UDC 615.15-047.22:658.818.2:615.233/.234:616.22/.24-008.4 https://doi.org/10.26641/2307-0404.2025.4.348306

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RESEARCH ON THE AWARENESS OF PHARMACISTS REGARDING THE RATIONAL USE OF MEDICINES IN PROVIDING PHARMACEUTICAL CARE FOR PATIENTS WITH COUGH OF VARIOUS GENESIS

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Цитування: Медичні перспективи. 2025. Т. 30, № 4. С. 199-212
Cited: Medicni perspektivi. 2025;30(4):199-212

Key words: *cough, pharmacist, pharmaceutical care, pharmacotherapy*
Ключові слова: *кашель, фармацевт, фармацевтична опіка, фармакотерапія*

Abstract. Research on the awareness of pharmacists regarding the rational use of medicines in providing pharmaceutical care for patients with cough of various genesis. Kaidash S.P., Sokolova K.V., Sliesarchuk V.Yu., Potapova T.M. *Pharmacists play an important role in the treatment of cough, which is a frequent complaint when seeking medical help and in 30-40% of cases is the main reason for a visit to the pharmacy. The aim of the study was to identify using a questionnaire, the level of awareness, practical approaches and difficulties faced by pharmacists when recommending medicines for the treatment of cough.The study was qualitative, descriptive in nature and was conducted in the form of an anonymous voluntary survey using a structured online survey in Google form. The instrument was a questionnaire with 20 questions (closed and semi-open type), developed by the author based on literature sources and clinical guidelines. The participants were 42 pharmacists from pharmacies in the city of Dnipro. The survey lasted one calendar month.According to the results of the study, pharmacists demonstrate a sufficient level of knowledge about the causes of cough, tactics for selecting over-the-counter drugs, indications for their use and general recommendations for patients, which indicates proper training of specialists in basic issues of pharmaceutical counseling. At the same time, a number of problematic aspects were identified: insufficient knowledge about drug interactions, incomplete information of patients about the features of the use of over-the-counter drugs and untimely referral of pharmacy visitors to a doctor. Such gaps increase the risk of irrational use of drugs and negatively affect the results of treatment.The conclusions emphasize the feasibility of implementing additional training measures for pharmacists, in particular cases with role-modeling of clinical situations, which will increase practical competence, optimize pharmaceutical care and reduce cases of unjustified prescription of antibiotics by specialists.*

Реферат. Дослідження обізнаності фармацевтів щодо раціонального застосування лікарських засобів при здійсненні фармацевтичної опіки хворих з кашлем різного генезу. Кайдаш С.П., Соколова К.В., Слєсарчук В.Ю., Потапова Т.М. *Фармацевти відіграють важливу роль у терапії кашлю, який є частою скаргою при зверненні за медичною допомогою та в 30-40% випадків є основною причиною візиту до аптеки. Метою дослідження було виявлення, за допомогою анкетування, рівня обізнаності, практичних підходів та труднощів, з якими стикаються фармацевти під час рекомендації лікарських засобів для лікування кашлю. Дослідження мало якісний, описовий характер і було проведене у формі анонімного добровільного опитування за допомогою структурованого онлайн-анкетування в Google-формі. Інструментом була анкета з 20 запитаннями (закритого та напіввідкритого типу), розроблена автором на основі літературних джерел та клінічних рекомендацій. Учасниками стали 42 фармацевти аптечних закладів м. Дніпро. Опитування тривало один календарний місяць. За результатами дослідження фармацевти показали достатній рівень знань щодо причин кашлю, тактики підбору безрецептурних препаратів, показань до їх застосування та загальних рекомендацій для пацієнтів, що свідчить про належну підготовку спеціалістів у базових питаннях фармацевтичного консультування. Водночас було виявлено низку проблемних аспектів: переоцінка ролі бактеріальної інфекції при гострому бронхіті, недостатні знання щодо лікарських взаємодій, не повне інформування пацієнтів про особливості застосування безрецептурних препаратів та несвоєчасне направлення відвідувача аптеки до лікаря. Такі прогалини підвищують ризик нераціонального використання ліків та негативно позначаються на результатах лікування. У висновках наголошено на доцільності впровадження додаткових навчальних заходів для фармацевтів, зокрема кейсів з*

рольовим моделюванням клінічних ситуацій, що підвищить практичну компетентність, оптимізує фармацевтичну опіку та зменшить випадки необґрунтованого призначення антибіотиків спеціалістами.

The most common symptom that causes patients to seek advice from pharmacies is cough. The etiology of cough is diverse: viral, bacterial, allergic, reflex, due to taking medications (drugs), etc. Cough is the most common reason for consulting a doctor or pharmacist in case of acute bronchitis due to acute respiratory viral infection (ARVI) [1]. Depending on the origin and nature of the cough, pharmacists prescribe various groups of over-the-counter drugs, such as mucolytics, antitussives, expectorants, and others. The misconception about the bacterial nature of any cough stimulates the uncontrolled use of antibiotics, which can be considered irrational pharmacotherapy and contributes to antibiotic resistance [2, 3, 4]. In Ukraine, despite the electronic prescription, a significant part of pharmacists is ready to dispense antibacterial agents without it, which is irrational use [5, 6]. A similar situation has developed in Eastern Europe and the Middle East, where the frequency of dispensing antibiotics without a doctor's prescription is 40-50% [7]. In this sense, the role of the pharmacist as a first line of medical care becomes particularly important.

The pharmacist's rational approach to drug selection is of critical importance, which makes the study of their level of awareness and practical approaches to the recommendation of cough remedies extremely relevant [8, 9].

When providing pharmaceutical care to patients with a cough, the pharmacist must pay close attention to identifying any red-flag symptoms in the patient for timely referral to a physician. The next step involves assessing the patient's needs and gathering information according to a clinical algorithm to determine the type of cough, select an appropriate management strategy, and recommend suitable over-the-counter (OTC) medications for its treatment. Furthermore, an essential component of the consultation is providing the patient with general treatment advice, explaining the specifics of medication use to ensure responsible self-care, and verifying that the information provided has been understood [10, 11, 12].

Taking into account the importance, relevance, frequency of the problem and not always proper implementation of pharmacopeia algorithms for cough by pharmacists, prompted the authors to conduct this questionnaire for a real assessment of the problem.

Research hypothesis. We assume that some pharmacists have gaps in knowledge regarding the causes of cough and the related possible irrational recommendations of over-the-counter drugs.

The aim of the study was to assess pharmacists' level of awareness, their practical approaches, and to identify the main difficulties they face in community pharmacy practice when counseling patients with cough symptoms, additionally to determine their need for additional training or methodological support.

MATERIALS AND METHODS OF RESEARCH

To achieve the goal, a questionnaire was developed to survey pharmacists regarding their practice of recommending over-the-counter drugs for symptomatic treatment of cough, a questionnaire was conducted and the results obtained were systematized.

To implement the main directions and objectives of the study, a social method was used, in particular, a questionnaire-based anonymous voluntary online survey of pharmaceutical workers. We developed a questionnaire via Google – a form for an online survey. The proposed questions are based on an analysis of professional literature and practical recommendations from the Ministry of Health of Ukraine, Europe, and WHO [13, 14, 15, 16].

