

ОРГАНІЗАЦІЯ ТА ЕКОНОМІКА ФАРМАЦІЇ

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The assessment of awareness about the rational use of medicines among Ukrainian pharmacy students

Aim. To study the awareness of graduate pharmacy students with the concept of the “rational use of medicines” and related issues.

Materials and methods. A questionnaire survey of 172 graduate students was conducted at the National University of Pharmacy.

Results and discussion. Most students believe that they are clearly familiar with the concept of the “rational use of medicines”; 97.1 % of them know it from the disciplines they studied at the University. It has been found that students have both correct and erroneous ideas about the mandatory principles of the rational use of medicines; they are most aware of its clinical aspects. Not all signs of the irrational use of medicines are obvious for future pharmacists. Students possess certain skills that can be useful in promoting the rational use of medicines. However, not all acquired skills are in demand in the professional activities of pharmacists in Ukraine. 75.6 % of respondents think their knowledge gained at the University is sufficient to promote the rational use of medicines. Only 48.3 % of respondents believe that Ukrainian pharmacists are sufficiently involved in promoting the rational use of medicines.

Conclusions. The study has revealed the lack of awareness of some pharmaceutical students about the concept and problem of the rational use of medicines, as well as the gap between the acquired skills and their demand in professional activities. Less than half of students rate the role of pharmacists in promoting the rational use of medicines at a sufficient level. Further research will be aimed at developing measures to improve the awareness of pharmacy students with the basic concepts of the rational use of medicines, as well as expanding the participation of Ukrainian pharmacists in promoting the rational use of medicines.

Key words: *pharmaceutical education; student awareness; rational use of medicines; irrational use of medicines; pharmacy*

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Оцінка обізнаності українських студентів-фармацевтів з проблемою раціонального використання ліків

Мета роботи – вивчити поінформованість студентів-фармацевтів випускного курсу про концепцію «раціональне використання ліків» та пов'язані з нею питання.

Матеріали та методи. У Національному фармацевтичному університеті проведено анкетне опитування 172 студентів випускного курсу.

Результати та їх обговорення. Більшість студентів вважає, що вони добре обізнані з поняттям «раціональне використання ліків»; 97,1 % з них знають це поняття з дисциплін, які вивчали в університеті. Виявлено, що у студентів сформовані як правильні, так і помилкові уявлення про обов'язкові принципи раціонального використання ліків; вони найбільше обізнані з його клінічними аспектами. Не всі ознаки нераціонального використання ліків є очевидні для майбутніх фахівців. Студенти мають певні навички, які можуть бути корисні у сприянні раціональному використанню ліків. Проте не всі набуті навички затребувані в професійній діяльності фармацевтів в Україні. 75,6 % респондентів вважають, що отриманих в університеті знань достатньо для сприяння раціональному використанню ліків. Лише 48,3 % респондентів вважають, що українські фармацевти достатньо залучені до сприяння раціональному використанню ліків.

Висновки. Виявлено недостатню обізнаність частини студентів-фармацевтів з концепцією та проблемами раціонального використання ліків, а також розрив між отриманими навичками та їх затребуваністю в професійній діяльності. Менше половини студентів оцінює роль фармацевтів у сприянні раціональному використанню ліків на достатньому рівні. Подальші дослідження будуть спрямовані на розроблення заходів з покращення обізнаності студентів-фармацевтів з основними поняттями раціонального використання ліків, а також розширення участі українських фармацевтів у сприянні раціональному використанню ліків.

Ключові слова: *фармацевтична освіта; обізнаність студентів; раціональне використання ліків; нераціональне використання ліків; аптека*

Introduction. There is an urgent need to build a strong patient-centred healthcare system in Ukraine due to the lack of state health insurance, high morbidity and mortality, and improper regulation of market processes [1, 2]. Against the background of limited budgetary resources for healthcare, reduced solvency of a large part of the population and a high level of out-of-pocket spending, there are numerous signs of the irrational use of medicines in Ukraine [3].

Such signs given in the official documents of the Cabinet of Ministers of Ukraine in 2018 are the high level of self-medication, polypharmacy, over-prescribing and uncontrolled use of antibiotics, violation of rules of dispensing prescription medicines from pharmacies, inconsistency of the drug consumption structure with causes of the population morbidity, an excessive consumption of non-essential medicines with an insufficient consumption of essential medicines, and an extensive consumption of medicines with the unproven therapeutic efficacy [4].

An additional sign of the irrational use of medicines in Ukraine is a small share of the hospital segment of the pharmaceutical market compared to the retail segment. For instance, in 2017 it was only 12.6 % in monetary terms and 9.0 % in physical terms. According to the results of January-August 2020, the share of the hospital segment in the total structure of the drug consumption reached 14.4 % in monetary terms and 12.8 % in physical terms [5].

