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QUALIFICATION WORK

on the topic: « **THE ROLE OF INTERNET RESOURCES IN THE DISTRIBUTION OF PHARMACEUTICAL INFORMATION»**

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specialty 226 Pharmacy, industrial pharmacy
educational and professional program Pharmacy
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ANNOTATION

The qualification work examines the role of Internet resources in the dissemination of pharmaceutical information. It considers modern digital platforms, in particular social networks and telemedicine, as tools for communication between specialists and consumers of medicinal products.

The qualification work is set out on 50 pages long and consists of an introduction, three chapters, conclusions, and a list of references. The list of references contains 32 items. The thesis is illustrated with four tables and nine figures.

Keywords: Internet resources, pharmaceutical information, telemedicine, social networks, digital technologies, communication.

АНОТАЦІЯ

У кваліфікаційній роботі проведено дослідження ролі інтернет-ресурсів у розповсюдженні фармацевтичної інформації. Розглянуто сучасні цифрові платформи, зокрема соціальні мережі та телемедицину, як інструменти комунікації між фахівцями та споживачами лікарських засобів.

Кваліфікаційна робота викладена на 50 сторінках та складається зі вступу, 3 розділів, висновків та списку використаних джерел літератури. Список використаної літератури налічує 32 позиції. Робота ілюстрована 4 таблицями та 9 рисунками.

Ключові слова: Інтернет-ресурси, фармацевтична інформація, телемедицина, соціальні мережі, цифрові технології, комунікація.

CONTENT

INTRODUCTION

Relevance of a subject. In today's environment, online resources have become key channels for disseminating medical and pharmaceutical information, providing prompt access to scientific data, clinical guidelines, and instructions for medicines for both healthcare professionals and the public. This trend has become especially important during the COVID-19 pandemic, when remote forms of medical care, including telemedicine, have become a necessity. At the same time, the risk of disseminating inaccurate or distorted information is growing, which can negatively affect the choice of therapy, adherence to treatment regimens, and overall patient safety.

Information has become one of the most important parts of a managerial and strategic resource, as important as human, financial, and material resources. Its production and consumption form the basis for the efficiency of functioning, as well as for the development of various spheres of public life, and especially the economy. In turn, the above means that sources of information become available in any part of the world, including the emergence of new information that is generated, becoming the property of the entire human community. Nowadays, the pharmaceutical sector is actively saturated with new medicines from various manufacturers and suppliers, the range of generic medicines is increasing, and the quality of medical care largely depends on the objectivity and effectiveness of pharmaceutical information.

The purpose and tasks of the research. The aim of the research is to study the role of Internet resources in the dissemination of pharmaceutical information. In order to achieve the above goal it is necessary to solve the following tasks:

- Study the literature sources relevant to the topic of the qualification work.
- Analyze the structure and consumption of pharmaceutical information:
- Investigate the role of Internet resources in the dissemination of pharmaceutical information

- To conduct a comparative analysis of the use of Internet resources for the dissemination of pharmaceutical information
- To conduct a comparative analysis of ways to obtain information

Objects of the study: Internet resources used for the dissemination of pharmaceutical information (official websites of government agencies, pharmaceutical companies, medical portals, social networks, etc.), consumer behavior in terms of perception, use and dissemination of pharmaceutical information online.

Subject of the study: The information component and content of websites containing pharmaceutical information, the effectiveness of dissemination of pharmaceutical information through Internet resources.

Methods of researches: System and content analysis (study and processing of publications); methods of logical analysis, abstract and descriptive modeling and generalization (formulation of conclusions and mathematical analysis; graphical method (visual, schematic presentation of the study results) were used.

Scientific novelty and practical significance of the obtained results. The results of the study can be used to improve the effectiveness of communication between pharmaceutical professionals and consumers through online resources. Also, the findings of the study may be useful for healthcare institutions and pharmacists in the process of organizing patient information and implementing digital communication strategies.

The results of the study were approved at the XXXI International Scientifical and Practical Conference of Young Scientists and Students «Topical issues of new medicines development», that was held on 23-25 April 2025 in Kharkiv.

Structure and volume. The qualification work is set out on 50 pages long and consists of an introduction, three chapters, conclusions, and a list of references. The list of references contains 32 items. The thesis is illustrated with four tables and nine figures.

CHAPTER I. THEORETICAL ASPECTS OF PHARMACEUTICAL INFORMATION (LITERATURE REVIEW)

1.1 General concept of information, types of information.

Information is any information, facts, data or knowledge that is transmitted or received by people through various means of communication [20]. The primary meaning of the term ‘information’ is messages transmitted by people in words, in writing or in any other way (with the help of technical means or symbols). Since the middle of the 20th century, the word ‘information’ has become a general scientific concept that includes the exchange of messages between people, involves the exchange of information between a person and a machine or a machine and a machine; it is also possible to transfer features at the cellular level, from cell to cell or, as in the case of genetic information, from organism to organism[8].

To be stored or exchanged, it is necessary to acquire a form of information representation, for example, information can be presented in various forms: text, numerical, graphic, sound, video, etc [16].

It is generally accepted to distinguish the following types of information:

Factual information: this is specific data or facts that can be verified and confirmed, usually it is primary information about an event, process, existing state, and is usually the simplest type of information.

Analytical information: is the interpretation and analysis of factual information in order to understand its meaning and impact, most often used in the characterisation of the activities of enterprises and organisations.

News: information about current events and events of general interest to the public. This is a timely information message that covers relevant and important information for society, which concerns certain areas of life of a community as a whole or its separate groups. In journalism, news is a distinct information genre characterised by a concise presentation of the most important information about a recent event.

Educational (scientific) information: knowledge that is transmitted for the education and development of people, it is data, information, knowledge that is acquired and accumulated in the course of the development of science and in the practical activities of people.

Advertising information: information that is intended to promote products or services, it is a message about a person or product that is disseminated in any form and manner to increase awareness and interest of advertising consumers [16].

Information is also distinguished by the way it is perceived, the form of presentation, the purpose, the source and the degree of accessibility. (Fig. 1.1)

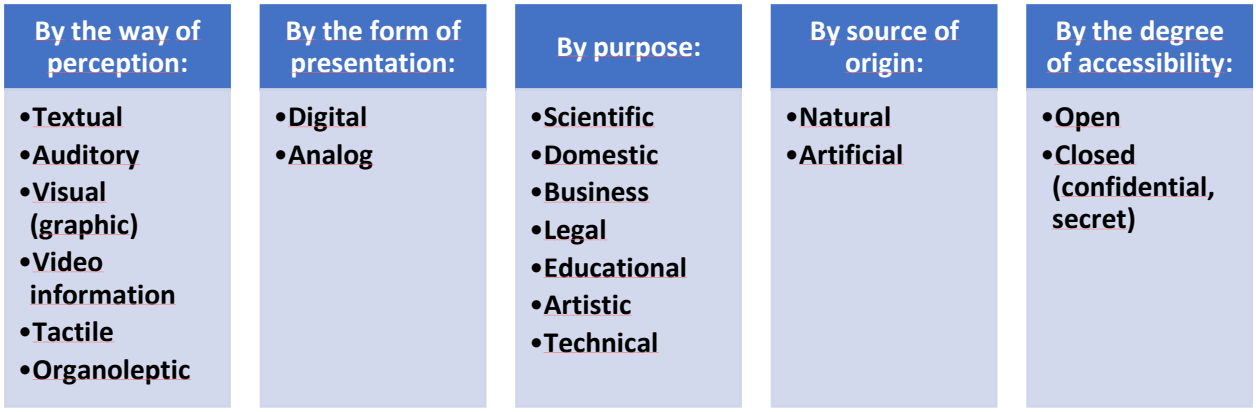

Fig. 1.1 The most common types of information

Among the various types of information, we can distinguish pharmaceutical information, which is a specialised type of information related to medicines, medical devices, processes of their manufacture, storage, use, interaction, as well as issues of pharmacotherapy, pharmacology, pharmacovigilance, logistics and legislative regulation.

It is generally accepted to define pharmaceutical information as statistical, regulatory, economic and pharmacoeconomic, informational, methodological, managerial messages or data on the creation, use, circulation of medicinal products or medical or pharmaceutical goods that are important in terms of pharmaceutical

activities of proper quality [14]. The most general part of pharmaceutical information is information that characterises the pharmaceutical side of the circulation of medicinal products (pharmacological, pharmacotherapeutic, chemical and other properties) [24].

An essential element of any information process is information carriers, since it is through carriers that information can exist, be transmitted or stored in time. Usually, these are physical or electronic media on which information is stored, transmitted or reproduced A storage medium is a material object or electronic system used to capture, store and transmit data in a certain form (text, sound, graphic, digital, etc.) [20].

Media allow information to be stored for a long time, even after physical or digital processing. They enable the exchange of knowledge between people, organisations and generations, and allow for instant access to large amounts of information (e.g. via smartphone or computer) [16]. Media can be used to protect data (e.g. digitally encrypted or stored in a paper vault). Media provide authenticity and documentation, for example, printed documents can be legally binding and digital documents can be signed with an electronic signature.

Thus, information carriers are the basis for storing, systematising, transferring and using knowledge in all spheres of life - science, medicine, education, pharmacy, etc. The choice of the right type of media determines the efficiency of working with information, its accessibility, reliability and security.

Mainly, there are paper and electronic media.

Paper media is a traditional way of storing and transmitting information in the form of text, graphics, tables or images on physical materials (paper, cardboard, etc.). In pharmacy, they remain an important source of official, regulatory and educational information, despite the development of digital technologies [20]. For example:

Instructions for medical use of medicinal products, which are included in the package and contain complete information about the drug: indications, dosage, contraindications, side effects, etc. Pharmacopoeias, Official printed collections of

quality standards for medicinal products; Medical forms and reference books containing standardised data on medicinal products and treatment protocols. Journals and scientific publications that publish the results of clinical trials, drug reviews, new therapies. Educational literature: Textbooks, manuals for medical and pharmaceutical students. Pharmacy documentation, e.g. logbooks (e.g. narcotic drugs), quality certificates, invoices, prescription forms. Posters, leaflets, brochures that are educational materials for patients, providing information on disease prevention, vaccination, etc.

