# ABSTRACT

Charles University in Prague, Faculty of Pharmacy in Hradec Kralove
Department of Social and Clinical Pharmacy
Candidate: Eva Kopecna, M.D., MSc.
Supervisor: Prof. RNDr. Jiri Vlcek, CSc.
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## REGULATION AND SAFETY OF NON-PRESCRIPTION MEDICINES

### INTRODUCTION

Non - prescription medicines (NPM) have become a major pillar of healthcare systems. Individual countries apply their politics of health care by implementation of legislation and rules which govern entry and access of NPM to the market. Among the main stakeholders who play an important role in regulation and safety of NPM in the Czech Republic (CZ) are the Government, Ministries, State Institute for Drug Control (SIDC), manufacturers and distributors, associations of manufacturers and consumers, healthcare professionals, and finally consumers.

### OBJECTIVES

The aim of the theoretical part of our research was analysis of the legislative framework for NPM in CZ and to assess if the current legislation and educational environment for NPM can ensure safety of patients in their self-medication with NPM.

### METHODS

For the theoretical part literature and internet research reviews have been conducted. The experimental part comprised of three studies analysing relations and behaviour of stakeholders which play an important role in the process of self-medication with NPM.

### RESULTS

Theoretical part

Important steps to the deregulation of OTC market started in the European Union (EU) in 2001. In the Czech Republic this process has started in 2007, when SIDC initiated the switch

of several active substances to the category of NPM and introduced a new NPM category - NPM with restriction. Legislation in CZ which governs in CZ non-prescription drugs is fully harmonized with EU legislation. Prescription status is however granted by SIDC within the framework of the drug registration process. The EU has recently strengthened requirements on pharmacovigilance for medicines and started the process of continuous re-assessment of safety and efficacy profiles of human medicinal products. As a result of this process additional safety measures are implemented which should lead to increased safety of medicines.

Experimental part

***Adverse drug reactions reporting in the Czech Republic 2005 - 2009***

***Aim:*** The aim of this study was to assess the process regarding spontaneous adverse drug reaction (SADR) reporting in the Czech Republic during a five year period (2005 - 2009), to compare the data with the data from three other EU countries, and with the data from Czech Toxicological Information Centre (TIS) recorded on drug intoxications.

***Methods:*** Spontaneous adverse drug reaction reports received by the pharmacovigilance department of Czech State Institute for Drug Control (SIDC) during 2005 - 2009 were collected, analysed and compared with the SADR report data from the Slovak Republic, Denmark, and the United Kingdom. We analysed the following data: number of reported SADR, reporters, qualification of reporters, seriousness and outcome of serious adverse drug reaction, the list of "top 10" active substances with highest number of SADR. The following data were generated and analysed from TIS database for the same period: all intoxications, drug intoxications, reports on individual drug groups.

***Results:*** During the study period 2005 - 2009, the pharmacovigilance department of SIDC received 7,708 SADR reports of which 73.6 % were serious and 2.1 % resulted in death. The number of SADR reports per 10,000 inhabitants ranged from 1.3 to 1.7, which was lower when compared with the number of reports from the other three EU countries. The healthcare professionals contributed 64.2 % of the adverse drug reactions reports, marketing authorization holders 35.5 %, and patients 0.3 %. The highest numbers of SADR reports were for vaccines, ketoprofen, amoxicillin, statins, and estradiol. In the same period TIS recorded 50,613 calls of which 21,117 were related to drug intoxications. The most frequent drugs reports that TIS receives are for ibuprofen and paracetamol.

*Conclusions:* This study assessing SADR reports received by SIDC during a five year period 2005 - 2009 showed that the reporting rate was relatively low. To help facilitate an increase in spontaneous reporting, it is recommended that more educational and training activities are needed for all potential reporters to increase their knowledge regarding what should be reported, how and to whom to report and also to emphasize the importance of reporting and the implications for the safety of the Czech Republic population as a whole. Another important recommendation is that it would be beneficial to have connection link between the two databases (SIDC and TIS) to help to collect more information about adverse drug reactions and additional information about safety of drugs from real life use.

### *Role of pharmacists in the selection and safety of non-prescription medicines*

*Aim:* The aim of this study was to assess the factors affecting pharmacist's decision when recommending non-prescription medicines (NPM). The study looked at pharmacists'opinion on regulation and safety of NPM and explored their knowledge of detecting and reporting of adverse drug reactions.

*Methods:* A cross-sectional study was conducted in the Czech Republic. The study sample was members of Czech Chamber of Pharmacists, who were approached via the Journal of Czech Pharmacists. A questionnaire with 40 questions was posted on the website of Czech Chamber of Pharmacists. Part of the survey was a Pharmacovigilance test, which contained 10 questions focussing on legislation and procedure for adverse drug reporting. Statistical analysis of data used SPSS$^{®}$ 16.0 software and parametric and non-parametric statistical tests were used.