In Ukraine, a considerable amount of expenditure on medicines is made directly at the expense of the population. According to statistics, approximately 600,000 households in Ukraine suffer catastrophic financial expenditures on healthcare every year. At the same time, a significant number of households cannot receive medical care or medicines, mainly due to their economic unavailability [4].

All this determines the need to reform the healthcare system and implement systemic measures to ensure the quality and effectiveness of pharmaceutical care.

According to the recommendations of the World Health Organization (WHO), the rational use of medicines contains a whole range of problematic issues. It is an important area that requires detailed elaboration and the state regulation while developing national policies for provision of medicines to the population. Back in 2002, the WHO experts proposed directions and measures to make use of medicines more rational and identified 12 key provisions for promoting the rational use of medicines [6].

In Ukraine, the current state and available resources of the healthcare system, the specificity of the state regulation of drug circulation and peculiarities of the Ukrainian pharmaceutical market, as well as socio-cultural and economic factors necessitate a detailed study of all areas of work to the provide rational use of medicines.

The educational component plays an important role in providing the rational use of medicines [7]. Training of pharmacists is one of ten recommendations to improve the use of medicines in developing countries [8].

In undergraduate pharmaceutical education, future specialists should acquire the necessary knowledge and skills that enable them to monitor and evaluate the rational use of medicines [9]. This knowledge and skills should be developed and improved in the system of postgraduate education of health professionals [6].

Several studies are devoted to the analysis of the teaching process and awareness of medical and pharmaceutical students of various aspects of the rational use of medicines [10-12]. Researchers conclude that awareness of pharmaceutical and medical students and graduates in the rational use of medicines in some countries is not satisfactory; there is a gap in its implementation [10]. Some studies have shown that even a brief educational module or intervention can improve the students' attitude and knowledge, as well as increase their self-efficacy in certain skills related to the rational use of medicines [11, 13].

In Ukraine, research on the awareness of pharmacy students with the principles of the rational use of medicines has not yet been conducted.

The aim of the work is to study the awareness of graduate pharmacy students with the concept of the "rational use of medicines" and related issues.

Materials and methods. A survey was developed to identify the students' awareness of the concept of the "rational use of medicines" and related issues. A questionnaire survey of graduate students of the Master's level in specialty "Pharmacy, Industrial Pharmacy" (educational programs "Pharmacy" and "Clinical Pharmacy") was conducted at the National University of Pharmacy (NUPh) using Google-forms in the period from 19.10.2020 to 20.11.2020. The main part of the questionnaire included 5 multiple-choice questions (with the opportunity to add students' own answers) and 3 one-choice questions. The questionnaire was pre-tested on a limited number of students; as a result, some options for answering the questions were clarified and supplemented. The student feedback was collected using an anonymous, self-administered questionnaire; students were not encouraged to participate in the survey with any additional points in the disciplines; students' answers had no effect on the ranking of academic disciplines; the informed consent was obtained from students.

As the survey was conducted during the quarantine when remote technologies were used in the educational process, teachers of the Pharmaceutical Management and Marketing Department sent invitations to the survey by e-mail and other messengers and announced it at the lecture. Students provided answers in their spare time.

The questionnaires of 172 graduate students were received, i.e., more than 90.5 % of the final year students took part in the survey (190 students per year in total). 47.7 % (N = 82) of the surveyed students had already the work experience in a pharmacy. Results are reported as frequencies and percentages for categorical data.

Results and discussion. The first question concerned the students' general awareness with the concept of the "rational use of medicines" (Fig. 1).

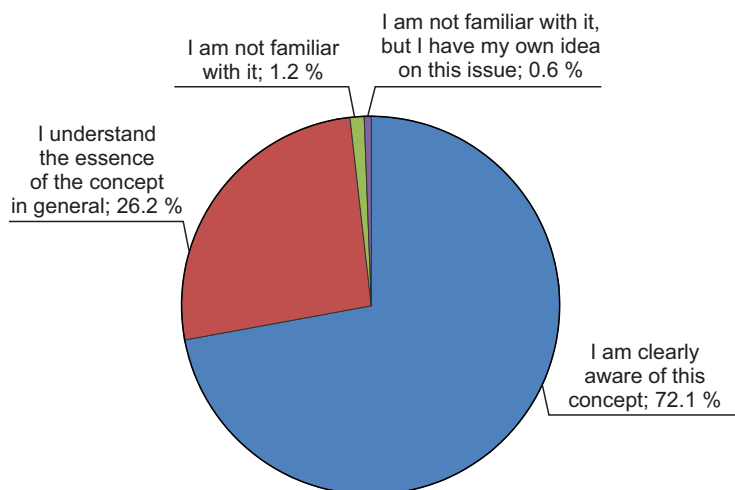


Fig. 1. Students' answers to a question: "Are you familiar with the concept of the "rational use of medicines"?"

