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# General provisions on medication errors committed by pharmacists

**Nicoleta Cheptanari-Birta**

*Vasile Procopisin* Department of Social Pharmacy, *Nicolae Testemitsanu* State University of Medicine and Pharmacy Chisinau, the Republic of Moldova

**Author's ORCID iD, academic degree and contribution are available at the end of the article**

Corresponding author: nicoleta.cheptanari@usmf.md
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## Abstract

**Background:** Healthcare professionals are not fully aware of the harm caused by medication errors in terms of patient discomfort and economic burden. The problem being presented, we propose the analysis of the specificity of the pharmaceutical activity and the research of the errors committed by the pharmacists for the elaboration of the recommendations for their prevention.
**Material and methods:** This research is a meta-analysis in which it quantitatively combined the results from previous studies to obtain a summary value. The research was carried out in 4 stages: identification, selection, extraction and data analysis.
**Results:** Studying the specialized literature we identified great gaps in the knowledge of the actual data about the frequency of medication errors and their classification. Quality research is needed to determine the effectiveness of the following interventions: implementation of efficient and qualitative tools that will contribute to reducing medication errors; educational interventions regarding risk factor management; developing an anonymous system for reporting medication errors; review of the schedule, workload and conditions under which pharmacists work.
**Conclusions:** Medication errors require clear and unambiguous definitions where patients, doctors, manufacturers, and regulators will understand each other. The pharmacists' ethics manifests itself in honest acknowledgment of their mistakes, because in this profession, as in no other profession, the slightest inaccuracy will lead to serious consequences and can be fatal for the patient.
**Key words:** medication errors, pharmacists, risk factors, classification.

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## Introduction

Health is one of the main indicators of life quality and the essential factor of sustainable development of society. As in the case of other countries, the health care system in Moldova must respond to new needs, appeared from demographic and socio-cultural changes, globalization process and rapid progress of medical technologies.

Pharmacists are the most often visited and accessible members of the health care team, being visited by sick and healthy people. For example, in the countries of the European Union, the 107.000 pharmacists serve 343.3 million of the population. Of this number about 17 million visit the pharmacy daily [1].

The pharmacist undertakes his/her own responsibility for each prescription, which he/she must check. He is the professional of health making up the last link in the way of the drug, guiding the patient against its misuse. The guarantee of quality and safety brought by the pharmacist is a true foundation that he consents the preparation and releasating of the drug [2].

**Purpose**. The problem being presented, is proposed to be analyzed to highlight the specifics of the pharmaceutical activity and research the errors committed by pharmacists to develop recommendations for their prevention.

## Material and methods

This research is a meta-analysis in which the results from previous studies have been combined to obtain a summary value. The research was divided into 4 stages: identification, selection, extraction and analysis of data.

At the first stage, were identified all the articles corresponding to the subject under investigation. After collecting the articles followed the selection of true information from them and the extraction of relevant data. Finally, all the data were analyzed and conclusions were formulated.

## Results and discussion

Studying the literature we have identified large gaps in the knowledge of current data about the frequency of medication errors and their classification. Quality researches are needed to determine the effectiveness of the following interventions, which would help to prevent medication errors:

- Computerized systems through which the doctor can complete and transmit the pharmacy recipes online and who can also check according to drug allergy and drug interactions, and, as well and as quickly inform about warnings regarding the correlation of prescriptions with the patient's condition. This system will make much easier the pharmacist's work, and due to

its speed, overloads of the pharmacist will be avoided;
- Educational interventions according to the management of factors which contribute to the occurrence of medication errors;
- Developing an anonymous system for reporting medication errors;
- Improving the level of professional knowledge of pharmacists;
- Double check by pharmacists of prescription drugs before release;
- The involvement of pharmacists in reporting the factors that cause them to make errors;
- The review of the program, the volume of work and the conditions under which pharmacists work.