Paper-based pharmaceutical information is a reliable, convenient and affordable way of transmitting medical information, which remains relevant especially for patients and professionals in situations where electronic resources are not available or less effective.

Electronic media are means of storing, transmitting and processing information in digital (electronic) form. In pharmacy and medicine, such media play a key role in providing quick access to up-to-date knowledge, simplifying workflow and implementing electronic services [33]. For example:

Computer memory, Hard Disk Drives (HDDs), Solid State Drives (SSDs), Random Access Memory (RAM). Portable storage devices: USB sticks, memory cards (SD, microSD), optical discs (CD, DVD). Cloud storage: Google Drive, Dropbox, OneDrive provide access from any device with the Internet. Electronic medical databases: Electronic prescriptions, patient registers, drug databases. Mobile devices: Smartphones, tablets, e-readers for reading reference books, instructions, recommendations. Servers and databases used in hospitals, pharmacies, and healthcare facilities to store patient records, logistics of medicines, etc. [9]. Medical information systems (MIS) - Special software systems that integrate data from patients, doctors, pharmacies, laboratories.

Electronic media of pharmaceutical information is a modern, fast, convenient and flexible tool that significantly increases the efficiency of access to medical knowledge for both professionals and patients.

Television and radio are also effective tools for disseminating pharmaceutical information due to their mass appeal, speed and audience trust. However, to achieve the best effect, they should be used in combination with other sources, such as the Internet, printed materials and personal consultations [11]. In summary, although television and radio are powerful channels for disseminating pharmaceutical information, their use requires caution, control of the accuracy of the content and supplementation with other sources, such as personal consultations, Internet resources, printed materials, etc.

Television is a powerful communication channel that combines image and sound, which makes it easy and effective to convey information to a wide audience [5]. TV programmes, news, social advertising and special medical programmes provide information about medicines, advice on their proper use, warnings about the dangers of self-medication, and explanations of preventive measures and vaccination campaigns. Advertising of OTC medicinal products is also widespread on television and is regulated by the current legislation.

Radio, as an audio medium, is convenient to use in everyday life. Short consultations with doctors and pharmacists, prevention messages, vaccination schedules and other important health news can be heard through radio programmes. Radio also serves as a means of information in remote or hard-to-reach areas where other media are less accessible.

1.2 Characteristics of data storage media

The following advantages and disadvantages of the above-mentioned storage media can be identified (tabl. 1.1)

Paper media. Advantages:

Long-term storage: Information on paper does not depend on electronic devices, the Internet or electricity. It can be stored for years without changes in content.

Ease of use: Brochures, manuals, leaflets are easy to read anytime, anywhere - they don't need to be switched on or connected to a network.

Table 1.1

Advantages and disadvantages of these storage media

Paper media	Electronic media	Television and radio
1	2	3
Advantages		
Long-term storage	Quick access to information	Wide audience coverage
Ease of use	Relevance and real-time updates	Prompt delivery
High reliability	Multimedia	Easy and accessible perception
No technical dependence	Saves space and resources	Influence on public behavior
Patient-friendly	Easy to update data	Variety of formats
Suitable for audiences without access to digital technology	24/7 accessibility from anywhere	High level of trust
Disadvantages		
Limited access	Technology dependence	Limited amount of information
High probability of physical damage	Data security issues	Lack of feedback
Limited storage and archiving capability	Difficulty in updating and maintaining	Possibility of dissemination of unverified or advertising information
Difficulty updating information	Ensuring accuracy	Focus on mass audience

Contin.table 1.1

1	2	3
Costs of production and storage	Accessibility issues for certain groups	Influence of commercial interests
Limited search and analysis capability	Costs of technical support and infrastructure	Insufficient depth of presentation
Risk of loss or error	Inability to be physically stored	Passive perception
Environmental issues		

High reliability: Officially printed documents (instructions for medicinal products, pharmacopoeias, registers) are usually subject to review and approval, so they are a reliable source of information.

Convenience for patients: The patient can receive the instructions for use of the drug together with the packaging, which allows them to review the dosage, method of administration, contraindications, etc. at any time.

No technical dependence: Paper-based media do not require special equipment to read, unlike electronic formats that require access to gadgets or the Internet.

Possibility of visual accentuation: Colour highlighting, bullet points, note boxes - all of these make paper information easy to use and remember individually.

Suitable for audiences without access to digital technology: The elderly, rural populations or those with low digital literacy levels can still receive the pharmaceutical information they need through printed materials.

Paper media. Disadvantages:

Limited access: Access to paper-based information requires physical proximity to the medium, which makes it difficult to access data when remote access is needed or when a document is missing.

High probability of physical damage: Paper media can be damaged by water, fire, and physical wear and tear, resulting in the loss of important information.

Limited storage and archiving capabilities: Paper documents take up a lot of storage space, and over time, their number can become difficult to manage. Storing large amounts of information requires significant archiving resources.

Difficulty updating information: Making changes to paper-based records requires rewriting or correcting documents, which takes time and can lead to errors or inaccuracies. Updating such data can be difficult and inefficient.

Production and storage costs: Paper documents require costs for printing, paper, files and storage cabinets. Over time, this can become a costly process for pharmaceutical companies or healthcare facilities.

Limited searchability and analysis: Paper-based records do not allow for quick searching of information or sophisticated data analysis as well as electronic records. Searching for information among a large number of documents takes a lot of time.

Risk of loss or errors: Paper documents are easily lost, misplaced, or misinterpreted due to human error, affecting the accuracy and reliability of the information.

Environmental issues: The use of paper leads to significant consumption of resources, such as wood, and impacts the environment through paper consumption and the need to dispose of used documents.

Electronic media . Advantages:

Quick access to large amounts of information: Electronic sources allow you to quickly find up-to-date pharmaceutical information through searching - without having to turn pages as you would with paper-based sources.

Real-time relevance and updates: Pharmaceutical reference books, databases and electronic forms are updated regularly, providing users with the most up-to-date information on drugs, dosages, interactions, etc.

Multimedia: Electronic platforms can present information not only in the form of text, but also images, videos, and infographics, which makes it easier to understand, especially for patients.

Saving space and resources: There is no need to store a large amount of printed literature - all information is contained in digital form on a single medium (flash drive, computer, smartphone, etc.).

Convenience of data updating: Instead of reprinting paper products, it is enough to make changes to the electronic version of the document, which saves time and money.

24/7 accessibility from any location: Information can be retrieved from a computer, tablet or smartphone at any time if you have access to the Internet or a pre-loaded database.

Searchability: Electronic resources allow you to quickly find what you need using keywords, which is especially useful for professionals in busy work environments.

Integration with other systems: Electronic media can be combined with the patient's electronic medical record, prescription system, drug interaction databases, etc.

Electronic media . Disadvantages:

Dependence on technology: Access to electronic information requires a stable internet connection and appropriate devices (computers, tablets, smartphones). If electronic equipment or the Internet is not available, access to information becomes difficult.

Data security issues: Electronic media can be vulnerable to cybercrime, such as hacker attacks, data leaks or unauthorised access. This compromises the confidentiality of pharmaceutical information, which often includes sensitive data.

Difficulty in updating and maintaining: Updating electronic information requires additional time and resources. In addition, not all users may be familiar with new technologies or systems.

Ensuring accuracy: Electronic media can be prone to errors, such as incorrect data entry or misreading of information, which can lead to inaccurate results.

Inability to be physically stored: Compared to paper-based records, electronic records do not provide physical archiving, which can be important in cases where information needs to be stored for a long time or verified in the future.

Problems with accessibility for certain groups of people: Older people or those not used to using modern technology may have difficulty accessing electronic pharmaceutical information.

Costs of technical support and infrastructure: To ensure that electronic systems work properly, investments in technical support, software and regular system updates are required

Television, radio. Advantages:

Wide audience reach: Television and radio allow information to be delivered to a large number of people at the same time, including people in remote or inaccessible regions.

Efficiency of presentation: These media allow for the rapid dissemination of up-to-date pharmaceutical information, such as drug availability, vaccination campaigns or new regulations.

Simplicity and accessibility: Information is presented in a clear, accessible form for the general public. Visual presentation (on television) or emotional sound (on radio) is particularly effective, as it increases memorability.

Influence on public behaviour: Through the influence of public figures, stories or public service announcements, television and radio can motivate people to visit a doctor, get vaccinated or adhere to a medication regime.

Variety of formats: Pharmaceutical information can be presented in the form of news, an interview with a doctor or pharmacist, a documentary, or a social video, which makes it possible to adapt the presentation to different audiences.

- High level of trust (especially in public broadcasting): Many people trust information from traditional media more than from the Internet. This is especially important when fighting disinformation or in crisis situations.

Educational effect: Television and radio can perform an educational function - informing about disease prevention, proper use of medicines, side effects, etc.

Television, radio. Disadvantages:

Limited amount of information: It is difficult to convey a large amount of detailed, evidence-based or specialised pharmaceutical information on the air. Messages are usually short and simplified.

Lack of feedback: Viewers or listeners do not have the opportunity to ask questions or clarify information immediately, as they might, for example, when talking to a pharmacist or during an online consultation.

Possibility of dissemination of unverified or promotional information: Especially in cases where advertising is disguised as news stories. This can be misleading to consumers and create an incorrect impression of medicines.

Targeting a mass audience: Information is presented in a general way, without taking into account the individual needs or health status of a particular person, which is important in the pharmaceutical industry.

Influence of commercial interests: TV and radio broadcasting is often funded by advertising, so priority may be given to promoting certain brands rather than objective medical information.

Insufficient depth of information: Due to time constraints, it is not always possible to fully explain the mechanism of action of a drug, its side effects, contraindications, etc.

Passive perception: A person may perceive information superficially, especially if it sounds in the background or while doing other things.