Most students, namely 72.1 %, believed that they were clearly familiar with the meaning of the concept of the "rational use of medicines". 26.2 % of respondents answered that they understood the essence of this concept in general. 0.6 % of respondents were not familiar with the concept, but had their own ideas on its meaning. 1.2 % of respondents answered that they were not familiar with this concept.

For 97.1 % of respondents, the concept of the "rational use of medicines" was familiar from the disciplines they studied at the NUPh (Fig. 2). Most students indicated several sources from which they received information on this concept (the average number of sources indicated by one respondent was 2.3). 50.0 % of respondents received information on the concept of the "rational use of medicines" in the process of self-education, self-improvement or/and independent study of professional literature outside the educational process in the NUPh; 33.7 % of respondents – from the media; 27.3 % – from the work experience at a pharmacy, 11.1 % – from conferences, workshops and trainings outside the educational process in the NUPh; 10.5 % – from their internship at a pharmacy.

Since the rational use of medicines is a multifaceted concept and contains mandatory components, which consideration and observance was necessary in pharmacists' professional activities, we were interested to explore which disciplines students most closely associated with it. The list of disciplines for the relevant questionnaire was formed after the analysis of Masters' curricula in the educational programs "Pharmacy" and "Clinical Pharmacy". This list includes both major and minor courses that explain, mention or use the concept of the "rational use of medicines". In addition to the answer options proposed, students had the opportunity to add other names of the disciplines they studied.

Answering this question, students indicated several disciplines they studied at the NUPh (on average, each student chose 4.3 disciplines) (Fig. 3). Respondents studied those disciplines at the Departments both of the medical-biological and administrative profile. The largest number of respondents mentioned such discipline as "Clinical Pharmacy and Pharmaceutical Care" (91.9 %). Approximately equal number of respondents mentioned such disciplines as "Social Pharmacy" (67.4 %), "Pharmacology" (67.4 %), "Pharmacoeconomics" (62.8 %),

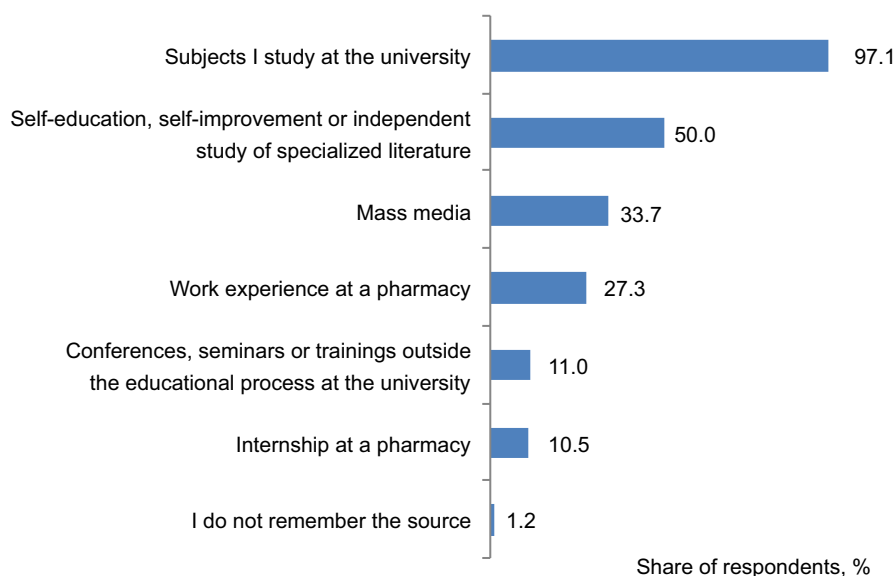


Fig. 2. Students' answers to a question: "What are your sources of information on the concept of the "rational use of medicines"?"