The target population of the study was pharmacists working in pharmacies (state and private ownership) in the city of Dnipro. Respondents were selected using a nonprobability, purposive sampling method among professional communities and networks that unite pharmaceutical workers. Inclusion criteria were: the presence of a valid pharmacist certificate and consent to participate in the survey. Exclusion criteria: lack of practical experience in a pharmacy. The survey was conducted anonymously and voluntarily (without stimulation or coercion to fill out) within one calendar month. Data collection was carried out by distributing a link to the questionnaire through online platforms (messengers among professional communities and networks that unite pharmaceutical workers).

A single cross-sectional survey was conducted from 24th April 2025 to 30th May 2025. This design was chosen as optimal for assessing the current state of knowledge and practices of pharmacists at the time of the study.

A total of 42 respondents participated in the study.

Study limitations. The small sample size (n=42) and nonprobability purposive sampling of respondents limit the representativeness of the results and the possibility of generalizing the results to a wider population. It should be noted that the sample was formed within the city of Dnipro, which may not reflect regional differences in the practical work of pharmacists. The sample structure by gender and age was uneven, and the data were based on self-reports, which may affect the accuracy of the responses.

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The results should be considered with these limitations in mind.

The questionnaire consists of 20 questions, including both closed (with one or more answer options) and semi-open, as well as questions with a rating scale for self-assessment of knowledge.

The questionnaire contains two content blocks:

• socio-demographic: questions on age, gender, work experience, education and sources of information used in professional activities;

• knowledge assessment block: questions aimed at assessing knowledge of etiology, classification of cough, principles of rational and safe use of drugs for the treatment of cough of various genesis.

The obtained survey results were exported from Google Forms to a Google Sheets table in .csv format.

The study was conducted in accordance with the principles of bioethics set forth in the Declaration of Helsinki "Ethical Principles of Medical Research Involving Humans", "Universal Declaration on Bioethics and Human Rights (UNESCO)", and relevant laws of Ukraine. Participants were guaranteed anonymity and confidentiality. Participation in the study was voluntary, informed consent is considered obtained when filling out the questionnaire. The study protocol was approved by the Biomedical Ethics Commission of the Dnipro State Medical University (No. 27 dated 16th April 2025).

In the study conducted, qualitative data assessment methods were used [28], which do not require the use of deep statistical calculations. Only descriptive statistics methods built into the Google software environment were used to process the responses. To describe quantitative data, frequencies (n) and percentages (%) were used. Visualization of the results was carried out using the graphical method of constructing bar charts in the software environment. The work also used an analytical research method, which involves critical thinking and assessment of the validity of facts [13, 14, 15, 16].

RESULTS AND DISCUSSION

Total of 42 pharmacists of different age groups with different levels of training and education participated in the survey. In the questionnaire provided to the respondents, the questions were divided into 2 content blocks: the first regarding the general characteristics of the respondents, the second – regarding the issues of rational and safe use of medicines for the treatment of cough of various genesis.

Results of the first content block – **General characteristics of the respondents based** on the analysis of the questionnaire responses.

The socio-demographic characteristics of the sample are presented in Table. The age of the respondents ranged from 18 to 60 years, half of the respondents were under 30 years of age. The vast majority were women (93%, n=39). The respondents' work experience was distributed as follows: up to 1 year – 16.7% (n=7), from 1 to 5 years – 40.5% (n=17), from 6 to 10 years – 14.3% (n=6), from 11 to 20 years – 16.7% (n=7), over 20 years – 11.9% (n=5). As for education: the majority 69% (n=29) had higher pharmaceutical education, 23.8% (n=10) – secondary medical education, 14.3% (n=6) – secondary pharmaceutical education; 2.4% (n=1) each – higher medical education, higher biological education and incomplete higher pharmaceutical education.

Socio-demographic characteristics of respondents (n=42)

Indicator	Category	Number (n)	Share (%)
Age	<30 years	21	50.0
	30-45 years	13	31.0
	45-60 years	8	19.0
Gender	Women	39	93.0
	Men	3	7.0
Work experience	Under 1 year	7	16.7
	1-5 years	17	40.5
	6-10 years	6	14.3
	11-20 years	7	16.7
	>20 years	5	11.9

To provide qualified pharmaceutical care, the vast majority (90.5%) of respondents use information from the instructions for medical use; the fewest – (33.3%) turn to official foreign sources of information (Fig. 1).

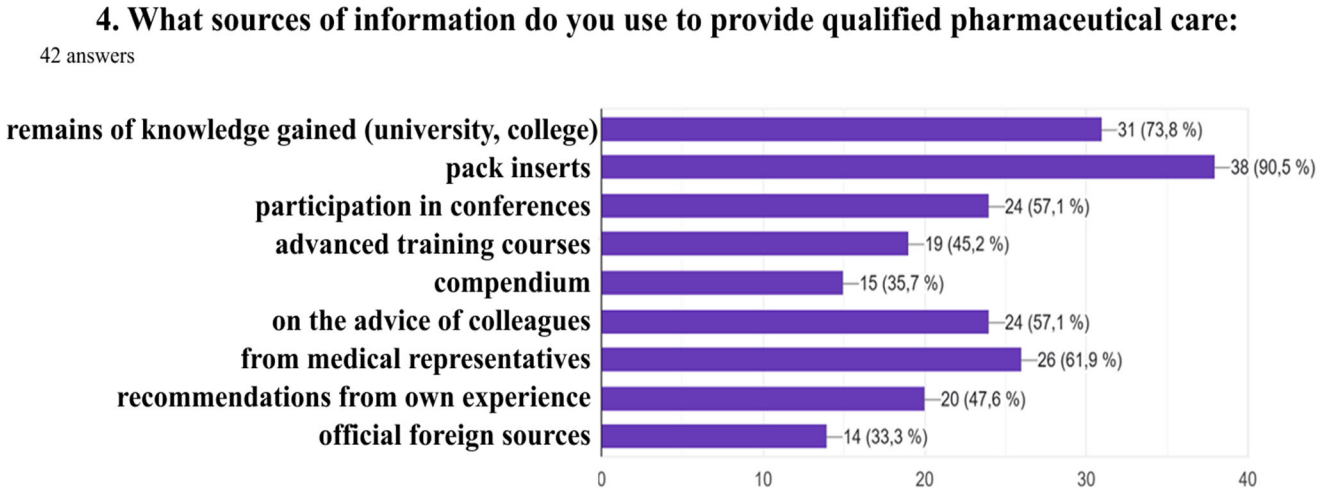

Fig. 1. Sources of information of respondents for providing qualified pharmaceutical care

According to the results of self-assessment of the level of knowledge regarding the use of medicines in the treatment of cough of various genesis, 78.6% consider their knowledge to be good, 16.7% – insufficient, and 4.8% of respondents indicated their knowledge as excellent (Fig. 2).