The activity of the pharmacist in the open-circuit pharmacy is that of counseling the patient in mild conditions that do not require consultation with the doctor and guidance to the doctor where the gravity of the situation imposes advice on how to administer the medication recommended by the doctor [3], warning of potential adverse reactions and side effects (for example: gastric discomfort / gastrointestinal ulcer in the case of NSAID, intolerance to certain substances, possible teratogenic effects when administering certain drugs to pregnant women, especially in the first trimester of pregnancy), information on combinations of medicines or foods that may decrease the effectiveness of medication (for example: concomitant administration of oral contraceptives with tetracyclines, vitamin C, combination of tetracyclines with dairy foodstuffs or salts of Ca2+, Al3+, Fe2+, Bi3+, Mg2+ – oral antacids), warning on some associations contraindicated or those done with precautions (for example: combination of NSAID at patients in treatment with oral anticoagulants, or at the patients with asthma with/without allergic component, association of beta-blockers (non-selective propranolol) at patients with hypoglycaemic therapy or selective at persons in treatment with anti-asthmatic or antidepressant medicinal products (for antidepressants, only for lipophilic beta blockers), the usage of caffeine-containing drinks or OTC medicines in gout patients) [4].

The pharmacist who works in an open-circuit pharmacy can play an important role in education of the population both in terms of OTC medication, as well as in the treatment recommended by the doctor, showing the professionalism and promptness in providing the information as clearly as possible, in a language accessible to the patient [5]. His role is not only to release the drug, but also to ensure that the information he transmits with its release has been fully understood, that the treatment scheme will be respected and as in the case of undesirable or serious manifestations the patient will contact the doctor or pharmacist as soon as possible [6].

All these and many other activities are part of the specifics of pharmaceutical activity that is always at risk. At first, the main risk to which pharmacists were exposed was related to the usual threats lurking in a business (thefts, fires, etc.), and also to negligence regarding errors in the release of the recipes. Now, modern pharmaceutical practice must take into account new risks, related to the usage of technologies and electronic data transmission, patient counseling and requirements for evaluating the administration of medicines as well as confidential health information. Pharmaceutical practice evolves, and with it increases the risks related to the changing environment and objectives. Pharmacists should be conscious of the inherent risks of the provision of medical products and services and develop risk management strategies to counteract them [7]. All these risks have negative consequences of medication errors that can have a negative impact on patients' lives.

The problem of medical and pharmaceutical errors has been and remains one of the most important in the field of healthcare in many countries of the world. One of these problems was the terrible "tragedy of thalidomide" (from 1956 to 1962), when after thalidomide prescribing at pregnant women were born up to 12 thousand children with congenital malformations [8] and it was after this time that special pharmacovigilance services were created for the first time in several countries of the world to identify and prevent complications of drug therapy.

In the Republic of Moldova studies have not been conducted that reflect the statistics of medication errors, but the analysis of similar data from other countries shows that:
- in the United States of America, the pharmacists make 4-12 mistakes out of 100 cases of drugs delivery, about 87% of errors are caused by incorrect reading of a recipe, the confusion on behalf of medicinal products and packaging design [9];
- in community pharmacies in the United Kingdom, the errors of drugs releasing constituted 0.01-3.32% [10];
- in Denmark were identified up to 0.6% of prescriptions containing medication errors, but 8.7% of them can lead to deaths [11].

According to Professor N. Schaad of the University of Medicine in Geneva, the medication errors represent any mistake in prescribing, releasing or administration of a medicinal product, whether these errors lead to negative consequences or not [12]. Practically it is an action made incorrectly or due to ignorance, caused by a miscalculation, writing, speech, law or failure to perform an action that was planned, as well as using a wrong action plan to achieve a goal.

Cognitive psychologists believe that errors, lapses are the price we pay for superior brain function and those errors are inevitable. Ernest Mach (1838 - 1916) was saying "knowledge and error flow from the same mental source, only success can differentiate them"[13].

In 2013, Ivan Anosov, an employee of the Department of pharmaceutical Management and Economics of the Friendship University of Russia [14], made a research for identifying the typical mistakes that pharmacists commit in their practice. This study classified the errors as follows:
- the error associated with the name of the drug – 34.4%;

– releasing of a wrong medicinal product – 22.1%;
– releasing children's medicines to an adult patient and vice versa – 15.3%;
– the error in calculating the dose, the concentration of the drug – 10.4%;
– the error in replacing the drug with an analogue – 9.8%;
– the recommendation and drug releasing which are not in accordance with the indications – 8.0%.

Regarding the last two types of errors mentioned above, was made a study in the Republic of Moldova in 2015 on *the Ethical promotion of medicines:* current approaches and regulations [15], in which 1000 people were questioned. At the question "*Did the pharmacist suggest you should buy a drug other than the one recommended/prescribed by the doctor?"* 22% of respondents answered: "Yes, very often"; 54.4 % of respondents answered: "Yes, sometimes"; 22.4 % of respondents answered: "No".