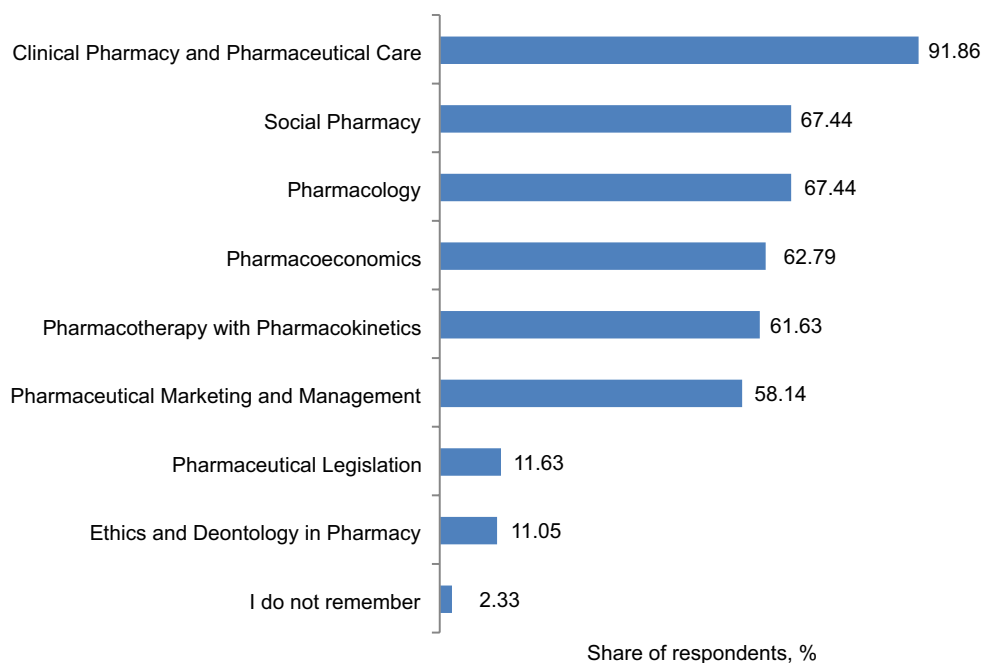


Fig. 3. Students' answers to a question: "Which courses at the university explain, mention or use the concept of the "rational use of medicines"?"

"Pharmacotherapy with Pharmacokinetics" (61.6 %) and "Pharmaceutical Marketing and Management" (58.1 %).

Significantly fewer respondents indicated such disciplines as "Pharmaceutical Legislation" (11.6 %) and "Ethics and Deontology in Pharmacy" (11.1 %). 2.3 % of respondents could not remember in which disciplines they studied or mentioned the concept of the "rational use of medicines".

The next question was aimed at finding out how accurate the students' perception of the concept of the "rational use of medicines" was. Respondents were asked to choose the mandatory principles of the rational use of medicines from the list provided. The list of possible answers was developed on the basis of studying the sources of scientific literature, the Ukrainian regulatory framework and the WHO documents [14]. The list contained both correct answers corresponded to the WHO materials or the Ukrainian regulatory framework for the rational use of medicines (or supplement them), and distracters, which were not related to mandatory principles (Table). Some correct answers and distract options were added after testing the questionnaire, considering new respondents' answers.

According to the survey results, the opinions of the Ukrainian pharmaceutical students on the mandatory principles of the rational use of medicines were not unanimous and did not always coincide with the WHO recommendations and the Ukrainian regulatory framework.

The large number of future pharmacists (over 70.0 %) believed that the rational use of medicines was their use: by a doctor's prescription or recommendation (78.5 %); in right doses, individually selected (76.7 %); according to patients' clinical needs (76.2 %) and considering the patients' safety (75.6 %) (Fig. 4).

In the authors' opinion, the answer chosen by the largest number of respondents, namely the use of medicines prescribed by a doctor, is not a mandatory and sufficient

principle of the rational use of medicines. Firstly, doctors' prescriptions are not always rational [15-17]. Secondly, the problem of the rational use of medicines for self-medication, which is at high level in many countries, remains unsolved [18, 19]. Thirdly, this principle is not mentioned in the WHO definition and the Ukrainian regulatory framework [14].

A slightly smaller number of respondents thought that obligatory principles of the rational use of medicines were their use: according to the patient information leaflet (69.2 %); taking into account the therapeutic efficacy of medicines (66.9 %); in strict accordance with clinical indications (56.4 %); taking into account the evidence base of medicines built on results of clinical trials (55.2 %); based on clinical guidelines, standards and treatment protocols (51.2 %); the use of medicines for a sufficient period of time (36.6 %). We consider all these answers to be correct, as those provisions are indicated in the WHO recommendations and the Ukrainian regulatory framework or supplement them. Thus, Ukrainian pharmaceutical students are best aware of the clinical (pharmaco-therapeutic) component of the rational use of medicines.

At the same time, some respondents' answers contained provisions that were not specified in the WHO recommendations or the Ukrainian regulatory framework and were wrong: the use of medicines based on genetic characteristics of patients (47.7 %), the use of medicines based on the ease of use (38.4 %), and the use of medicines considering consumer preferences (18.6 %).