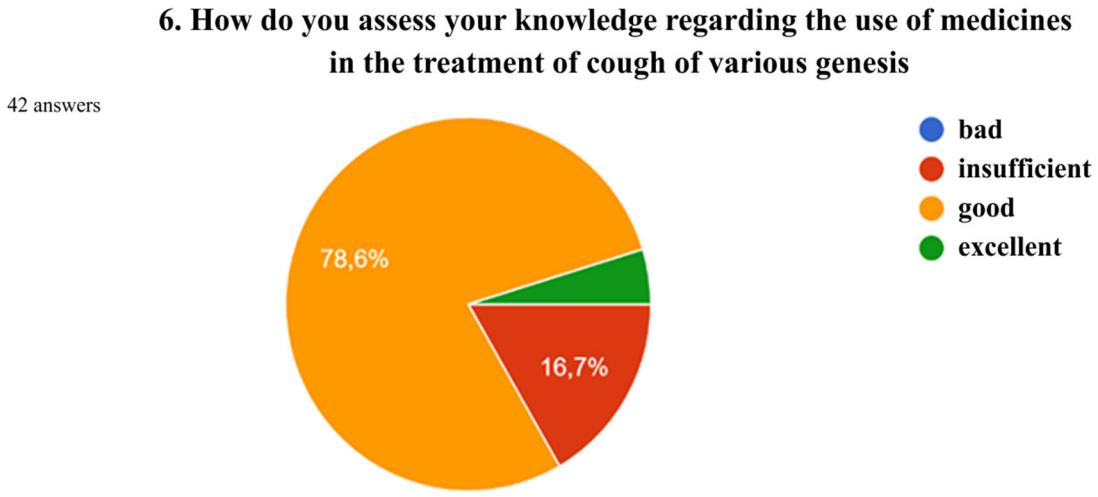

Fig. 2. Self-assessment of the level of knowledge regarding the use of drugs for the treatment of cough of various genesis

Results of the second content block – **Analysis of the results of the pharmacists' questionnaire regarding the rational and safe use of drugs for the treatment of cough of various genesis.**

Answers to the question as for type of cough patients most often seek help from the pharmacy, are presented in Fig. 3.

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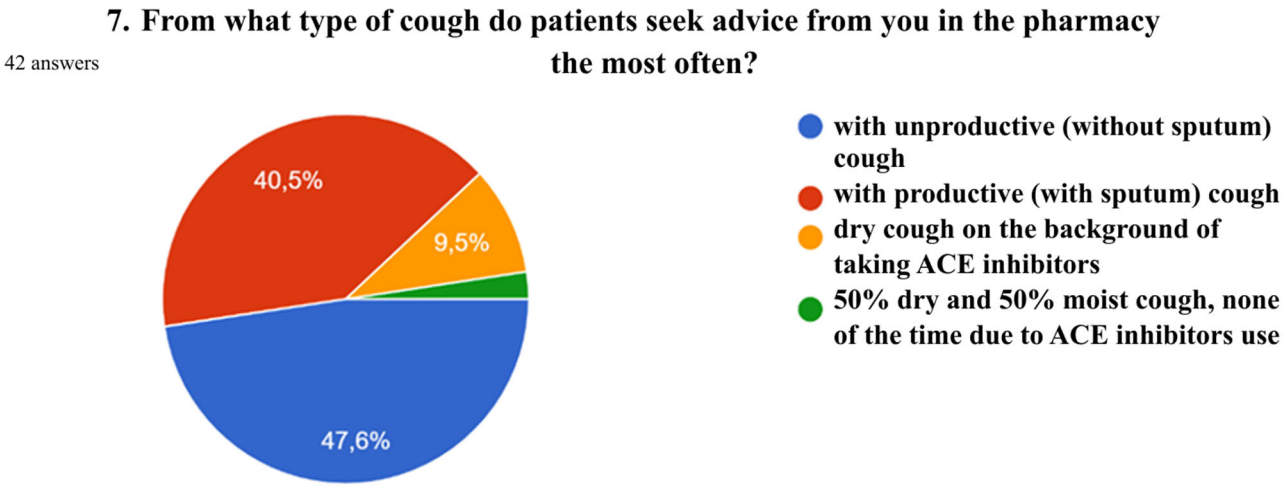

Fig. 3. Distribution of frequency of patients' visits to the pharmacy by type of cough

Regarding the question on the knowledge of the etiological factors of acute bronchitis (several answer options), 81% of respondents answered correctly, noting that these are respiratory viruses and bacteria. 28.6% answered incorrectly, noting that it is the opposite, bacteria and respiratory viruses. Also, 7.1% of respondents answered correctly about the presence of non-infectious causes (smoking, allergens) (Fig. 4).

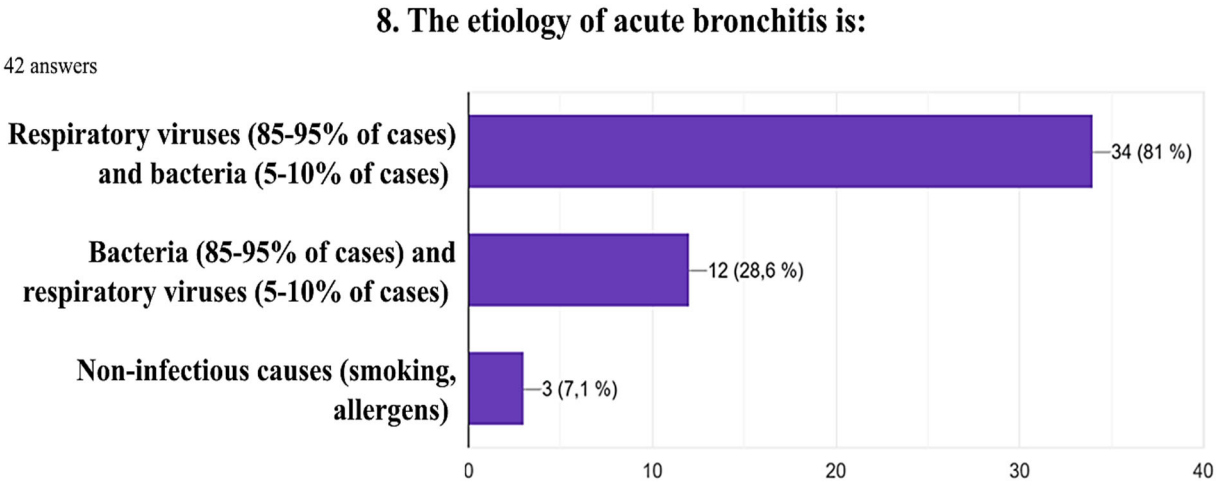

Fig. 4. Distribution of respondents' awareness of the causes of acute bronchitis

When asked about general recommendations for the treatment of acute bronchitis given to patients (several answer options), absolutely all respondents (100%) correctly indicated that if necessary (i.e., if the patient has threatening symptoms), they offer to consult a doctor; 81% of respondents recommend adequate hydration (1.5-2.0 liters of fluid) – that is also correct; 78.6% of respondents correctly advise patients with cough to quit smoking (active and passive); 19% of respondents who recommend anti-viral drugs regardless of the duration of the disease answered incorrectly, and 2.4% of respondents who routinely offer antibiotics (especially to children) for the treatment of cough in acute bronchitis are incorrect (Fig. 5).