*Results:* In total 283 (3.6 %) registered pharmacists completed the survey. The respondents comprised of 79.9 % females and 20.1 % of males, with mean age 39.4 (±11.2) years and ranged from 25 to 67 years in age (median 37 years). Pharmacists from all regions and town size of the Czech Republic were represented. The majority of pharmacists (67.5 %) reported that their pharmacy had a separate sale counter for the NPM. Most of the pharmacists responded (88.4 %) that they have sufficient time to provide advice to patients for NPM, but only 49.1 % of them reported that they have sufficient information about patients to be able to make qualified decision on the choice of NPM to recommend to patients. For more than 90 % of pharmacists the main factors affecting their choice of NPM are health problems described by the patient, active substance and additional information obtained from patient regarding his/her general health. Economic factors of pharmacy such as profit for pharmacy

or goods on stock with short expiration period played the less importance. Only 56.2 % of pharmacists reported that they would report adverse drug reaction to Drug Agency. Those who reported in their lifetime (25.2 %) indicated that they had reported ADRs only in 49.8 % to the Czech Drug Agency. Czech Drug Agency plays a key role for pharmacists (85.4 %) in providing information regarding the safety of the drugs. The Pharmacovigilance test was completed by 208 (73.5 %) of pharmacists who scored on average 7.2 (± 1.4) of correct answers.

*Conclusions:* The study found that pharmacists play a key a role in the selection and recommendation of NPM. Access to patient's health records would improve qualified choice of NPM for individual patient. The pharmacists have the ability to detect the drug related problems and therefore can contribute to improving the safety of NPM, in prevention of drug related problems and in reporting of ADR. The study recommends training pharmacists in pharmacovigilance, and that the Czech Drug Agency, universities and Czech Chamber of Pharmacists would be the most appropriate bodies to undertake this role.

*Use of medicines among students of high schools in the Czech Republic*

*Aim of the study:* To examine the prevalence and type of medicines used among high school students in the Czech Republic, to collect students' experience with drug related problems and to explore their knowledge on the drug use and the source of drug information they are using for self-medication and drug related problems.

*Methods:* A cross-sectional study was conducted in high schools in the Czech Republic. The study sample was a student population from nine high schools from two regions and three towns. Questionnaires respecting anonymity were distributed to the students during a regular class period. Students answered closed and semi-opened questions, 48 (for males) and 51(for females), divided into seven sections focussing on their experience with chronic and short term use of medicine, medicine used during last six months, conditions treated, type and source of the used medicines. The study was carried out from April to June 2010. Poisson regression model with a robust variance estimator (sandwich) was used for statistical analysis as well as chi- quadrat test.

*Results:* In total, 979 students, aged 14–21 years (mean age 17 years) participated in the study: 310 (32 %) were male and 669 (68 %) female. 177 (19 %) of students reported regular use of medicines for chronic disease. The use of medicines during the last 6 months was reported by 811 (83 %) of students; 342 (43 %) of them reported the use of both prescription

and over-the counter (OTC) medicines; 205 (22 %) the use only of OTC, and 249 (31 %) only prescription medicines. Allergy (8.1%), asthma (2.6 %), and disorders of the thyroid gland (2.1 %) were among the most frequent long-term diseases. The most frequent groups of medicines used for the treatment of long-term diseases were systemic antihistamines (46.9 %), thyroid preparations (9.0 %), and respiratory drugs (7.9 %). Non-steroidal anti-inflammatory medicines, ibuprofen (84.2 %) and paracetamol (44.0 %) were the most frequently used non-prescription active substances during last six months.

About 86.0 % of students admitted self-medication during their lifetime. Out of 780 students, 38.0 % remembered that they experienced a drug related problem at some point in their life. Out of 981 students 38.1 % admitted drug non-compliance. The student's mother was the most frequent person who disposed the drug to adolescents (43.9 %), and home medicine cabinet (77.8 %) was the main source of drugs. The most frequent source of information for students was the physician 70.1 %, followed by pharmacist 53.3 % and mother 48.3 %. Students were familiar with indications for paracetamol and ibuprofen but have very poor knowledge regarding the safety of the drugs. Statistically significant associations were found between use of medicines during last 6 months and type of school, sex and chronic diseases, and between self-medication and sex.

*Conclusions:* The study results showed quite extensive use of both prescription and OTC medicines in students of high schools in the Czech Republic and their wide experience with self-medication and drug related problems. Students tend to try and resolve drug related problems as well as obtaining information about drugs from non-healthcare professionals. From these results it highlights that there is a need of increased communication between students, parents, teachers and healthcare professionals to ensure an appropriate level of understanding of the risks and benefits of drug use.

**CONCLUSION**

The legislative environment in CZ provides a good basis for safety of NPM. Czech Drug Agency plays a key advisory role for management of pharmacies and the implementation of good practices to ensure safety and efficacy of NPM. Our data demonstrated the need for additional educational activities for all who participate in the process of self - medication.