Such important principles as the use of medicines with the highest cost-effectiveness of the treatment; the use of medicines included in the State Formulary of Ukraine and the use of medicines with a minimum cost for a patient and the society received a small number of respondents' answers (34.3; 27.3 and 18.6 %, respectively). It indicates that future pharmacists lack awareness of the important aspects of the use of medicines.

Answer options to the mandatory principles of the rational use of medicines
and assessment of their correctness

Answer options	Share of respondents, w	Number of respondents, N	Compliance with the WHO recommendations	Compliance with the Ukrainian regulatory framework	Conclusion on the correctness of the answer
Use of medicines prescribed by a doctor	78.5	135	-	-	incorrect
Use of medicines in right doses, individually selected	76.7	132	+	+	correct
Use of medicines according to patients' clinical needs	76.2	131	+	+	correct
Use of medicines considering safety	75.6	130	complements existing positions	complements existing positions	correct
Use of medicines considering a drug-drug or drug-food interaction	70.9	122	complements existing positions	complements existing positions	correct
Use of medicines in accordance with the patient information leaflet	69.2	119	-	+	correct
Use of medicines considering comorbidities and other patient characteristics	69.2	119	complements existing positions	complements existing positions	correct
Use of medicines considering their therapeutic efficacy	66.9	115	complements existing positions	complements existing positions	correct
Use of medicines in strict accordance with clinical indications	56.4	97	+	+	correct
Use of medicines based on evidence of clinical trials	55.2	95	complements existing positions	complements existing positions	correct
Use of medicines based on clinical guidelines, standards, and treatment protocols	51.2	88	-	+	correct
Use of medicines considering genetic characteristics of a patient	47.7	82	-	-	incorrect
Use of medicines considering the ease of use	38.4	66	-	-	incorrect
Use of medicines for a sufficient period	36.6	63	+	+	correct
Use of medicines with the highest cost-effectiveness of the treatment	34.3	59	complements existing positions	complements existing positions	correct
Use of medicines included in the State Formulary	27.3	47	-	+	correct
Use of medicines at a minimum cost to a patient or the society	18.6	32	+	+	correct
Use of medicines considering consumer preferences	18.6	32	-	-	incorrect



Fig. 4. Students' answers to a question: "What are mandatory principles of the rational use of medicines, in your opinion?"

The next question was aimed at finding out what Ukrainian pharmacy students considered to be signs of the irrational use of medicines. It should be noted that all question options are signs of the irrational use of medicines [6]; and they are extremely common, according to official documents [4].

The most obvious signs of the irrational use of medicines for future pharmacists were an excessive or unreasonable use of antibiotics (85.5%), consumption of prescription medicines without a doctor's prescription (79.7%), and the use of medicines with a doubtful or insufficient evidence base (76.2%) (Fig. 5).

The following group of signs received a slightly lower number of respondents' answers: a high level of self-medication (58.7%), the excessive use of medicines per one patient (55.8%), the excessive consumption of non-essential medicines against low consumption of essential ones (47.7%), and mismatch of the

drug consumption to the structure of morbidity of the population (47.1%).

In our opinion, such an important feature of the irrational use of medicines as the use of expensive medicines in the presence of more affordable alternatives, which was indicated by only 33.7% of respondents, was much underestimated. Only 26.7% of respondents considered it irrational to use injections when oral administration was possible.

The next question was to find out what skills pharmacy students possessed to promote the rational use of medicines while working at a pharmacy. It should be noted that there is no system of pharmacotherapy management with participation of pharmacy specialists in Ukraine; additional services provided in pharmacies are mostly commercial in nature. The list of skills was designed based on the analysis of curricula in the disciplines mentioned in the questionnaire (Fig. 6).