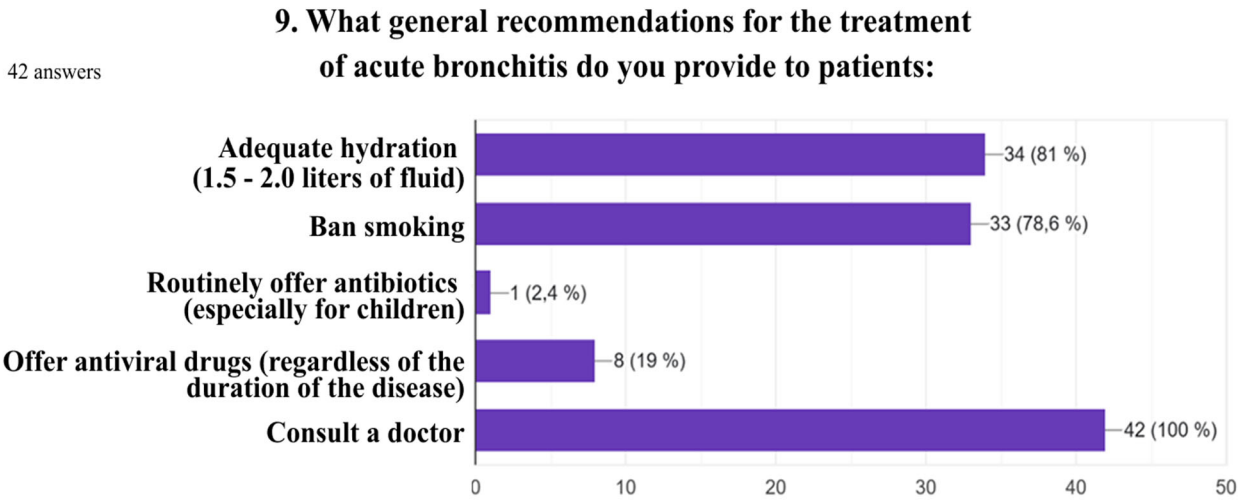

Fig. 5. Distribution of respondents' answers regarding general recommendations for the treatment of acute bronchitis

When asked about the necessary recommendations for a pharmacy visitor who complains of a dry cough that lasts for more than a week, the majority (73.8%) answered correctly – to consult a doctor if necessary, because this is a threatening symptom. Other answers are incorrect (Fig. 6.).

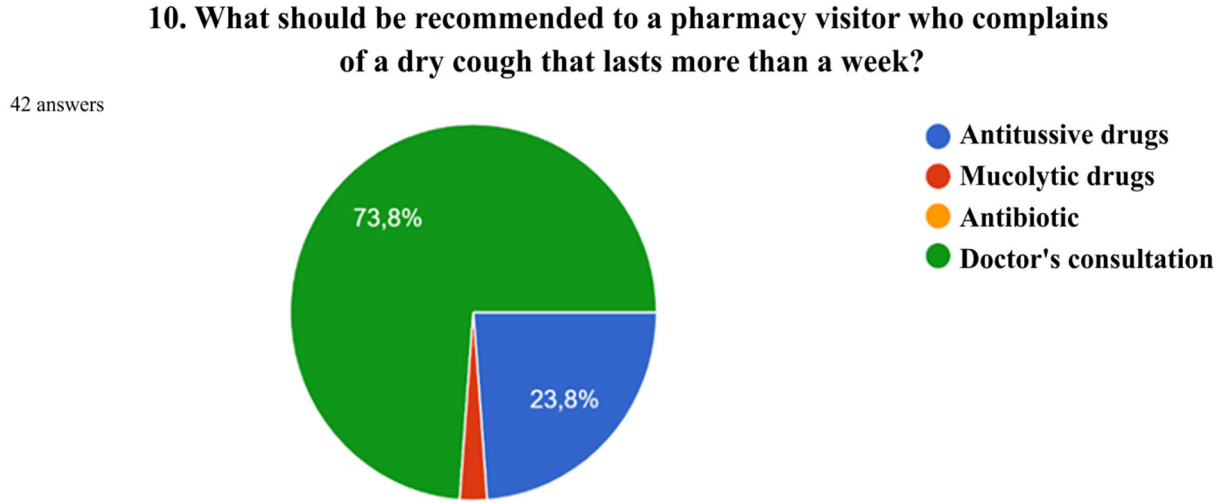

Fig. 6. Distribution of respondents' answers regarding providing recommendations to a pharmacy visitor who complains of a dry cough lasting more than a week

When asked about the most common mistake that patients make in self-treatment of cough during a cold, 52.4% of respondents answered correctly – taking antibacterial drugs; the other answers were incorrect (Fig. 7).

An important point in the pharmaceutical care of patients with cough is to identify the type of cough, tactics and selection of over-the-counter drugs for the treatment of cough. Thus, in case of complaints of cough with difficult sputum discharge and in the absence of threatening symptoms, the recommendation regarding the prescription of mucolytic drugs is correct, this correct answer is given by 73.8% of respondents (Fig. 8).

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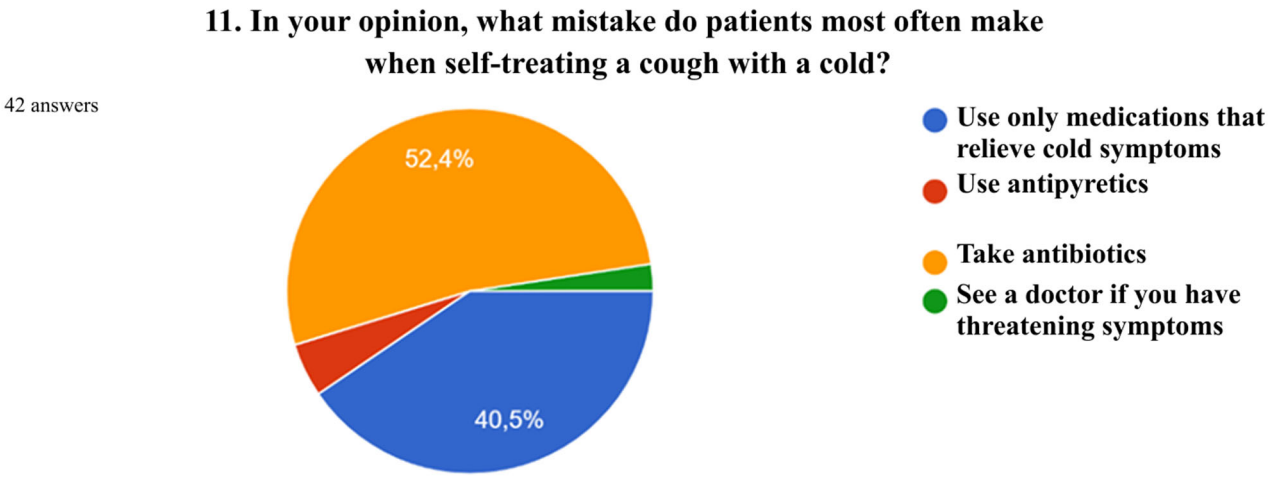