Information carriers also include the experience and knowledge of healthcare professionals: pharmaceutical and medical staff, including representatives of drug companies. Although we are used to thinking of information carriers as tangible or digital media (books, files, databases), information can be stored and transmitted through living people - their experience, knowledge, skills and competencies. This is especially important in the healthcare sector, as unique clinical cases, mistakes, and successful treatment approaches are knowledge that is not always described in the literature but can be passed on orally, during consultations, training, and seminars. Representatives of companies and experienced doctors are often the first to learn about changes in treatment protocols, the emergence of new drugs, etc. Live communication allows you to ask questions, clarify what you don't understand, and

get examples from practice - something that an article or instruction manual cannot provide.

Pharmacists who have in-depth knowledge of medicines, their indications, interactions, side effects, storage rules, etc. A pharmacist is often the first professional a patient turns to for advice.

Healthcare professionals (doctors, nurses, laboratory technicians, etc.), their clinical experience and knowledge help to diagnose and treat diseases correctly.

Representatives of pharmaceutical companies (medical representatives), who provide doctors and pharmacies with up-to-date information on new drugs, clinical trials, methods of use, updated instructions, etc. They are the channel of information transfer from the manufacturer to the healthcare system.

Thus, the knowledge and experience of healthcare professionals is a dynamic, living type of information carrier that is of great importance for decision-making, medical care, training of young professionals and implementation of new approaches in pharmacy and medicine.

Summary to Chapter 1

Information, as a general scientific concept, is a key element of communication in society. It includes the transmission of messages between people, automated systems, and at the biological level, which emphasizes its universality and multidimensionality.

There are several main types of information: factual, analytical, news, educational (scientific) and advertising. Each of them performs specific functions in the process of knowledge transfer and decision-making.

Pharmaceutical information is a separate, specialized type of information that covers information about medicinal products, their circulation, use, properties, as well as regulatory, economic and methodological aspects that are critical for the proper conduct of pharmaceutical activities.

Information carriers are material or electronic means that ensure the storage, transmission and reproduction of information. Their existence is a prerequisite for the functioning of any information process.

The main types of pharmaceutical information carriers are paper and electronic. Paper media remain relevant due to their reliability, accessibility to different categories of the population and legal significance. At the same time, electronic media provide quick access, ease of updating, resource savings, and integration with medical information systems.

Television and radio also serve as channels for disseminating pharmaceutical information, especially as part of information campaigns among the general public. However, to ensure the accuracy and completeness of information, they should be used in conjunction with other sources.

The analysis of the advantages and disadvantages of different media allows us to conclude that the choice of the method of pharmaceutical information presentation should be adapted to the target audience, the context of use and the requirements for relevance, reliability and accessibility of information

CHAPTER II. ANALYSIS OF THE STRUCTURE AND USE OF PHARMACEUTICAL INFORMATION

2.1 Structure of Pharmaceutical Information

From a scientific point of view, the structure of pharmaceutical information is a multifaceted body of knowledge that includes data on medicinal products, their production, use, as well as the legal and regulatory framework governing pharmaceutical activities [16]. It covers numerous aspects related to the efficacy, safety, quality and availability of medicines. pharmaceutical information usually includes: regulatory acts, guidelines, information on medicines, formulary system, organisational, management and economic reports, national and insurance lists of medicines, as well as marketing and pharmacoeconomic information [16]. The structure of pharmaceutical information can be classified into several main categories, each of which has its own role in scientific research, practical application and pharmaceutical services.

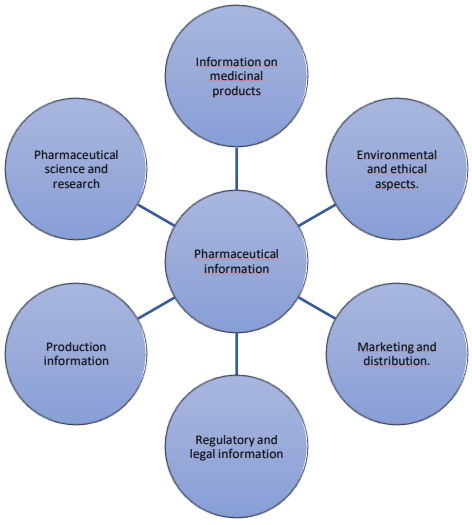

Fig. 2.1 Structure of Pharmaceutical Information

- Information on medicinal products. One of the main aspects of pharmaceutical information is the detailed documentation of medicinal products. It includes

Chemical composition and pharmacological properties: description of active ingredients, their pharmacokinetic and pharmacodynamic properties, mechanisms of action in the body, and toxicological characteristics.

Pharmacotherapeutic indications and dosage: analysis of indications for use, compliance of the medicinal product with clinical protocols and recommendations.

Side effects and interactions: a systematic description of side effects, their frequency, mechanisms of occurrence and interactions with other drugs that may affect the effectiveness of treatment.

- Regulatory and legal information. Scientific research of pharmaceutical information is impossible without taking into account the norms and standards governing the pharmaceutical industry. This includes:

Drug registration process: regulatory requirements for documentation, clinical trials, and the stages required to obtain a licence to market a drug.

Legal standards and clinical trials: analysis of the legislation governing clinical trials, monitoring of efficacy and safety of medicinal products at the post-registration surveillance stages.

- Information on manufacturing. Manufacturing of medicinal products is an important aspect that determines their quality and safety:

Production technologies: methods used in the manufacture of dosage forms (tablets, capsules, solutions), including pharmaceutical processes, quality and safety control at all stages of production.

Engineering aspects of quality control: implementation of the latest technologies for quality control of raw materials and final products, as well as application of GMP (Good Manufacturing Practice) principles.

- Pharmaceutical science and research. Pharmaceutical research and development involves the study of new active ingredients, clinical trials and the improvement of treatment methods:

Innovations in pharmaceutical science: research into new molecules to create more effective and safer medicines.

Clinical trials: scientific research that confirms the safety and effectiveness of medicines at various stages of their use.

Pharmacogenetics and personalised medicine: the latest approaches to treatment based on individual genetic characteristics of patients.

- Information for patients and pharmacists. Pharmaceutical information also covers the counselling aspect, which helps to ensure the correct use of medicines:

Instructions for patients: information containing recommendations on dosage, duration of treatment, possible side effects and contraindications.

The role of the pharmacist: advice on the correct use of medicines, assessment of their interaction and assistance in adjusting treatment.

- Marketing and distribution. Information on pharmaceuticals also includes aspects of marketing strategies and access to medicines:

Marketing research: analysis of demand, competitiveness, and effectiveness of advertising campaigns for medicines.

Distribution systems: ensuring proper storage, transportation and supply of medicines to pharmacies and healthcare facilities.

- Environmental and ethical aspects. Consideration of environmental and ethical aspects is important for the sustainable development of the pharmaceutical industry:

Environmental responsibility: measures to minimise production waste, environmental impact and waste disposal.

Ethical issues: ethical issues in pharmaceutical research, ethical standards in clinical trials and patient engagement.

Thus, pharmaceutical information has a multilayered structure that includes both scientific and practical aspects. Its use helps to ensure effective treatment, improve patient safety, and contributes to the development of pharmaceutical science and the industry as a whole.

2.2 Consumers of pharmaceutical information

Consumers of pharmaceutical information are all individuals and organizations that need access to knowledge related to medicines, their use, efficacy, safety, and regulatory aspects of pharmaceutical practice [6]. This includes not only patients, but also healthcare professionals and pharmaceutical organizations.

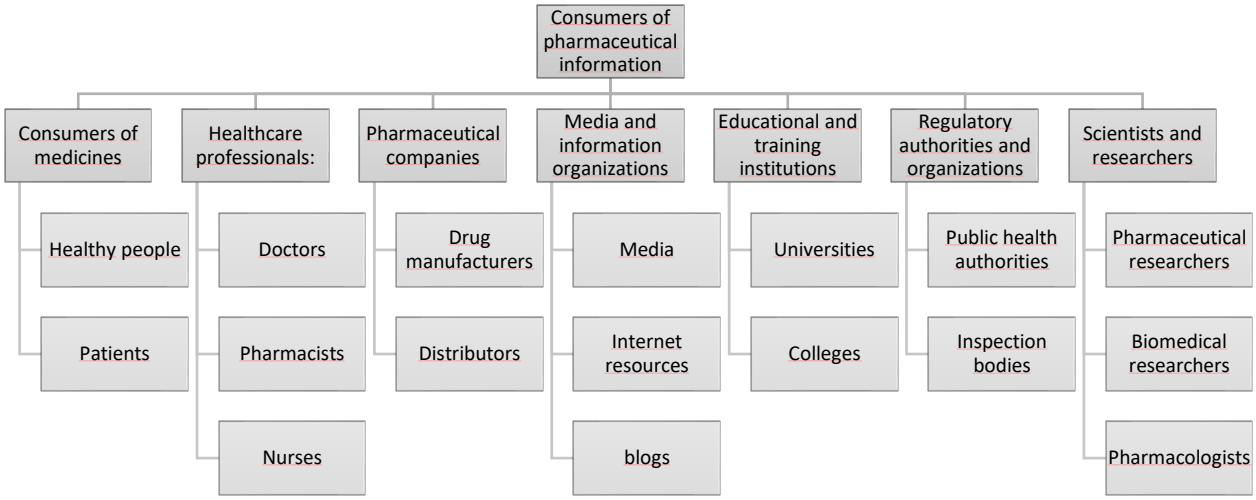

Fig. 2.2 Consumers of pharmaceutical information

Main categories of pharmaceutical information consumers:

- Patients and consumers of medicines:Patients are the main consumers of pharmaceutical information because they need knowledge about how to use medicines properly, what side effects to watch out for, what interactions are possible with other medicines, and how to ensure that treatment is effective [14]. Healthy people can also be consumers of pharmaceutical information when it comes to preventive use of medicines or supplements, and in the context of advice on choosing over-the-counter medicines.
- Healthcare professionals: Physicians use pharmaceutical information to make decisions about prescribing medicines, their dosage, choosing therapies, and to monitor patients and adjust treatment. Pharmacists provide information on how to

use medicines and advise patients on dosages, side effects, and possible interactions. Nurses and medical assistants also need pharmaceutical information to perform their duties, for example, when administering medications to patients.