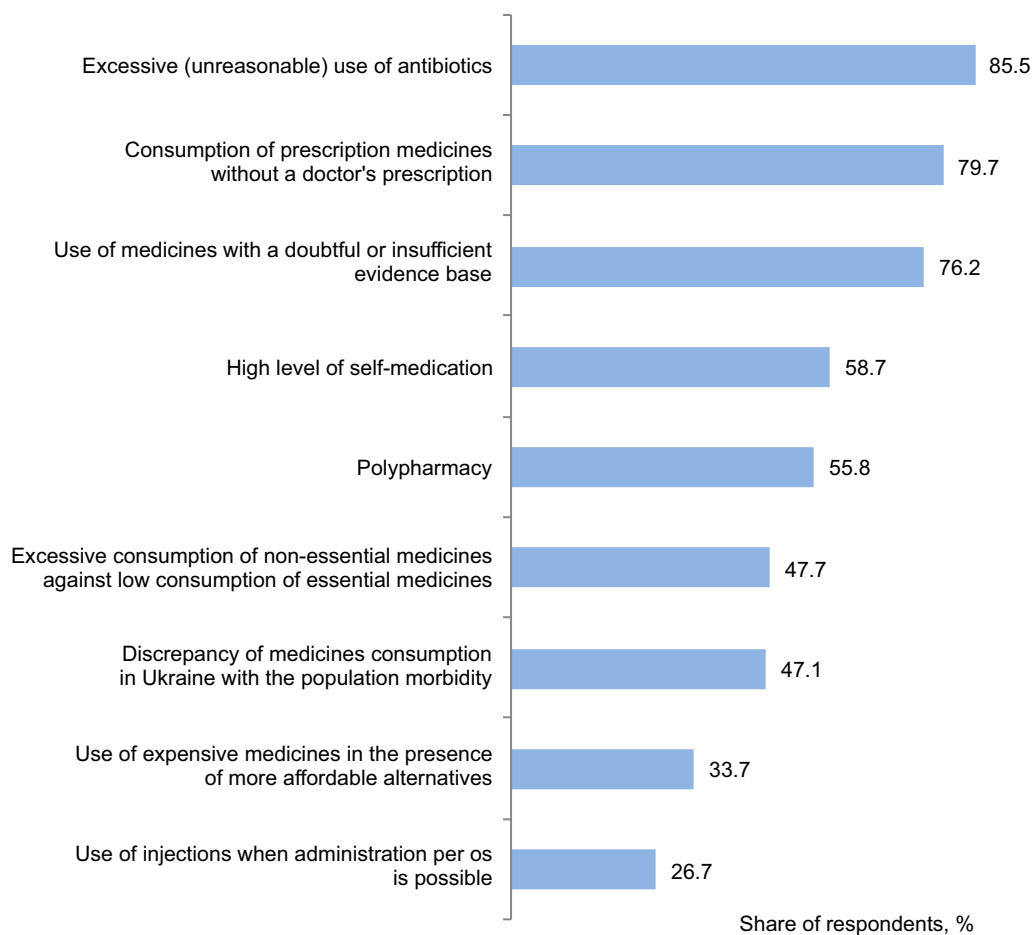


Fig. 5. Students' answers to a question: «Which of the following do you consider signs of the irrational use of medicines?»

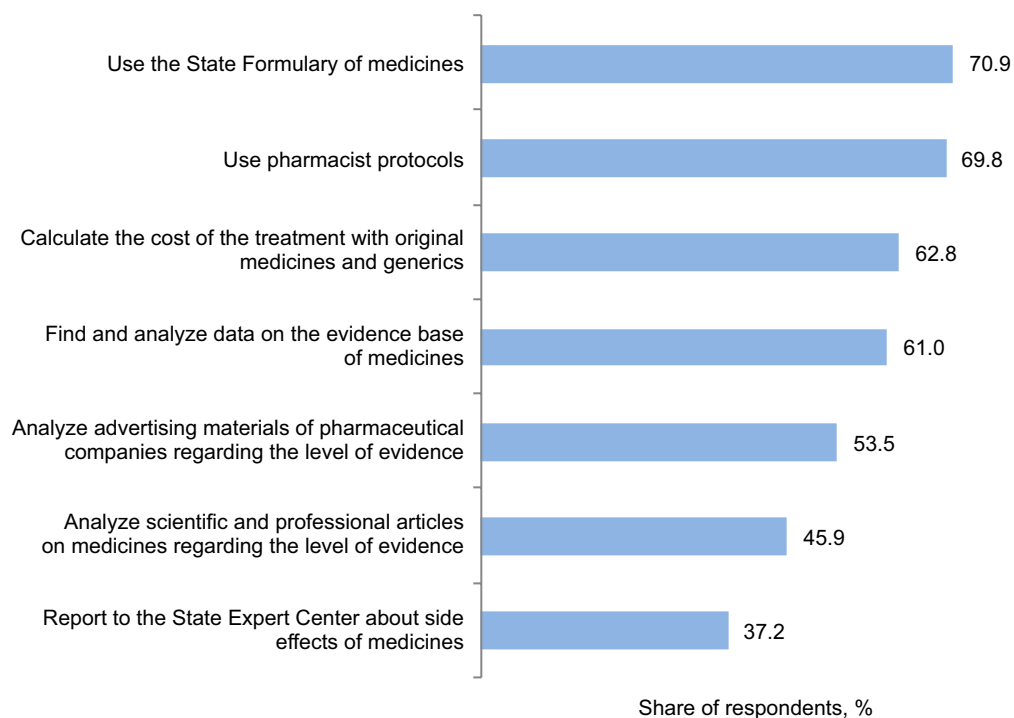


Fig. 6. Students' answers to a question: «Which of the following can you do to promote the rational use of medicines?»