Fig. 7. Distribution of respondents' answers regarding the most common mistake made by patients in self-treatment of cough during a cold

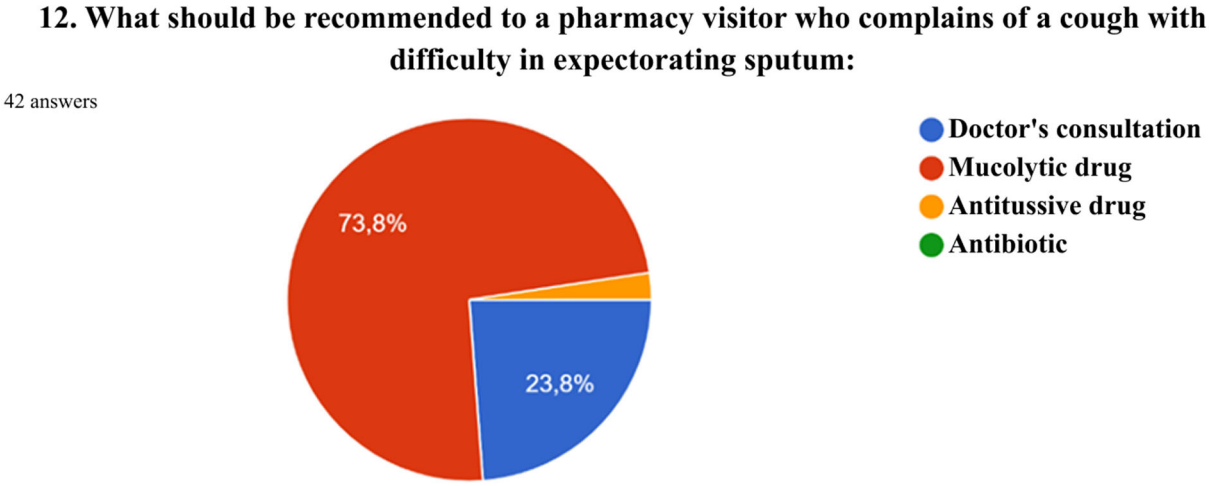

Fig. 8. Distribution of respondents' answers regarding recommendations to a pharmacy visitor who complains of cough with difficulty in expectorating sputum

The following question regarding the pharmacological activity of a herbal preparation containing plantain, marshmallow root, ivy leaves, and thyme herb, the vast majority of respondents (81%) answered correctly – expectorant; 19% of respondents gave incorrect answer – antitussive (Fig. 9).

Answering the question with which pharmacological group of drugs it is forbidden to combine expectorants with, several answer options were offered: 88.1% of respondents answered correctly – with antitussive drugs (because they inhibit the cough reflex and contribute to the accumulation of sputum); 23.8% also answered correctly – with antihistamines of the first generation (due to thickening of sputum); 16.7% – with diuretics and 7.1% – with laxatives (because these groups of drugs dehydrate the patient's body). 14.3% of respondents answered incorrectly – with decongestants; and 4.8% – with antibacterial drugs (Fig. 10).

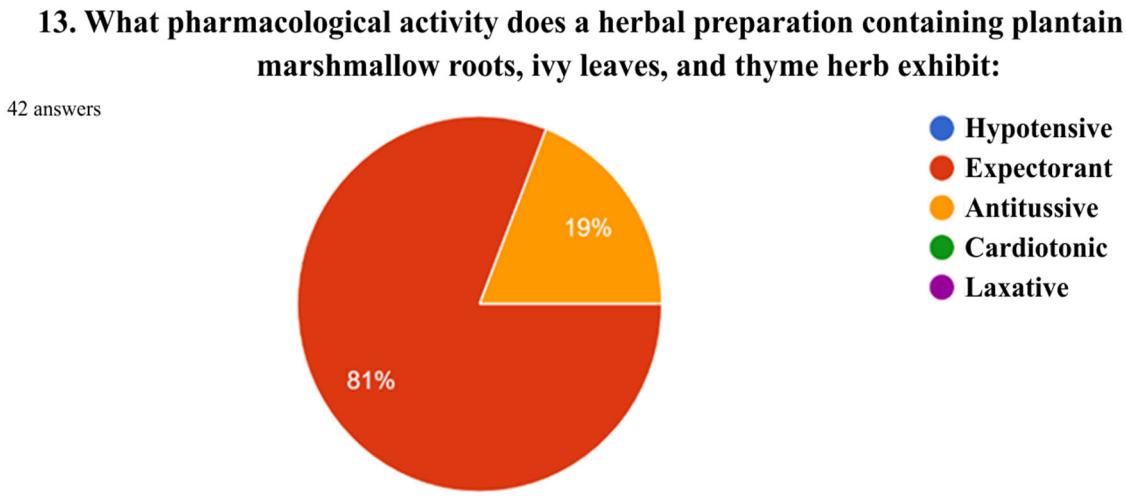

Fig. 9. Distribution of respondents' answers regarding what pharmacological activity is exhibited by a herbal preparation containing plantain leaves, marshmallow roots, ivy leaves, thyme grass

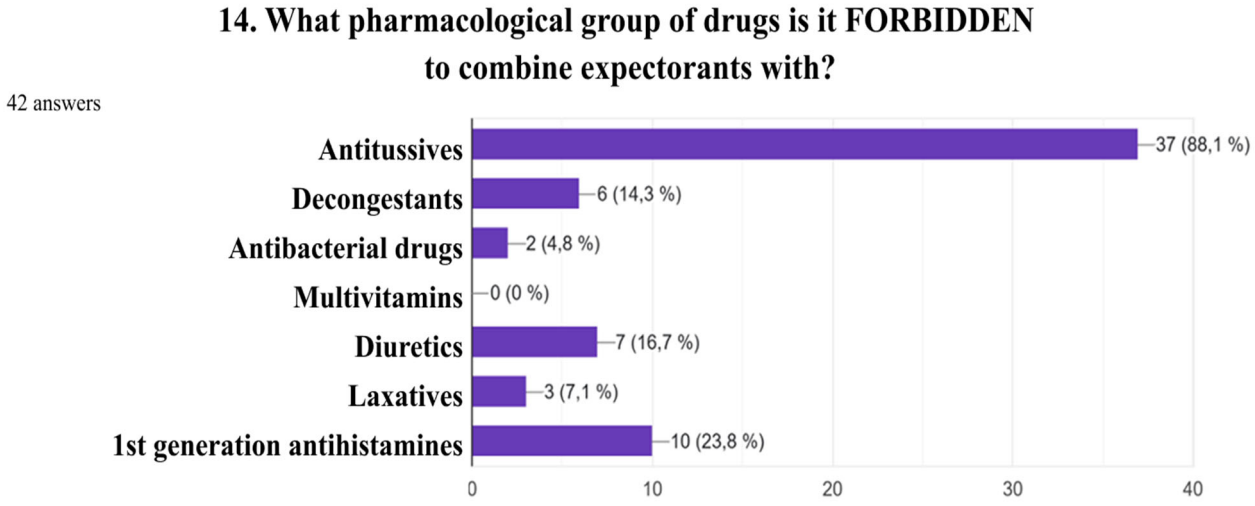

Fig. 10. Distribution of respondents' answers regarding what pharmacological group of drugs it is FORBIDDEN to combine expectorants with

Answering the question which drug closest in action can replace Acetylcysteine (belongs to the group of mucolytics) if it is not available in the pharmacy, the vast majority (90.5%) of respondents answered correctly – Ambroxol (also a modern mucolytic); 7.1% of respondents gave wrong answer – Glaucin (group of central non-narcotic antitussives) and 2.4% – Salbutamol (broncholytic) (Fig. 11).

