outpatient geriatric practice.

The aim of the study was to observe how often the prescribed PIMs are indicated in high-risk situations (i.e., how often they are used in the presence of diseases that are counted among their absolute or relative contraindications, in the presence of potential side effects, or how frequent are potential drug interactions of PIMs in the prescribed drug regimens).

**Methodology:** Data collection was performed by using a comprehensive, prospective, geriatric examination in the INOMED project protocol in the period from 02/2020 to 03/2023 in the Geriatric outpatient clinic of the University Hospital in Hradec Kralové. A standardized instrument was used to collect comprehensive characteristics of geriatric patients regarding: sociodemographic characteristics, data on the functional status of older adults, clinical diagnoses, symptoms, laboratory and clinical examinations performed, and data on medications use. Taking into account the previous thesis of R. Lestina, a total of 179 geriatric patients aged 75 years and older were examined. The study was approved by the Ethics Committee of the Faculty of Pharmacy, Charles University in Hradec Kralove, and the data were collected anonymously (after the information about the study was given to the patients by the caring physician and after the patient signed an informed consent). A list of all known explicit criteria for potentially inappropriate drugs in older age (PIMs) prepared by the research group "Aging, polypharmacotherapy and changes in the therapeutic value of drugs in old age" was used to identify relevant PIMs. In particular, three main areas were monitored in the use of these drugs in the Geriatric outpatient clinic of the FNHK: 1/ the manifestation of symptoms that may be related to potential adverse effects of PIMs, 2/ the use of PIMs in drug combinations that may lead to potential drug interactions, and 3/ the use of PIMs in the presence of diagnoses that are relative or absolute contraindications to the administration of PIMs. The benzodiazepine group was counted as "one entity" in this work, due to the very similar characteristics that were analyzed for PIMs from this drug group. The main objective was to determine the prevalence of prescribing PIMs in "risk situations" (see areas 1-3 above) for the 20 most commonly prescribed PIMs in the overall cohort.

**Results:** A total of 179 geriatric patients (63.7 % women and 36.3 % men) from geriatric outpatient care participated in the study. The mean age was 83.8 years (standard deviation SD  $\pm$  3.8, median 83 years). 159 patients (88.8 %) had been prescribed at least 1 PIMs. The 20 most commonly prescribed PIMs in the cohort were: acetylsalicylic acid (32.4 %), pantoprazole (27.4 %), omeprazole (14.5 %), apixaban (14.0 %), dabigatran (12.9 %), spironolactone (10.6 %), benzodiazepines (alprazolam, bromazepam, oxazepam - 8.9 %), amiodarone (7.4 %), digoxin (7.3 %), rivaroxaban (6.7 %), tramadol (6.7 %), ferrous sulphate (5.0 %), rilmenidine (3.9 %), solifenacin (2.8 %), trimetazidine (2.8 %), trospium (2.2 %), tiapride (2.2 %), fluoxetine (2.2 %), melperone (1.7 %) and theophylline (1.7 %). Compared to R. Lestina's pilot diploma thesis, the order of the 10 most frequently prescribed PIMs changed slightly, but acetylsalicylic acid and omeprazole with pantoprazole were still the most frequently prescribed medications. Of the new PIMs, tramadol and several drugs from the benzodiazepine group appeared on the "top 20 PIMs" list. The highest number of drug-drug interactions was recorded for acetylsalicylic acid (19.6 % of patients with at least 1 potential drug-drug interaction), as well as relative contraindications (in 16.8 % of patients). The highest number of absolute contraindications was observed with spironolactone (5.0 %) in our follow-up study. Of the newly evaluated PIMs, drug-drug interactions were most frequently recorded in the prescription of benzodiazepines (8.9 %), as well as the highest number of relative (3.4 %) and absolute contraindications (1.7 %).

**Conclusion:** Of the 179 patients who participated in the INOMED project and were examined in the Geriatric outpatient clinic of the Hradec Králové University Hospital, more than 80 % were taking at least 1 PIMs. The most frequently used PIMs were drugs belonging to the group of proton pump inhibitors and acetylsalicylic acid administered in a low-dose regimen, from the less prescribed ones benzodiazepines and tramadol were the most represented. The most common risk situations included the use of some PIMs with other drugs having central adverse effects or with  $\beta$ -blockers and diuretics, with potentially higher risk of orthostatic hypotension and falls in seniors. This analysis gives a pilot output that aimed to monitor the prevalences only, not association analyses.

**Keywords:** geriatrics, drug risks, potentially inappropriate medications in older age, rational geriatric pharmacotherapy, adverse effects, relative and absolute contraindications, drug interactions

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