- Pharmaceutical companies: Pharmaceutical manufacturers use pharmaceutical information to develop new drugs and to meet regulatory requirements, including documents on safety, efficacy, and dosage. Distributors and pharmacies use the information to organize the proper storage and delivery of medicines to the end user.
- Scientists and researchers: Pharmaceutical researchers and scientists need pharmaceutical information to conduct clinical trials, develop new therapeutic approaches, and study the pharmacokinetics and pharmacodynamics of drugs. Pharmacologists and biomedical researchers use this information to evaluate the effectiveness of drugs and their potential side effects, as well as to improve existing treatments.
- Regulatory authorities and organizations: Public health authorities and pharmaceutical regulators (e.g., the Ministry of Health, the National Medicines Service) use pharmaceutical information to monitor the safety of medicines, control their quality, and ensure compliance with legal requirements. Inspection bodies monitor compliance with the standards of production and circulation of medicines.
- Educational and training institutions: Universities, medical and pharmaceutical faculties use pharmaceutical information to educate students and conduct research. This includes the study of pharmacology, drug manufacturing technology, and the ethics of pharmaceutical practice.
- Media and information organizations: Mass media, online resources, blogs and social networks are channels through which pharmaceutical information reaches a wide audience, informing the public about new medicines, changes in legislation or news in the world of pharmacy [15]. Experts and media consultants can also help to disseminate verified and scientifically based pharmaceutical information to the general public.

In summary, consumers of pharmaceutical information include a variety of groups, including patients, healthcare professionals, pharmaceutical companies, regulators, scientists, and educational institutions. Each of these groups has its own specific needs and goals for using pharmaceutical information, which necessitates different formats for presenting this information depending on the audience.

As already mentioned, the main consumers of pharmaceutical information are healthcare professionals (doctors, pharmacists, nurses, pharmaceutical technicians, etc.) and patients (the public, consumers of pharmaceutical products). Healthcare professionals use pharmaceutical information to make decisions about prescribing treatment for patients, selecting medicines, and providing advice. Patients use pharmaceutical information to understand their health status, use medicines correctly, and avoid side effects. Other consumers of pharmaceutical information may include representatives of pharmaceutical companies, researchers, regulators, and other stakeholders.

Depending on who is the end user of the information, there are professional and consumer levels of pharmaceutical information. The main sources of professional level pharmaceutical information are: National Essential Medicines List (NEML), State Pharmacopoeia of Ukraine, State Formulary of Medicines. Pharmacist's protocols for dispensing OTC medicines are widely used.

At the consumer level, the main sources of pharmaceutical information are the knowledge and skills of healthcare professionals, television and radio, social media, newspapers, and banners [23]. (Table 2.1)

The professional level of pharmaceutical information is the level of knowledge and competencies required to use pharmaceutical information correctly and effectively in professional activities, as well as to make informed decisions in the field of pharmaceuticals. This level includes knowledge of various aspects related to pharmaceuticals, their production, use, safety and regulation. It is important that a pharmacist or other healthcare professionals can effectively interpret and use this information to ensure proper patient care and compliance with legal requirements.

Table 2.1

Results of comparative analysis of pharmaceutical information levels

Level	Information content	Main sources	Target audience
Professional	Instructions for medical use of medicinal products Pharmacological guides Clinical trial data Registration dossiers Information on interactions, side effects Regulatory acts in the field of medicinal products circulation Pharmacovigilance (pharmacological safety) Scientific publications and monographs	State Register of Medicinal Products Information systems (Pharmindex, Compendium, WHO databases, etc.) Professional journals Official websites of the Ministry of Health, State Administration on Medicinal Products, WHO	Pharmacists Doctors Scientists Represen-tatives of pharmaceutical companies Regulatory authorities
Consumer	Simplified instructions for patients Advertising and presentations of medicinal products (in accordance with the law) Educational materials (brochures, posters)	Pharmacy advisory materials Television, Internet, social networks Insert instructions (for consumers)	Patients General public Self-medicators or caregivers

	Online information (on websites of pharmacies, the Ministry of Health, etc.) Pharmacist's advice during dispensing of medicinal products	Explanations from healthcare professionals	

Professional-level pharmaceutical information includes a thorough understanding of pharmaceuticals, including knowledge of the composition of pharmaceuticals, their pharmacological properties, mechanisms of action and side effects, the ability to determine the correct dosage, methods of administration and storage of medicines, and evaluation of the effectiveness of medicines

Experience in pharmaceutical practice, namely understanding of the principles of pharmaceutical counseling, ability to correctly interpret prescriptions and instructions, use of pharmaceutical information to improve the quality of pharmaceutical services and ensure patient safety, knowledge of the peculiarities of prescription drug dispensing.

Some experience and skills in the use of clinical information Understanding of clinical protocols, research and clinical trials that confirm the efficacy and safety of drugs, ability to apply scientifically based pharmaceutical information to select the best drugs and treatments.

Knowledge of the regulatory framework: Knowledge of legislative acts, standards and regulations governing pharmaceutical activities, including requirements for registration, circulation and control of medicines, understanding of the principles of ethics and professionalism in pharmaceutical practice.

Skills in processing and interpreting pharmaceutical information: ability to work with electronic and paper-based pharmaceutical information, automation systems and databases, ability to critically evaluate information sources, identify potential errors and manipulations in the information provided.

To be aware of the methods of quality control of pharmaceuticals at all stages of their manufacture and circulation. Ability to identify and assess risks arising from the use of medicines and find ways to minimize them.

Skilled use of pharmaceutical information helps to select the most effective and safe medicines, which contributes to better treatment outcomes. The ability to correctly interpret information about medicines allows avoiding errors in dosage, interaction with other drugs and side effects, which reduces the risk of adverse reactions in patients. Knowledge of regulatory requirements helps to avoid legal violations and ensure that the activities of a pharmacist or a pharmaceutical organization comply with applicable law.

Thus, the professional level of pharmaceutical information is an integral part of effective and safe pharmaceutical practice. It requires professionals to be able to quickly navigate a large amount of scientific, clinical and legal data related to medicines and use this information to make the right decisions that ensure the health and safety of patients.

The consumer level of pharmaceutical information is the level of access and understanding of pharmaceutical information that is focused on the end user - patients and consumers of medicines. This level provides the necessary information about medicinal products in a form that is understandable and accessible to persons who do not have specialized knowledge in pharmacy or medicine.

At the same time, the information should be presented in a simple, understandable and accessible form for a wide range of consumers. This includes the use of simple language without complex terms that may make it difficult to understand. Other important elements are clear instructions for use, description of side effects, dosage, storage and use.

Consumers are provided with basic information about the medicinal product, including: How to use the medicine correctly (dosage, route of administration), When and how often to take the medicine, What side effects may occur, Contraindications for use, Interactions with other medicines or products.

The consumer level of pharmaceutical information should include warnings about possible dangers, in particular: Side effects and how to act in case of their occurrence. Information on improper use of medicines that may lead to undesirable consequences, Methods of storage of the drug to ensure its quality and safety (e.g. storage temperature). Instructions for patients, including how to avoid mistakes when using medicines (e.g., whether to take the drug with food, how the time of day affects the effectiveness of the drug). A description of alternative treatments or advice on consulting a doctor if treatment is not working.

Consumer-level pharmaceutical information is often provided through a variety of communication channels, including product instructions, online resources, mobile apps, pharmacy consultations, and brochures. Different formats of information are considered, such as video instructions or online platforms for receiving advice on the use of medicines.

Thus, consumer-level pharmaceutical information is important for patients to be able to use medicines correctly, reducing the risk of errors, overdoses, or interactions with other medicines. Patients need to be aware of the principles of effective treatment in order to actively engage in the process of recovery and adhere to recommended dosages. Clear and correct use of medicines allows patients to avoid side effects and increases the effectiveness of treatment.

Therefore, the Consumer level of pharmaceutical information is critical to ensuring the health and safety of patients. This level provides people with the necessary knowledge to use medicines correctly, helps to avoid mistakes, improves treatment effectiveness, and promotes general health awareness.

Conclusions to Chapter II

The analysis has shown that pharmaceutical information is a complex multi-component system that covers a wide range of information about medicinal products, from their chemical composition, pharmacological properties and therapeutic use to regulatory aspects, manufacturing processes, marketing, distribution, and environmental and ethical factors.

The structure of pharmaceutical information is represented by a number of interrelated categories, each of which performs a specific function in ensuring the quality of pharmaceutical care and scientific progress. In particular, scientific, regulatory, clinical, manufacturing, marketing and distribution information supports all stages of the life cycle of a medicinal product - from development to use by the end user.

The key element of the pharmaceutical information system is its consumers - representatives of various professional groups, as well as patients. It has been established that consumers of pharmaceutical information can be classified according to the level of training into professional and consumer levels, which necessitates the adaptation of the methods of information presentation in accordance with the target audience.

The professional level involves a deep understanding of pharmacotherapy, clinical practice, pharmaceutical legislation and modern scientific achievements, while the consumer level is focused on providing accessible, understandable and safe information to the public in order to increase compliance and self-control in the treatment process.

Thus, an effective pharmaceutical information system promotes not only the rational use of medicines, but also ensures the integration of scientific, clinical and legal knowledge into healthcare practice, contributing to the sustainable development of the pharmaceutical industry and improving the quality of healthcare.

CHAPTER III. ROLE OF INTERNET RESOURCES IN DISTRIBUTION OF PHARMACEUTICAL INFORMATION

Internet resources have become an integral part of the modern healthcare system, in particular in the field of pharmacy. The role of these resources in the dissemination of pharmaceutical information is directly related to raising public awareness of medicines, facilitating access to up-to-date information for healthcare professionals, and improving decision-making in medicine. The Internet provides an unprecedented level of access to a large amount of data related to medicines, their efficacy, safety and use, which in turn has a significant impact on the outcome of treatment [19].