Based on the survey we attest the existence of the situations when pharmacists suggest buying other medicine than the one recommended/prescribed by the doctor. The changing of the doctor's option by the pharmacist can be based on various reasons: the lack of the product in the pharmacy, the encouragement of sales of a particular drug of a particular pharmaceutical company, etc.

At the question "Did t*he pharmacist insist to buy in addition to the medicine/s requested some other medicine/s?" 15*.4 % of respondents answered: "Yes, very often"; 28.2 % of respondents answered: "Yes, sometimes"; 56.2 % of respondents answered: "No". The majority of respondents said that the pharmacist did not insist on other drugs besides those requested. However, there are also respondents who have dealt with proposals from the pharmacist on the purchase of an add-on drug.

There is a difference between the attitude of a person who is not in the pharmaceutical field and the attitude of a pharmacist to his professional mistakes [16], and that is:

1. The pharmacist has a tendency to objectify the source of errors. His own thinking way, like that of a doctor, is dialectical and dynamic.

2. At patients, is often observed an opposite tendency – to see the omnipotent pharmaceutical science, but the source of errors is only in the pharmacist incompetence or in the unwillingness to help the patient. The thinking way of healthy and sick patients is logical-mechanical and statistical.

In order to understand how medication errors are committed and to develop methods of prevention their classification will be taken into account, what can be contextual, according to the mechanism of production and psychological. Contextual classification includes specific time, place, drugs and involved people. The classification according to the production mechanism examines how errors occur (e. g. by omission, repetition or replacement). However, is preferable the classification based on psychological theory because it explains the events and their description. According to this theory, medication errors can be classified as follows:

**Category A:** there are circumstances and events that are capable of causing errors;

**Category B:** an error has occurred, but the error does not affect the patient;

**Category C:** an error which affects the patient has occurred, but the error does not cause a harmful response to the patient;

**Category D:** an error affecting the patient has occurred and monitoring is required to confirm that the error does not cause a harmful response to the patient and / or the required intervention is required to exclude harmfulness;

**Category E:** an error affecting the patient occurred and may have contributed to or resulted in a temporary harmful response of the patient and no intervention was required;

**Category F:** an error that has occurred may have contributed or resulted in a temporary harmful response of the patient and was imposed an initial hospitalization or prolongation of hospitalization;

**Category G:** an error that has occurred may have contributed or resulted in a permanent harmful response of the patient;

**Category H:** an error that occurred may have required an intervention to support the patient's life;

**Category I:** an error that occurred may have contributed to or resulted in the patient's death [17, 18].

According to the mechanism of production, pharmaceutical errors are divided into (fig. 1):

➢ Errors produced by the pharmacist;
➢ Errors in which the pharmacist has not a fault.

All these errors can be committed by a huge range of drugs (20 thousand products), at the same time, too many medicines have similar orthographic names: tamiflu-theraflu, linex-linkas, somnil-sonmil, prostamol-paracetamol, ranitidine-remantadine, etc. As well as the similarities between the packaging of medicines (e.g. Cyston and Liv-52) or the same medicine, but in different doses. Pharmacists can also be influenced by tiredness, haste, overwork, illness, household problems, insufficient sleep or by conflicting patients. All these reduce the attention and can have negative effects on the patient's health.

Another cause of errors is the lack of qualified personnel. By the beginning of this year, there were about 1400 pharmacies in the Republic of Moldova, and their number is constantly increasing. About 80-90 specialists graduate from *Nicolae Testemitsanu* State University of Medicine and Pharmacy annually and only four out of ten of them work in pharmacies. According to the data, the number of non-professional employees in pharmaceutical organizations reaches 40% [20, 21]. On account of the acute deficiency of specialists, employers had to lower the requirements to the professional level of employees.