When asked what mucolytic shows synergy with the antibiotic amoxicillin, the majority (47.6%) of respondents answered correctly – with ambroxol (Fig. 12).

In the next question, we suggest choosing a mucolytic – an antidote in case of paracetamol overdose, the vast majority of 83.3% of respondents answered correctly – it is acetylcysteine; the other answers were incorrect (Fig. 13.).

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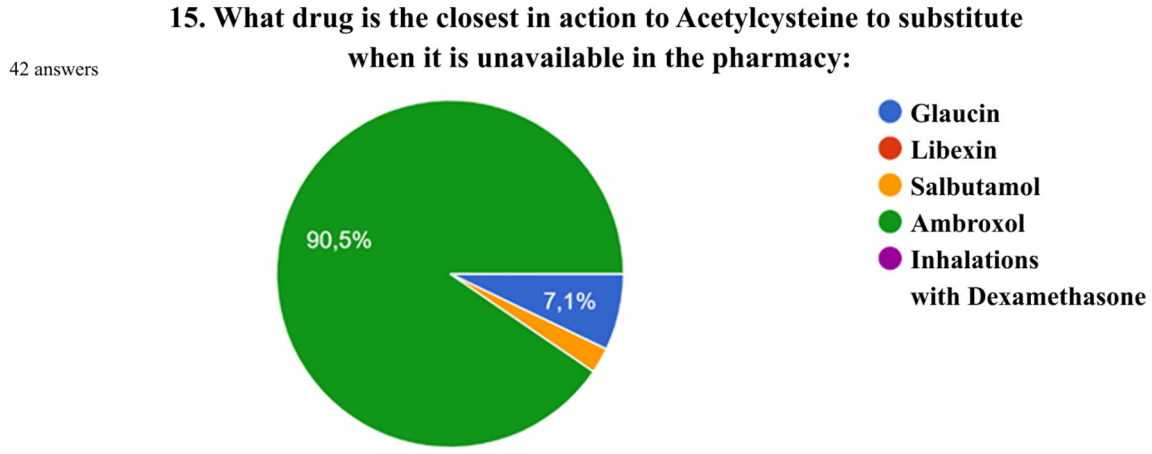

Fig. 11. Distribution of respondents' answers regarding what drug is closest in action to Acetylcysteine, when it is unavailable in pharmacies

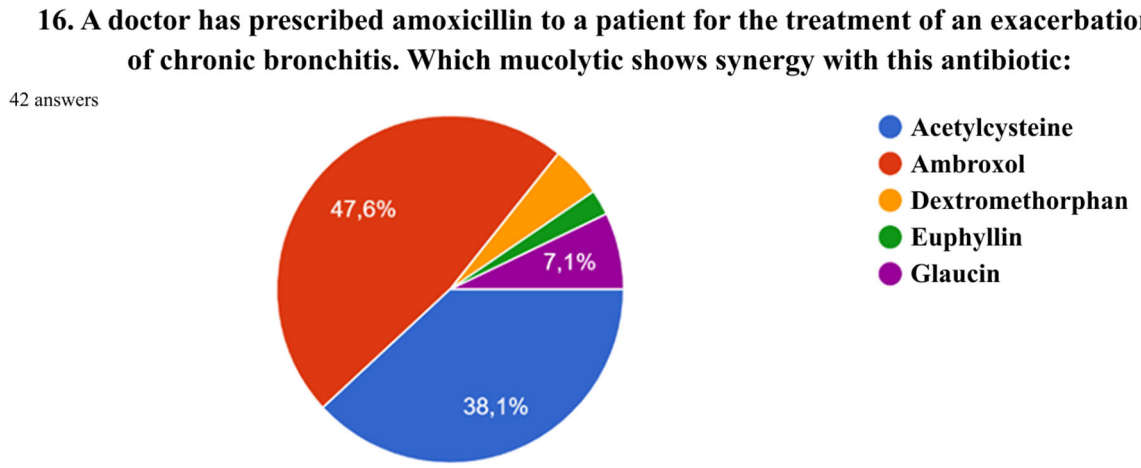

Fig. 12. Distribution of respondents' answers regarding what mucolytic shows synergy with the antibiotic amoxicillin

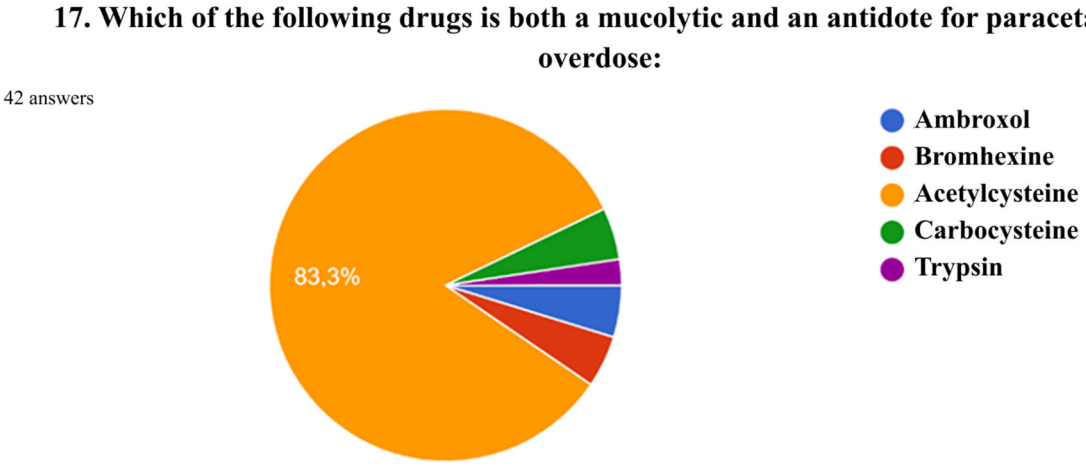

Fig. 13. Distribution of respondents' answers regarding which drug is both a mucolytic and an antidote in case of paracetamol overdose

Answering the question what mucolytic to recommend to a patient who smokes and suffers from chronic bronchitis, and which would help to improve sputum discharge and surfactant formation, the majority of respondents (59.5%) answered correctly – ambroxol (because it has the ability to increase the surfactant content in the lungs); other answers were incorrect (Fig. 14.).