Internet resources can be effectively used to disseminate pharmaceutical information to various categories of consumers, including patients, healthcare professionals, pharmacists and the public in general [7]. The use of online platforms allows for quick access to up-to-date, accurate and scientifically based information. Here are some ways to use online resources to disseminate pharmaceutical information:

- Official websites of pharmaceutical companies and medical institutions

Pharmaceutical companies can create their own official websites where they publish information about medicines, their efficacy, safety, instructions for use, side effects, contraindications, and updates on new products. Such websites may have special sections for doctors and patients.

Medical institutions and pharmacy chains can use their platforms to publish relevant scientific articles, research, and provide patient consultations through online formats.

Websites can include interactive tools for searching for medicines, asking questions to pharmacists, and receiving dosage instructions.

- Medical portals and online databases

MedlinePlus, Drugs.com, EudraPharm (for the EU) are examples of international medical portals that provide information about medicines, their side effects, use,

dosage and compatibility with other drugs. They can be used by both healthcare professionals and patients.

National pharmaceutical information databases can be useful for checking the license of medicines, their indications, instructions, side effects and interactions. This helps to maintain a high level of transparency and trust in medicines.

- Mobile applications for patients and healthcare professionals

The development of mobile applications that provide pharmaceutical information helps patients and doctors to quickly obtain up-to-date data, such as dosages, drug compatibility, side effects, etc.

Some apps may include features to remind you to take your medication, as well as to record patient feedback on the effectiveness of medications.

Pharmaceutical companies can develop apps to monitor patients' health and get up-to-date news about new research and drugs.

- Social networks and forums

Social networks (Facebook, Instagram, Twitter) and blogging platforms (e.g. Medium, WordPress) can be used to publish news and articles related to pharmaceutical innovations, new medicines, and to interact with patients [15].

Pharmacists and medical professionals can actively interact with patients by answering questions, providing advice, and publishing useful tips on how to use medicines.

Online forums for patients where they can discuss their experience of using medicines, side effects, and share information about alternative treatments.

It is important that these platforms provide verified and scientifically based information to avoid the dissemination of false or unsafe advice.

- Webinars, online courses and distance learning

Webinars and online courses can be an effective way to provide pharmaceutical information to healthcare professionals, pharmacists, doctors and medical students.

Online courses can focus on topics such as pharmacology, the latest advances in pharmaceuticals, drug interactions, the use of medications for various diseases, etc.

Such platforms can include certification or accreditation, which allows healthcare professionals to gain new knowledge and confirm their qualifications.

- Use of video and interactive platforms

Video content on platforms such as YouTube can help patients and healthcare professionals understand how to use medicines correctly, how to recognize side effects, and how to act in case of overdose.

Interactive platforms with video tutorials and virtual consultations can be used to provide patients with more in-depth knowledge about medicines and their effectiveness.

- Online advertising and advertising campaigns

Online advertising, such as banners on medical websites or targeted ads on social media, can be used to disseminate pharmaceutical information about new medicines, research, and clinical trials.

It is important to ensure that advertising campaigns are properly regulated to prevent excessive commercialization of consumer exposure and to comply with ethical standards.

- Electronic journals and publications

Scientific journals and electronic pharmaceutical publications can be used to publish research, clinical trial results, reviews, and other important pharmaceutical information.

Such resources can be made available to both industry professionals and a wider audience through open access or paid subscriptions.

Despite its many advantages, the use of online resources for the dissemination of pharmaceutical information also faces certain challenges. The main challenges include: Insufficient verification of the accuracy of information, which leads to the dissemination of false or unreliable data. Confidentiality issues: online consultations may violate the rules for storing personal data. Dependence on Internet access, which limits the ability to use resources in remote regions or in case of technical problems.

Thus, online resources play an important role in the dissemination of pharmaceutical information due to their accessibility, interactivity and the ability to

quickly update data. The use of such platforms allows reaching a wider audience and raising awareness of medicines among patients, healthcare professionals and pharmacists.

3.1 Comparative analysis of the use of internet resources for pharmaceutical information dissemination

The use of Internet resources for pharmaceutical information dissemination has become an integral part of the modern world. This opens up new opportunities for access to up-to-date data, scientific articles and recommendations that can be useful for both healthcare professionals and patients. However, along with the benefits, there are also significant challenges, including the reliability of sources and the risks of false information. Therefore, the next stage of the study examines the main pros and cons of using online resources for pharmaceutical information.

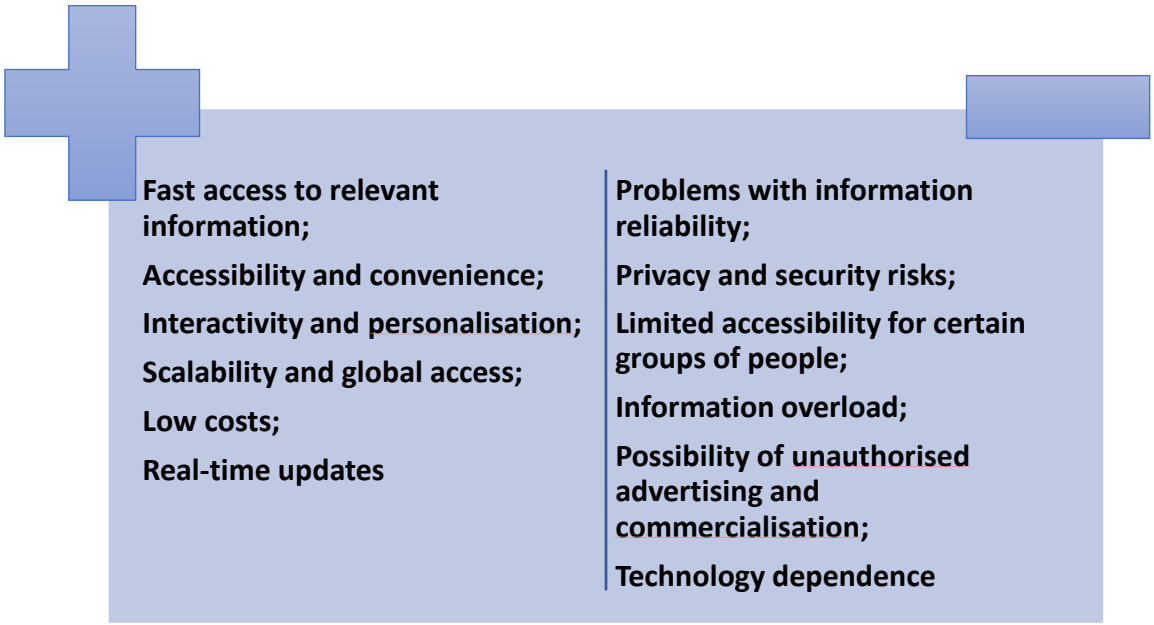

Fig. 3.1 Advantages and disadvantages of using Internet resources for pharmaceutical information dissemination

Advantages of using Internet resources for pharmaceutical information dissemination

Quick access to up-to-date information: The Internet allows for instant access to up-to-date information, which is very important in a rapidly changing pharmaceutical and healthcare industry. New research, updates in dosage, side effects or instructions can be published and accessed in near real time. This also allows consumers of pharmaceutical information (doctors, patients, pharmacists) to have constant access to the latest news, research and changes in pharmaceutical legislation.

Accessibility and convenience: Online resources are available 24/7, which allows users to access information at any time, regardless of the working hours of pharmacies or medical institutions. This is especially convenient for patients who need advice or additional information outside of business hours. The platforms can be accessed via various devices - computers, smartphones, tablets - allowing users to get information from anywhere.

Interactivity and personalisation: Online resources can include interfaces that allow users to ask questions, receive recommendations or view personalised information. This creates a convenient and interactive platform for patients and healthcare professionals. For example, mobile apps can remind patients to take their medication or interact with them to monitor the effectiveness of treatment.

Scalability and global access: The Internet allows for a large number of users around the world, including remote and hard-to-reach regions where access to traditional healthcare resources may be limited.As many online resources have multilingual versions, this allows for users from different parts of the world to be informed, ensuring global accessibility of pharmaceutical information.

Low costs: Dissemination of pharmaceutical information via the Internet can be significantly cheaper than traditional methods (e.g., print materials, television advertising). This allows pharmaceutical companies, healthcare institutions and organisations to provide information to a wide audience without high costs.

Real-time information updates: Online platforms allow for rapid updates of information, which is particularly important to ensure that information is up-to-date. Any changes, such as new contraindications or studies on drug interactions, can be quickly incorporated into websites and databases, enabling users to receive these changes instantly.

-Disadvantages of using Internet resources to disseminate pharmaceutical information

Problems with the reliability of information: The Internet is full of information resources, and not all of them are reliable or scientifically based. Patients may encounter unreliable sources that publish false or unverified information about medicines or treatments. The importance of having some kind of content review mechanisms in place, such as moderation, content certification, or flagging of authoritative resources, to ensure that the information disseminated is correct and accurate.

Privacy and security risks: The collection and processing of personal patient data through mobile apps or online platforms may raise privacy concerns. Online resources may be exposed to cyber threats such as hacker attacks or data breaches. It is important that platforms comply with data security standards (e.g. GDPR in the EU) to protect users' personal information.

Limited accessibility for certain groups of people: Although the internet is a very accessible resource, not all people have equal access to technology. For example, older people or people living in rural or remote areas may not have stable access to the internet or the skills to use online resources. This can lead to a digital divide, where some populations do not receive the pharmaceutical information they need due to technical barriers.

Information overload: The large number of available online resources can lead to information overload, where patients and healthcare professionals have difficulty finding relevant information among the vast amount of material. This can be particularly problematic if resources are not organised in a logical way or do not have good filters to sort out important information.

Possibility of unauthorised advertising and commercialisation: Websites and mobile apps can be used to advertise medicines or healthcare services, which does not always meet ethical standards. For example, advertising medicines that do not have sufficient evidence of efficacy or safety. Online advertising can also create a conflict of interest for healthcare professionals if they directly cooperate with pharmaceutical companies or receive compensation for advertising their products.

Dependence on technology: High dependence on technology and online platforms can pose a problem if there are technical failures, internet connection failures or problems with software updates. This could temporarily limit access to important pharmaceutical information.