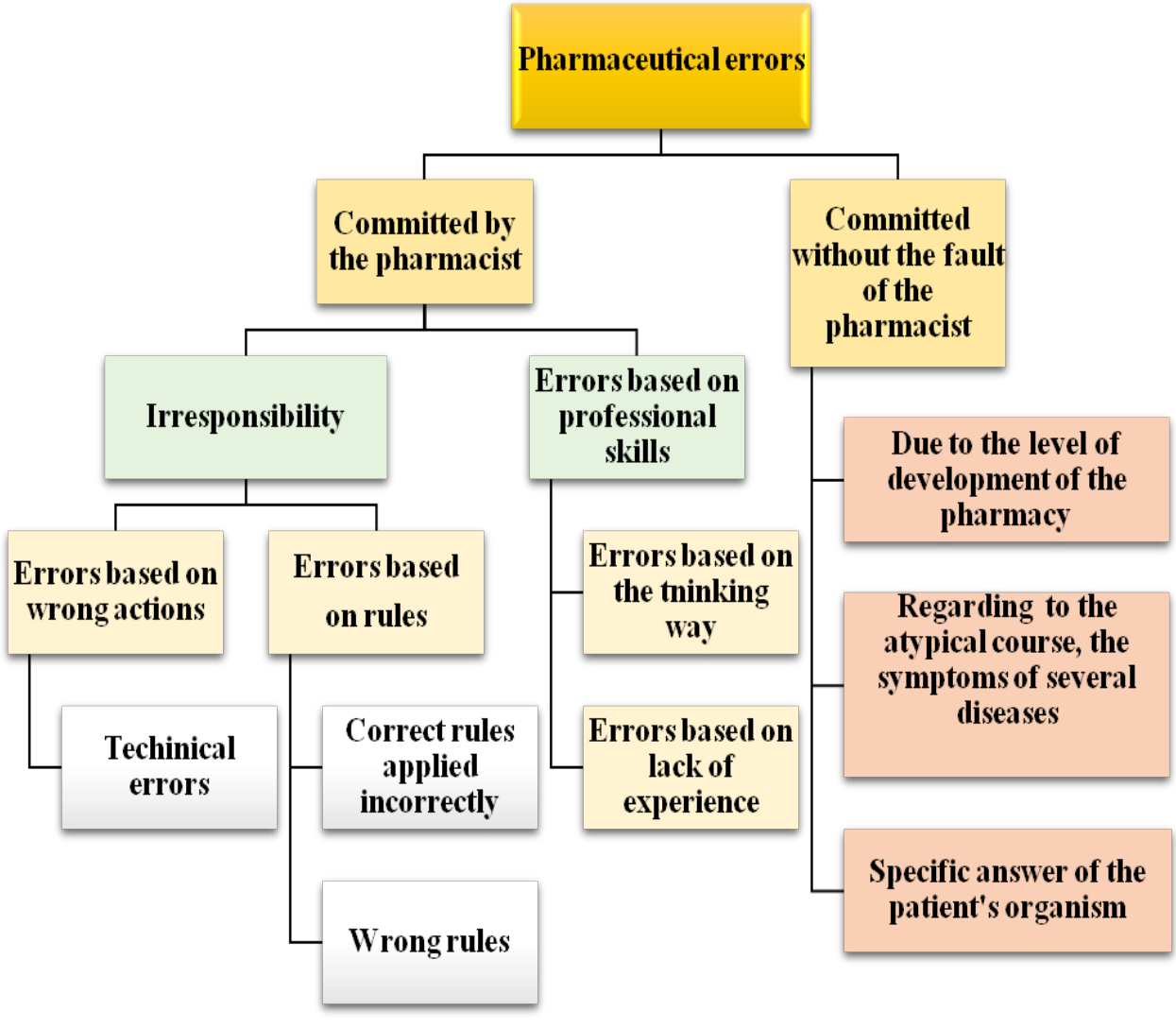


**Fig. 1. The classification of medication errors according to the mechanism of production [19].**

## Conclusions

The medication errors require clear and unambiguous definitions, so that patients, doctors, manufacturers and regulatory authorities can understand each other.

The classification of medication errors based on how they occur, may suggest strategies that will help reduce their occurrence.

The ethics of the pharmacists is manifested in the honest recognition of their mistakes, because in this profession, as in no other profession, the slightest inaccuracy results in serious consequences and can be fatal for the patient.

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**Author's ORCID iD and academic degrees**
Nicoleta Cheptanari-Birta – https://orcid.org/0000-0002-1331-1161, PharmD.

**Author's contribution**
NCB conceptualized the idea, conducted literature review, wrote the manuscript, revised and approved the final text.

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No competing interests were disclosed.