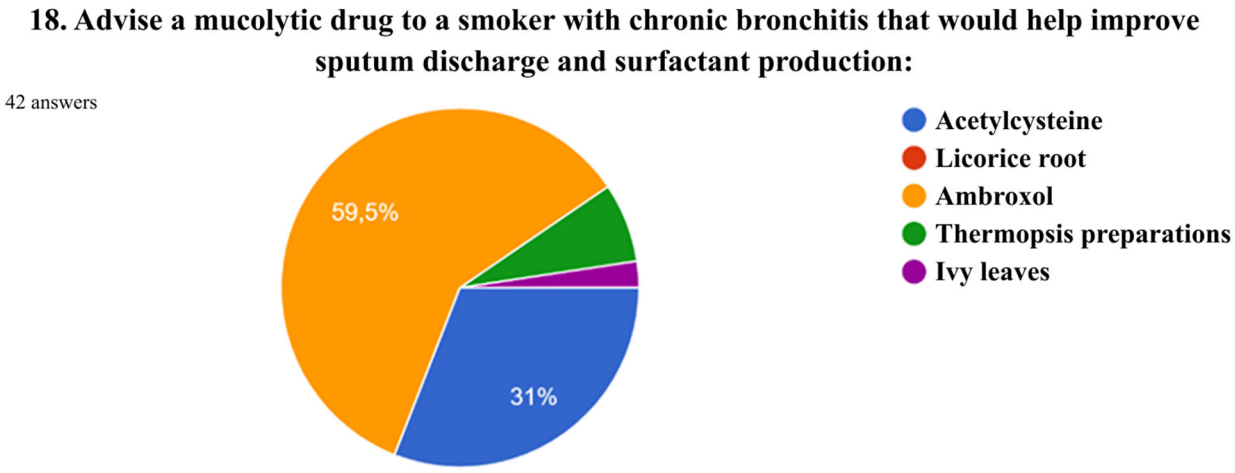

Fig. 14. Distribution of respondents' answers to the question what mucolytic to recommend to a patient who smokes and suffers from chronic bronchitis, and which would help to improve sputum discharge and surfactant formation

Answering the question as for typical side effect of glaucine hydrochloride, which a patient with chronic bronchitis should be warned about, 47.6% of respondents answered correctly: decreased blood pressure (this warning is noted in the package insert); other answers were incorrect (Fig. 15).

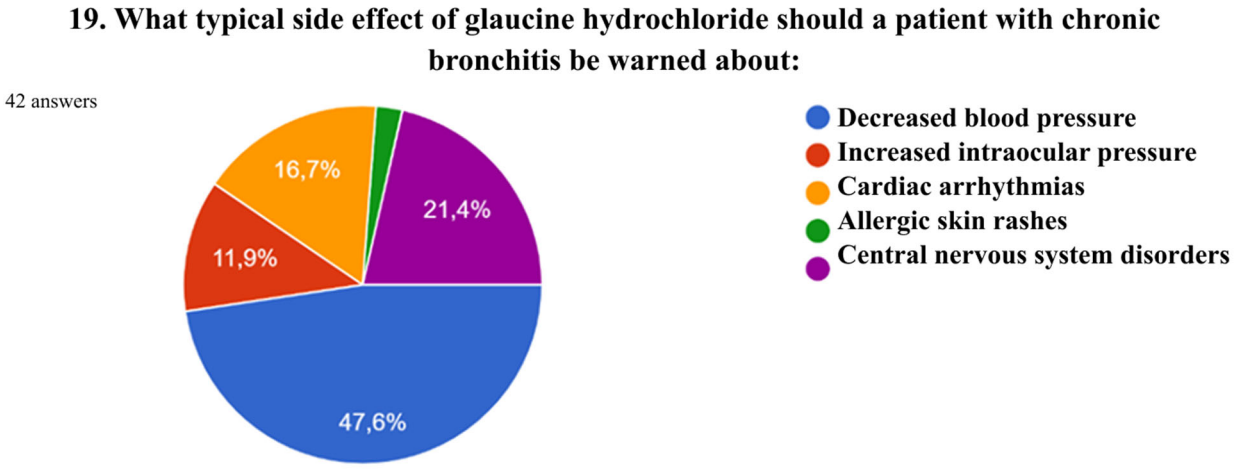

Fig. 15. Distribution of respondents' answers to the question as for a typical side effect of glaucine hydrochloride that a patient with chronic bronchitis should be warned about

Answering the question what should be recommended to a pharmacy visitor who complains of a dry cough developed after prescribing lisinopril, the vast majority of respondents (85.7%) answered correctly - to refer the visitor to a doctor for correction of antihypertensive therapy (lisinopril belongs to the group of ACE inhibitors a side effect in the form of a dry cough due to an increase in the level of bradykinin); other answers were incorrect (Fig. 16).

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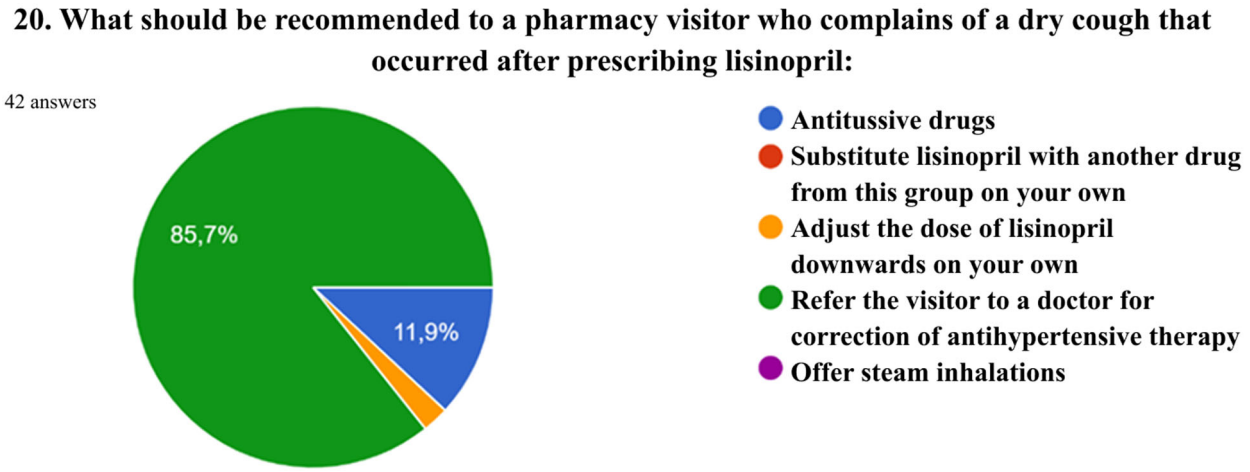

Fig. 16. Distribution of respondents' answers to the question what should be recommended to a pharmacy visitor who complains of a dry cough developed after prescribing lisinopril

The results of the study allow a comprehensive assessment of the level of knowledge and practical readiness of pharmacists to consult patients with cough in the context of modern requirements of pharmaceutical care. The results of the questionnaire identified problematic aspects in the pharmaceutical care of patients with cough and possible ways to solve them. Analysis of the educational level of the study participants showed the dominance of specialists with higher pharmaceutical education, however, a significant proportion of pharmacists with secondary medical or pharmaceutical training emphasizes the need for systematic advanced training. Similar results are consistent with the data of Ukrainian and foreign studies, which prove that continuous professional education is a key factor in ensuring uniform standards of pharmaceutical care [17, 18, 19, 20]. This is especially relevant in the field of respiratory symptoms, where differential diagnosis of cough is an important element of preventing complications.