3.2 Comparative analysis of ways of obtaining information

Potential consumers of pharmaceutical information can obtain it in different ways, depending on whether they are active or passive users of this information. There are two main approaches to obtaining pharmaceutical information: active and passive. Active users search for information on their own, using scientific databases, medical portals and other online resources, and also contact professionals for detailed advice. Passive users, on the other hand, often rely on information already provided to them, which they receive through advertisements, television programmes, medical journals or official documents. The choice of how information is received can largely determine not only its accuracy and reliability, but also the degree of influence on health decision-making. In this context, online resources can act as a powerful tool for quick access to information, but they also raise questions about the reliability of sources and ethical aspects of providing medical data.

Potential consumers of pharmaceutical information can obtain it in different ways, depending on whether they are active or passive users of this information. There are two main approaches to obtaining pharmaceutical information: (Table 3.1)

Table 3.1

Comparative analysis of approaches to obtaining pharmaceutical information

Criterion	Passive method ("push")	Active method ("pull")
1	2	3
Initiator of obtaining information	Supplier (manufacturer, pharmacy, medical institution)	Consumer (patient, medical professional)
Form of receipt	Information is received without a request	Information is searched independently
Examples	Advertising in the media and social networks Company newsletters Instructions for drugs Pharmacist consultations	Internet search Consultations with a doctor/pharmacist Use of mobile applications Forums, social networks
Advantages	Systematic information Minimal effort from the patient	Personalized approach Ability to obtain deeper and more accurate information
Disadvantages	May be irrelevant or general Risk of advertising influence	Requires effort and knowledge Risk of encountering unreliable or unverified information
Geographical examples	USA: active advertising of drugs EU: consultations in pharmacies Australia: mailings	Global phenomenon: use of the Internet, applications, online consultations
Technologies	Television, radio, letters, SMS, push notifications via TGA	Search engines, mobile applications, online databases, forums

A passive way of obtaining information ('push' information):

In this case, the information is provided to the consumer without his/her direct request. It is 'pushed' (sent) to them, as a rule, through advertising campaigns, database updates, mailings, instructions to prescribers or through pharmacists in pharmacies. The consumer receives information directly from suppliers (drug manufacturers, pharmacy chains, healthcare organisations).

This method is very common in the pharmaceutical industry, as it allows consumers to be informed without their active participation, ensuring constant and systematic communication.

In countries with developed pharmaceutical industries, such as the United States, the European Union and Japan, pharmaceutical companies actively use passive methods of information dissemination through advertising and educational programmes. For example, in the US, pharmaceutical companies can advertise medicines directly to consumers (advertising medicines on TV, radio or the Internet), which is legally permitted.

- In the EU, there are stricter restrictions on direct-to-consumer advertising of medicines, but information is still actively disseminated through pharmacies, where pharmacists provide the necessary advice upon request.
- In Australia, through the Australian Therapeutic Goods Administration (TGA), pharmaceutical companies provide regular updates on medicines through official reports and newsletters.
- Mobile applications and medication reminder systems are also actively used as a form of passive information support for patients.

Active method of obtaining information ('pull' information):

In this case, the consumer initiates the search for and receipt of the pharmaceutical information they need. This can be done through Internet search engines, contacting healthcare professionals or pharmacists for advice, as well as using mobile applications and online resources.

In the United States, there are many platforms for self-searching pharmaceutical information, such as Drugs.com or MedlinePlus, where patients can

find information about medicines, as well as view drug interactions, dosages and side effects.

In the European Union and the United Kingdom, national and international resources are active, such as EudraPharm (the EU medicines database), which allows patients to search for information on registered medicines in Europe.

In Japan, online platforms and mobile apps for patients play an important role, for example, apps to check drug compatibility or possible side effects.

In Canada, the national healthcare system has electronic databases that allow patients and healthcare professionals to obtain reliable information about medicines.

There are advantages and disadvantages to both passive and active pharmaceutical information dissemination. Passive information dissemination allows consumers to quickly obtain important information about medicines, but may not be sufficiently specific or individualised for each patient. Active information retrieval, in turn, allows patients to find specific data on request, but depends on their awareness and willingness to seek such information. Integration of both approaches into pharmacy practice helps to improve the overall level of patient awareness and safety in the use of medicines.

The use of mobile applications for obtaining pharmaceutical information is very relevant in the modern world. Mobile technologies have significantly changed the way we access medical and pharmaceutical information, making it available to users anytime and anywhere. Apps that provide information on medicines, dosages, side effects and drug interactions help both pharmacists and patients make informed health decisions (tabl.3.2).

The importance of such apps cannot be overstated, especially in countries with a high level of medical and pharmaceutical development. They provide quick access to up-to-date information, which is especially important in an environment where accuracy and speed can save lives. In addition, for pharmacists and healthcare professionals, apps such as UpToDate, Medscape and Epocrates are indispensable tools for clinical decision-making. For patients, apps such as MyTherapy,

Drugs.com and Pill Reminder offer convenient features that help track medication and remind them of important points, which also increases treatment effectiveness.

These apps are available on iOS and Android platforms, making them accessible to a wide audience. They can be used in most countries, especially in those with a developed mobile infrastructure, and are important tools for healthcare professionals and patients around the world.

For pharmacists, there are several mobile apps that make it easier to access up-to-date pharmaceutical information and clinical guidelines. One such app is UpToDate, which is aimed at healthcare professionals, including doctors and pharmacists. UpToDate has a database of clinical guidelines and medical articles that provide up-to-date scientific and clinical data. The app is updated in real time and covers a variety of topics such as pharmacology, therapeutics, and drug interactions. The app's interface is intuitive, allowing users to quickly find the information they need. UpToDate has paid access and is available on iOS and Android platforms. Its advantages include the relevance of the materials, which are updated several times a year, as well as the depth of the material, including access to clinical trials and guidelines. However, it is worth considering the high subscription fee, which may be a disadvantage for some users. In addition, some countries may have local restrictions on access to information. Available internationally, in particular, it is popular in the USA, Canada, the UK, Australia, Germany, France and other countries. It is commonly used by medical professionals in countries with a high level of medicine.

Table 3.2

Pharmaceutical mobile applications

Application	Target audience	Functionality	Platform	Cost	Advantages	Disadvantages
UpToDate	Pharmacists, doctors	Clinical trials, therapeutic recommendations	iOS, Android	Paid	Relevance, scientific accuracy, large volume	High price, complexity for regular users
Medscape	Pharmacists	Drug interaction tool, clinical data	iOS, Android	Free	Large database, tools for doctors	Information overload
Epocrates	Pharmacists	Pharmacological guides, drug interaction tools	iOS, Android	Free	Easy interface, databases	Free version is limited
MyTherapy	Patients	Drug reminders, status tracking	iOS, Android	Free	Easy to use, medication control	Limited information for patients
Drugs.com	Patients	Drug information, dosage calculator	iOS, Android	Free	Large database, simple interface	Technical information that can be difficult for patients
Pill Reminder	Patients	Drug reminders	iOS, Android	Free	Easy to use, dose reminder	Lack of in-depth pharmaceutical information

Another popular application is Medscape, which is also aimed at medical and pharmaceutical professionals. Medscape contains licensing guidelines, news, articles, pharmacological guides, and tools for healthcare professionals. The interface allows you to quickly find information about medicines, including instructions, side effects and dosages, as well as the function of interaction between medicines. Medscape is available for free on iOS and Android platforms. Among the advantages of this app are its free access, the scale of the database, and the ability to use tools to check drug interactions and the relevance of treatment regimens. However, there is also a drawback - the app can be overloaded with information, which sometimes makes it difficult to quickly access basic data. It is used in many countries, including the US, UK, Canada, Australia, India, and is also available in Europe and Latin America.

Another popular app is Epocrates, which is designed for doctors and pharmacists. Epocrates provides access to information about medicines, including dosages, side effects and indications, and offers tools for drug interactions and dose calculation. The app also allows you to monitor drug interactions and search for suitable drugs. Epocrates has a free version with limited functionality, as well as a paid subscription to access additional features. It is available on iOS and Android platforms. The advantage of Epocrates is its easy-to-use interface, extensive database, and convenience for pharmacists due to its drug interaction tools. However, the free version has limited access to some features, and users need to subscribe to a paid subscription to get more in-depth information. It is widespread in the US, Canada, the UK, Australia and many other countries, especially in countries with a high level of medical and pharmaceutical development.

Thus, each of these applications has its own features and benefits, which allows pharmacists to choose the one that best suits their professional needs

For patients, there are various mobile applications that help them better manage their health, in particular in the context of chronic diseases and regular medication. One of these apps is MyTherapy, which is designed for patients with chronic diseases. This app allows you to track your medication, adjust your dosage,

and receive reminders to take your medication. In addition, MyTherapy provides information about medications, their side effects and allows patients to collaborate with their doctor, which significantly improves treatment control. The app is available for free on iOS and Android platforms. The advantage is the ease of use and the ability to set reminders, which helps patients to control their medical condition. However, it is worth noting that the information in the app is not as detailed as in professional medical apps, and it may be limited for patients without medical education. An international app available in most countries, including the US, UK, Germany, France, Canada and other European countries.

Another useful app is Drugs.com, which is designed for both patients and healthcare professionals. The app contains detailed descriptions of medicines, their indications, side effects, interactions, and dosage calculators. Users can search for medicines alphabetically or by scanning barcodes, which makes it very convenient. Drugs.com is available for free on iOS and Android platforms. Among the advantages of this app are an extensive database of medicines and a user-friendly interface that allows you to check interactions between medicines. However, it is worth noting that due to the publicly available format, the information may be too technical for some users, which may make it difficult to understand. In particular, it is popular in the US, Canada, the UK, Australia and other English-speaking countries. The app provides basic information about medicines in the context of American standards

Another useful app is Pill Reminder, which is designed for patients who need to take their medicines regularly. This app allows patients to track their medication and create personalised schedules with reminders. Pill Reminder is available for free on iOS and Android platforms. Its main advantage is its simplicity and ease of use, as well as the reminder function that helps patients remember to take their medications. However, this app has limited pharmaceutical information that can only be accessed by professionals, which can be a disadvantage for those who need more in-depth information. Available internationally, including in the US, Canada,

the UK and Europe. This app is widely used in countries with developed healthcare systems, where patients often use mobile technology to monitor their medications. Thus, these apps provide patients with important tools for monitoring their treatment and health, but they have different levels of information that can be useful depending on the user's needs.