The largest number of respondents (70.9 %) stated that they knew how to use the State Formulary, the official source of information about medicines in Ukraine. The State Formulary of Ukraine is a component of the system of industry standards in the field of healthcare. It contains a list of medicines registered in Ukraine, including medicines with the proven efficacy, acceptable level of safety, which use is economically acceptable [20]. However, the use of the State Formulary is not in high demand in pharmacies. Moreover, according to changes that are planned to be made to the “License Terms of Retail Trade in Medicines in Ukraine” (further in the text – License Terms), pharmacists will have to provide information to consumers on use of medicines based on instructions for their medical use [4].

69.7 % of respondents stated that they knew how to use pharmacist’s protocols. In Ukraine, 36 pharmacist’s protocols were developed and approved by the order of the Ministry of Health. Pharmacist’s protocols are intended for use when dispensing of over-the-counter medicines, collecting information on cases of adverse reactions and / or lack of efficacy of drugs, and dispensing prescription drugs for the treatment of cardiovascular diseases that are subject to reimbursement. They contain algorithms of conversation with pharmacy visitors, allow pharmacists to identify threatening symptoms that require immediate medical attention, help pharmacists to choose over-the-counter medicines and provide recommendations on pharmaceutical care for patients, etc. However, these protocols are recommended as a source of information and are not mandatory when consulting pharmacy visitors [21].

62.8 % of respondents stated that they knew how to calculate the cost of the treatment with original medicines and generics. It should be noted that currently Ukrainian doctors prescribe medicines mostly under the trade name and without a properly written prescription. This is since Ukrainian consumers pay for the cost of medicines themselves in most cases; and there is practically no control over compliance with the rules of dispensing medicines from the pharmacy.

Since 2017, the government program “Affordable Medicines” has been implemented in Ukraine, which allows patients to receive reimbursement of the cost of medicines (currently – for the treatment of cardiovascular diseases, bronchial asthma, type II diabetes, diabetes mellitus and diabetes insipidus, mental and behavioral disorders, epilepsy). In 2022, the dispensing of antibiotics, narcotic and psychotropic drugs by electronic prescriptions was introduced. It is planned to further expand the use of electronic prescriptions. In electronic prescriptions, doctors must use the international non-proprietary name of a drug.

According to the “State Strategy for the Implementation of the State Policy of Providing the Population with Medicines for the Period Up To 2025” (further in the text – State Strategy), it is planned to amend the License Terms, according to which pharmacists must inform consumers about generic medicines available in pharmacies that are interchangeable with the original

medicines. Under such conditions, consumers can choose a drug (original or generic, foreign or domestic manufacturer) based on the information about the cost of the treatment, i.e., the ability of a pharmacist to calculate the cost of the treatment is in demand in professional activities.

61.1 % of respondents stated that they knew how to find and analyze data on the level of the evidence base of medicines. 55.5 % of students answered that they could analyze the advertising materials of pharmaceutical companies on the drug effectiveness evidence level; 45.9 % of respondents were able to analyze scientific and professional articles.

37.2 % of respondents answered that they knew how to report to the State Expert Center about the side effects of medicines. At present, pharmacists can report side effects to the State Expert Center, but the share of reports received from the pharmacy staff is negligible. According to the State Strategy, Ukraine envisages further implementation of the provisions of international standards of good pharmacovigilance practice, which may expand the role of pharmacists in pharmacovigilance.

Thus, unfortunately, not all the skills acquired in the learning process are currently in demand when working in Ukrainian pharmacies. Practice shows that the simple dispensing (in other words, sale) of medicines, sale of medicines by prior online order and less often the selection of medicines by simple symptoms take the lion’s share in the pharmacists’ work in Ukraine. In addition to dispensing medicines and advising visitors, during the working day pharmacists have a variety of tasks: taking medicines and other goods, controlling expiration dates, displaying goods in shop windows and shelves, returning to warehouses, checking for counterfeit and low-quality batches of medicines, registration and replacement of price tags, replenishment of the database, etc.

In addition, the interest of pharmacies and pharmacy chains owners in the financial results in the absence of the proper control by the state bodies creates grounds for total violations of the rules of dispensing medicines (ignoring the need for a prescription), priority recommendation to pharmacy visitors of high-value medicines and ones included in the promotional list of the pharmacy network.