Analysis of the results of the pharmacists' questionnaire on the rational and safe use of medicines for the treatment of cough of various genesis showed that the majority of specialists understand the causes of cough as a symptom, tactics of selecting over-the-counter medicines depending on the types of cough; the indications for the use of the main groups of medicines for the treatment of cough of various genesis, drugs of these groups and their main properties (they correctly recommended mucolytics for difficult sputum discharge, chose ambroxol as the most effective remedy for patients who smoke, and correctly determined acetylcysteine as an antidote for paracetamol overdose). Also, the majority know the general recommendations for the management of patients with cough, the tactics of identifying some threatening symptoms, which indicates awareness of the limits of own competence [21,22], but it is still necessary to deepen their knowledge in certain aspects. The results of the self-assessment of knowledge demonstrated a high level of confidence of pharmacists, but this indicator does not always correlate with objective competence. Thus, a third of respondents demonstrated misconceptions about the etiology of acute bronchitis, overestimating the role of bacterial infection, which can lead to irrational recommendations and unjustified use of antibiotics. This finding is consistent with WHO data from 2022, which emphasizes the global problem of antibiotic resistance, in particular due to incorrect advice in pharmacy practice.

Also, specialists faced some difficulties with: drug interactions when used simultaneously; insufficient knowledge in providing proper information about drugs for responsible self-medication (difficulties in identifying side effects of antitussives); detection of threatening symptoms and timely referral to a doctor. A third of respondents recommended clinically unfounded approaches, for example, taking antiviral drugs regardless of the duration of the disease (this is incorrect, as it has been proven that antiviral therapy is important to start within the first 48 hours and in the case of a severe form of acute bronchitis (for example, in influenza type A or B) to increase effectiveness and reduce the duration of symptoms). One specialist suggested that the routine prescription of antibiotics (especially for children) for the treatment of cough in acute bronchitis with acute respiratory viral infection is a misconception (the only exception may be suspicion of pertussis (Bordetella pertussis) or parapertussis infection (parapertussis) in children,

when the prescription of macrolides is justified, but, in any case, antibiotics are considered prescription drugs, so to determine the need for their prescription, it is necessary to refer the patient to a doctor).

Similar results are confirmed by data from studies from Finland and India, where gaps in pharmacists' knowledge regarding rational pharmacotherapy of cough are also recorded [23, 24]. An important conclusion is that although most pharmacists demonstrate a high level of basic knowledge, their competence in issues of pharmacological interactions and rational use of combined drugs needs to be improved. One way to address the problematic aspects of pharmaceutical care for patients with cough is to develop and use additional cases in the educational program for pharmacists, for example, role-modeling of situational cases in pharmaceutical care for patients with cough in a pharmacy, which allow working out practical counseling skills in conditions close to real-life and can help improve the quality of pharmaceutical care when using non-prescription drugs for the symptomatic treatment of common health disorders. Similar educational approaches have proven their effectiveness in the EU and North America, where they contribute to improving the quality of pharmaceutical care and reducing the frequency of clinical errors [25, 26, 27].

Therefore, we developed a questionnaire and conducted a survey of pharmacists, then analyzed the responses of the respondents, and taking into account the identified problematic aspects, proposed recommendations for pharmacists, which are based on the principles of proper pharmaceutical care for the rational and safe use of drugs for the treatment of cough of various genesis. The results of our study are consistent with international trends and indicate the need to strengthen educational activities for pharmacists, especially regarding the rational use of antibiotics, pharmacological interactions and clinically justified differentiation of cough.

CONCLUSIONS

Based on the results of the survey among pharmacists, the following conclusions were made:

1. The vast majority of respondents demonstrated a sufficient level of awareness of the main causes and types of cough. In particular, 81% correctly identified the etiological factors of cough in acute bronchitis, however, some gaps were identified that require additional study.
2. Most often, pharmacists recommend mucolytic and expectorant drugs for cough with difficult sputum discharge or for productive cough, and antitussive drugs for unproductive cough. At the same time, the majority of respondents (73.8%) adhere to the rules of rational pharmacotherapy, referring patients to a doctor in the presence of threatening symptoms.
3. The level of awareness among specialists about the inadmissibility of the simultaneous use of expectorants and antitussives is high (88.1%), however, knowledge about other undesirable combinations of expectorants (in particular, with first-generation antihistamines, diuretics, laxatives) remains insufficient (less than 20% of respondents answered correctly).
4. The majority (about 80%) of pharmacists adhere to the principles of rational pharmacotherapy: they correctly determine the need to refer the patient to a doctor, provide general recommendations regarding non-drug treatment of cough, which indicates a generally high level of professional training, however, 19% of specialists suggest unfounded prescription of antiviral drugs and 2.4% - antibiotics, that is, they demonstrate misconceptions about the appropriateness of using antibiotics and antiviral drugs for cough in acute bronchitis, which indicates the need to strengthen educational activities in the field of rational use of medicines.
5. When self-assessing knowledge regarding the use of medicines for the treatment of cough of various genesis, about 17% of specialists noted their knowledge as insufficient in this matter, also the vast majority (90.5%) of respondents, as a source of information for providing qualified pharmaceutical care, use the instructions for the drug, therefore, the survey revealed the need for additional training and methodological support (regular educational events, advanced training courses, case study and trainings that will contribute to the formation of practical skills). Thus, the results of our study confirm that the majority of pharmacists have a sufficient level of knowledge and skills to provide qualified pharmaceutical care to patients with cough of various genesis, however, there is a need for systematic updating of knowledge to minimize the risk of pharmacological errors.

Practical significance. The results of the study can be used to improve the effectiveness of pharmaceutical counseling, meet the needs for training or methodological support for pharmacists, and implement practical recommendations for optimizing pharmaceutical support for patients (algorithms for selecting cough medications in pharmacy practice).

Prospects for further research. The results obtained are the basis for further quantitative research aimed at expanding the geography of the survey using probabilistic selection methods (stratified sampling) to ensure external validity, as well as the use of qualitative methods (focus groups or in-depth interviews) with different categories of pharmacists (with long and short experience), which

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will help in developing practical recommendations (case studies) for optimizing pharmaceutical support for patients.

Contributors:

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Sokolova K.V. – resources, writing – reviewing and editing;

Sliesarchuk V.Yu. – resources, writing – reviewing and editing;

Potapova T.M. – resources, visualization, management, project administration.

Funding. This research received no external funding.

Conflict of interests. The authors declare no conflict of interest.

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Стаття надійшла до редакції 10.08.2025;
затверджена до публікації 08.11.2025

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