In order to analyze the impact of Internet resources and mobile applications on the dissemination of pharmaceutical information, a sociological survey was conducted among consumers of medicines. The study was conducted online using an anonymous questionnaire developed to meet the specifics of the research topic.

The survey was conducted in January-March 2025 on the basis of available social platforms (Google Forms, social networks), which allowed us to reach respondents of different ages, education and place of residence. The total number of respondents was 118.

The questionnaire contained 8 closed and semi-open questions aimed at clarifying the following aspects

- frequency of using the Internet to search for information about medicines;
- main sources of such information (official websites, social networks, forums, etc.);
- level of trust in online information;
- critical thinking when checking data from several sources;
- frequency of discussing the information found with healthcare professionals;
- preferences in the format of information presentation (text, video, infographics);
- impact of online information on decision-making

According to the survey, the majority of respondents regularly access online resources to obtain pharmaceutical information. In particular, 68% of respondents indicated that they look for such information daily, 22% - 2-3 times a week, while only 10% indicated that they access such sources less than once a week (Fig. 3.2)

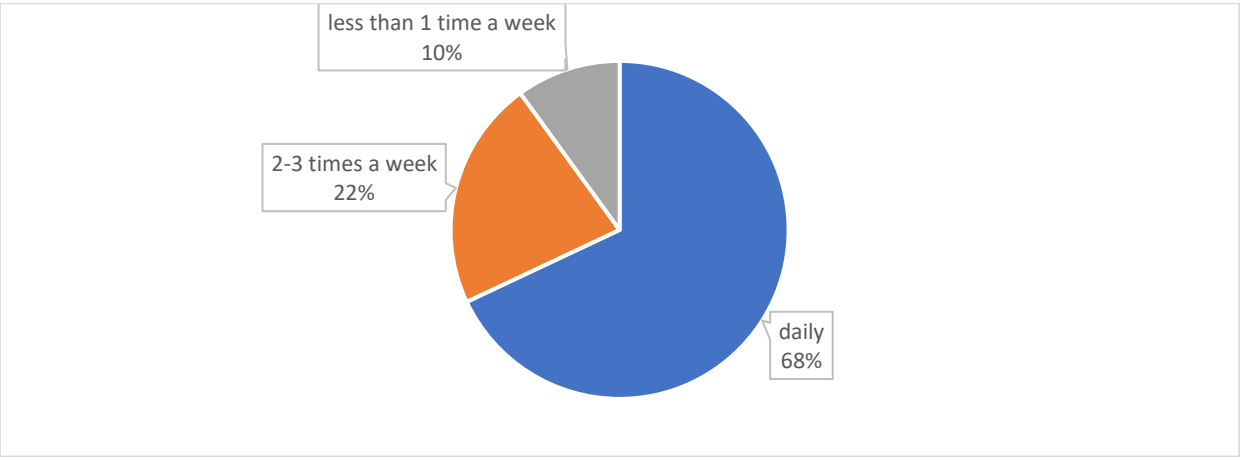

Fig. 3.2 Frequency of searching for information on the Internet among respondents

The level of trust in information obtained from the Internet was mostly average - 69% of respondents gave this assessment. Only 18% trust this information at a high level, and 13% rate the level of trust as low. (Fig. 3.3)

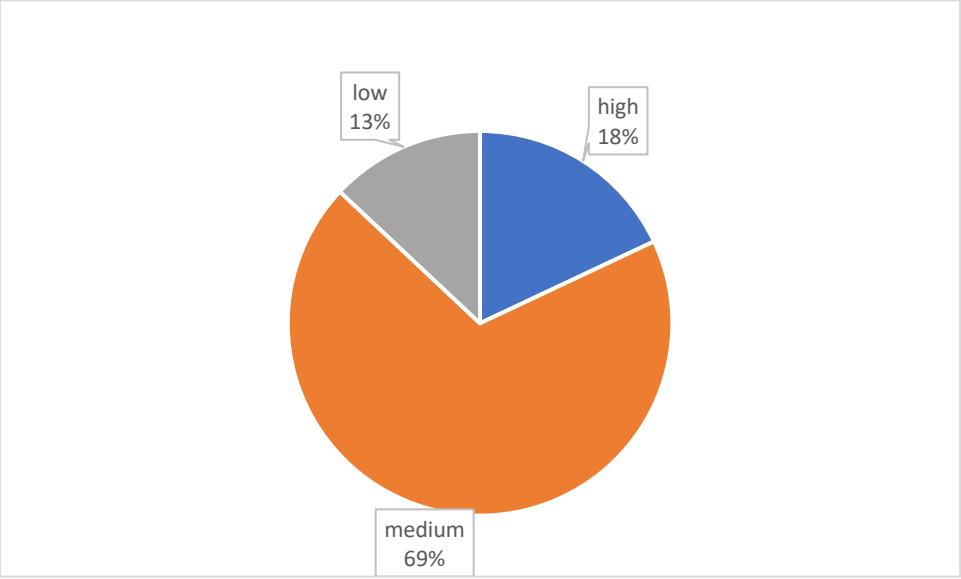

Fig. 3.3 The level of trust in online information among respondents

Regarding the critical attitude to online data, 57% of respondents said they check information from several sources, while 43% do not. (Fig. 3.4)

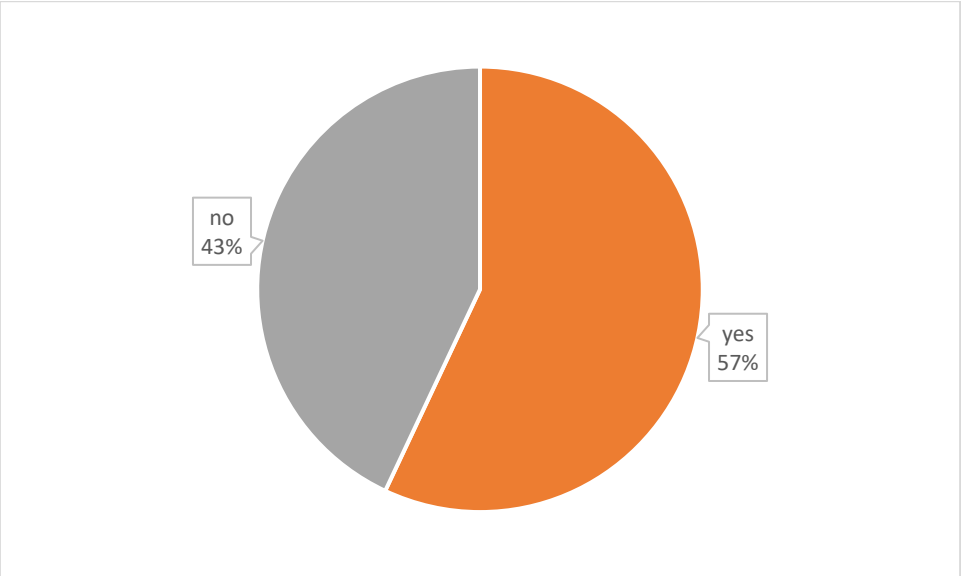

Fig. 3.4 Checking information from multiple sources

Discussing pharmaceutical information found on the Internet with healthcare professionals is a less common practice. Only 40% of respondents reported that they consult with doctors or pharmacists after searching for information, while 60% do not seek additional professional opinion (Fig. 3.5)

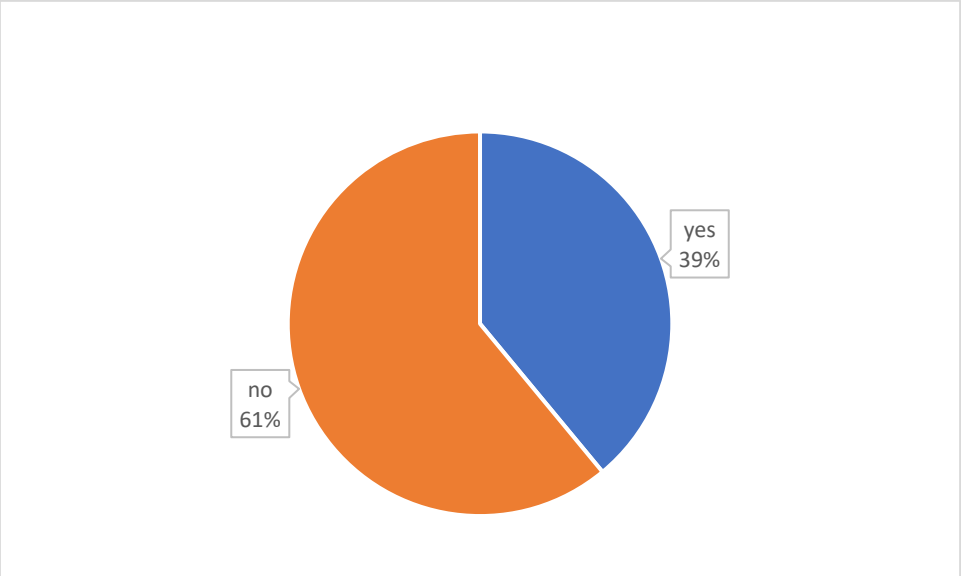

Fig. 3.5 Discussion of information with a healthcare professional

A separate section of the survey was about the use of mobile apps designed to search for or manage pharmaceutical information. 32% of participants use such apps daily,

38% use them 2-3 times a week, and 30% use them less than once a week. This demonstrates the growing popularity of digital tools in the field of self-management of health. (Fig. 3.6)