The next question was to find out whether pharmaceutical students considered the amount of knowledge gained during their studies to be sufficient to promote the rational use of medicines. Only 34.3% of respondents gave an affirmative answer “Yes”, while 41.3% of respondents gave the answer “Rather yes than no” (Fig. 7).

Students’ opinions on whether the Ukrainian pharmacists were sufficiently involved in promoting the rational use of medicines were heterogeneous (Fig. 8).

In total, 48.3% of respondents gave a positive answer to this question (22.1 % of respondents answered “Yes”, and 26.2 % – “Rather yes than no”). 34.3% of respondents gave a negative answer to this question (9.9 % of respondents answered “No”, 24.4 % – “Rather no than yes”).

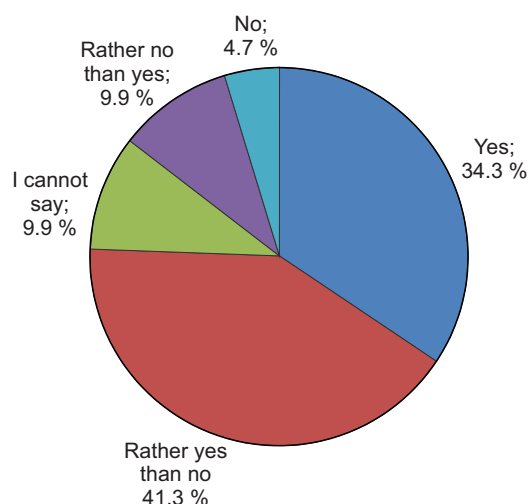


Fig. 7. Students' answers to a question: "Do you think your knowledge gained at the University is sufficient to promote the rational use of medicines when working at a pharmacy?"

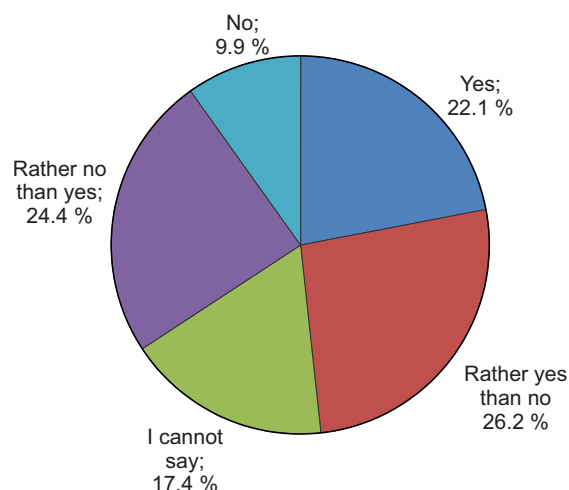


Fig. 8. Students' answers to a question: "Do you think pharmacists are sufficiently involved in promoting the rational use of medicines?"

Thus, in Ukraine, there is the lack of awareness of some pharmacy students about the concept and problem of the rational use of medicines, as well as the gap between the acquired skills and their demand in professional activities. Less than half students are optimistic about the pharmacists' role in promoting the rational use of medicines.

Conclusion and prospects of further research

1. Most students (72.1 %) believe that they are clearly familiar with the concept of the "rational use of medicines"; 97.1 % of them know it from the disciplines they studied at the University.

2. Students indicated on average 4.3 disciplines of the medical-biological and administrative profile that explained, mentioned or used the concept of the "rational use of medicines". The largest number of respondents (91.9 %) indicated "Clinical Pharmacy and Pharmaceutical Care".

3. Students' opinions on the mandatory principles of the rational use of medicines are not unanimous and do not always coincide with the WHO recommendations and the Ukrainian regulatory framework.

4. Some signs of the irrational use of medicines are obvious for future pharmacists (unreasonable use of antibiotics, consumption of prescription medicines without

a doctor's prescription, and the use of medicines with a doubtful or insufficient evidence base). Nevertheless, other important features of the irrational use of medicines (high level of self-medication, polypharmacy, etc.) are underestimated.

5. To promote the rational use of medicines, students have such skills as to use the State Formulary (70.9 %) and pharmacist's protocols (69.8 %), to calculate the cost of the treatment with original medicines and generics (62.8 %), to find and analyze data on the evidence base of medicines (61.0 %), etc. The study has revealed the gap between the acquired skills and their demand in professional activities in Ukraine.

6. 75.6 % of respondents think their knowledge gained at the University is sufficient to promote the rational use of medicines. Less than half of students rate the role of pharmacists in promoting the rational use of medicines at a sufficient level.

7. Further research will be aimed at developing measures to improve the awareness of pharmacy students with the basic concepts of the rational use of medicines, as well as expanding the participation of Ukrainian pharmacists in promoting the rational use of medicines.

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