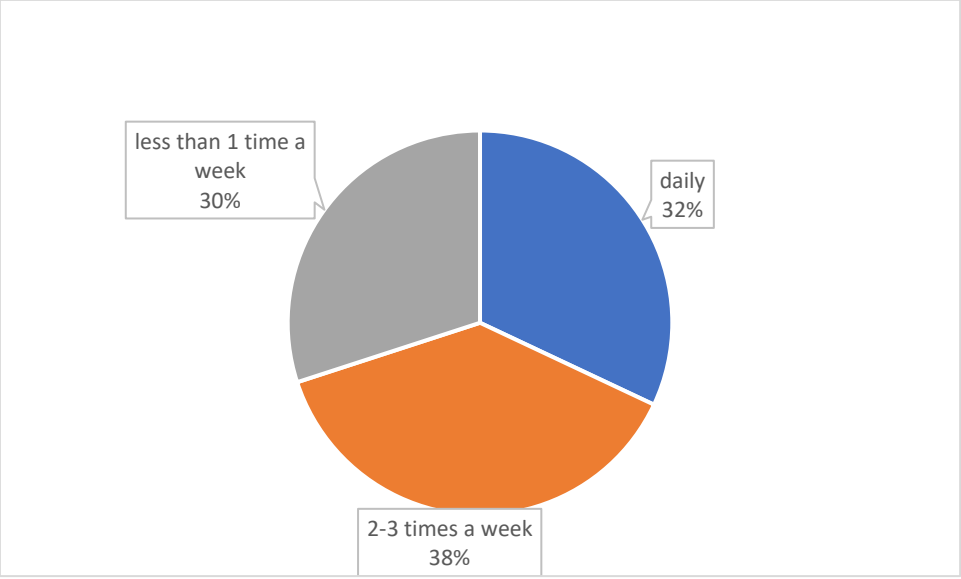

Fig. 3.6 Use of "pharmaceutical" mobile applications

Based on the results of the study, a **list of recommendations** can be formulated to improve the process of disseminating pharmaceutical information to the public using Internet resources and mobile technologies.

- Improving the quality and accessibility of reliable information

Given that most respondents search for information about medicines on the Internet on a daily basis, it is advisable to develop official online platforms (websites of ministries of health, pharmaceutical companies, professional associations) that contain scientifically based, relevant and understandable information about medicines for the general public.

- Promoting critical thinking among patients

Given the high level of distrust or average level of trust in Internet information, it is advisable to conduct educational work among the population on media literacy skills, methods of verifying information, and the importance of consulting specialists for final conclusions.

- Active involvement of healthcare professionals in patient information support

Given that only 40% of respondents discuss information found on the Internet with healthcare professionals, it is important to encourage professionals to actively communicate with patients, clarify and correct information received from online sources.

- Promotion and development of pharmaceutical mobile applications

More than half of the respondents use mobile applications at least 2-3 times a week. This indicates the relevance and feasibility of further development of functional, reliable and user-friendly mobile platforms that would allow to obtain quality information about medicines, control the schedule of their intake, check interactions, etc.

- Implementation of the system of official labeling of reliable sources

It is recommended to create mechanisms for labeling authoritative sources of pharmaceutical information, for example, in the form of certificates or digital marks confirming the reliability and expertise of the resource. This will allow users to navigate the information space faster and reduce the risk of misinformation.

Thus, the proposed measures can contribute to a more efficient, safe and conscious use of Internet resources for obtaining pharmaceutical information among both patients and medical professionals.

Conclusions to chapter 3

Internet resources play a key role in the dissemination of pharmaceutical information, providing a wide range of users with access to up-to-date data on medicinal products

The main advantages of using Internet resources include prompt access to updated information, ease of use, interactivity of platforms, global reach and low costs of data dissemination.

The main disadvantages include doubts about the reliability of information, risks of privacy violations, limited access for certain social groups, information overload and the possibility of spreading unauthorised advertising

Effective use of Internet resources in the pharmaceutical sector requires the introduction of clear mechanisms for content verification, personal data protection and elimination of technical barriers.

Ensuring a balance between open access to information and its reliability is critical to prevent the dissemination of inaccurate data that may influence clinical decision-making.

Pharmaceutical information can be obtained both through active search and passive consumption of content; each approach has its advantages and limitations depending on the user's level of awareness and specific information needs.

Mobile applications are an effective means of accessing pharmaceutical information, allowing patients and healthcare professionals to quickly obtain reliable data, which helps to improve medication management.

Professional apps such as UpToDate, Medscape, Epocrates support clinical decision-making, while patient apps such as MyTherapy, Drugs.com, Pill Reminder ensure medication adherence and improve communication with healthcare professionals.

Mobile technologies are significantly expanding global access to pharmaceutical information, but the level of their effectiveness is determined by the quality of digital infrastructure and the level of digital literacy in a particular country.

The integration of active and passive channels of information, combined with the use of modern mobile applications, creates the preconditions for increasing the availability of pharmaceutical knowledge and patient safety on a global scale

CONCLUSIONS

The study found that pharmaceutical information is a multidimensional and critical component of the healthcare system. It includes not only data on medicines, but also information on regulatory standards, production, distribution and marketing.

The theoretical analysis showed that pharmaceutical information should be adapted to the needs of the target audience. The division of consumers into professional and consumer levels requires different approaches to the presentation of information - from scientifically based for healthcare professionals to simplified, but reliable, for the general public.

The study of the structure of information channels has shown that both passive and active ways of disseminating information have the right to exist and should be integrated into a single information ecosystem. Passive channels (advertising, mailings, consultations in pharmacies) allow for a wide audience reach, while active channels (independent search, inquiries to specialists, use of mobile applications) ensure targeted and in-depth knowledge acquisition.

The results of the practical part showed a high level of involvement of the population in digital resources. In particular:68% of respondents search for pharmaceutical information on the Internet every day, which confirms the relevance of online channels.32% of respondents use mobile apps daily, and another 38% use them several times a week, which demonstrates the growing role of digital technologies in supporting pharmacotherapy.

Thus, the survey results emphasize the importance of combining electronic resources, personal consultations, and a controlled information environment. The main challenges remain the need to increase digital literacy, improve the quality of information content, and enhance interaction between patients and medical professionals.

Thus, an effective pharmaceutical information system should be based on the principles of reliability, accessibility, integration and user orientation. Ensuring these principles will contribute to the rational use of medicines, reduce health risks and improve the overall level of pharmaceutical awareness of the population.

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ANNEXES

Annex A

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

АКТУАЛЬНІ ПИТАННЯ СТВОРЕННЯ НОВИХ ЛІКАРСЬКИХ ЗАСОБІВ

МАТЕРІАЛИ
XXXI МІЖНАРОДНОЇ НАУКОВО-ПРАКТИЧНОЇ
КОНФЕРЕНЦІЇ МОЛОДИХ ВЧЕНИХ ТА СТУДЕНТІВ

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2025

СЕКЦІЯ 11. СОЦІАЛЬНО-ЕКОНОМІЧНІ, ОРГАНІЗАЦІЙНІ ТА ПРАВОВІ ДОСЛІДЖЕННЯ У ФАРМАЦІЇ
SOCIO-ECONOMIC, ORGANIZATIONAL AND LEGAL RESEARCH IN PHARMACY

will be ready to administer vaccinations on graduation and will not need to undergo additional special training.

Conclusions. Based on the study, the main arguments supporting the feasibility of the vaccination mechanism in pharmacies are summarized, and the historical aspects of the formation and current features of the provision of such services in different European countries are analysed. It is shown that in some countries, such programmes began before the COVID-19 pandemic with influenza vaccination, and in others during the pandemic. It is emphasised that in certain countries pharmacists can vaccinate the population not only against influenza and/or COVID-19, but also against other diseases.

PHARMACEUTICAL INFORMATION: THE ROLE OF MOBILE TECHNOLOGIES

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Introduction. In today's world, information is the most valuable global resource. Among all types of information, pharmaceutical information is a component of scientific and practical information and is closely related to medical information. According to the generally accepted definition, pharmaceutical information is regulatory, statistical, informational, methodological, economic, pharmacoeconomic, and managerial information on the creation, use, and circulation of medicinal products and other pharmaceutical and medical products necessary for the proper implementation of pharmaceutical activities and provision of pharmaceutical care to the population.

Aim. The aim of our study was to investigate the impact of Internet resources and mobile applications on the dissemination of pharmaceutical information

Materials and methods. The study used the methods of information search, sociological survey, and analytical generalization. In January-March 2025, an online survey of 118 respondents, consumers of medicines, was conducted using Google Forms and social networks.

Results and discussions. The survey found that the vast majority of respondents systematically use online resources to obtain pharmaceutical information. In particular, 68% of respondents said they access such sources daily, 22% – 2-3 times a week, and only 10% do so less than once a week.

The level of trust in pharmaceutical information obtained from the Internet was mostly moderate: 69% of respondents gave this assessment. A high level of trust was expressed by 18%, while 13% of respondents characterized it as low. Regarding the critical analysis of online information, 57% of participants said that they usually check it in several sources, while 43% do not.

Discussion of pharmaceutical information obtained from the Internet with medical professionals was not widespread: only 40% of respondents reported contacting doctors or pharmacists to clarify the data, while 60% did not seek additional advice. A separate section of the study was devoted to the use of mobile applications designed to search for or manage pharmaceutical information. According to the survey, 32% of respondents use such applications daily, 38% use them several times a week, and 30% use them less than once a week, which indicates a trend toward increasing popularity of digital technologies in the field of self-management of health.

Based on the data obtained, a number of recommendations have been formulated aimed at improving the mechanisms for disseminating pharmaceutical information using Internet resources and mobile technologies.

- It is necessary to develop official digital platforms with reliable pharmaceutical information.
- It is advisable to implement programs to improve media literacy of the population.
- The role of healthcare professionals as consultants in matters arising from patients' questions after reading online information should be enhanced.
- It is recommended to support the development of functional mobile applications for self-management of pharmacotherapy.
- A certification system for reliable information sources should be introduced to reduce the risk of misinformation.

Conclusions. The study showed the high popularity of Internet resources and mobile applications as sources of pharmaceutical information among the population. At the same time, an average level of trust in online data and insufficient communication with medical professionals after independent information search was found. The findings emphasize the need to develop official digital platforms, increase media literacy of the population, and introduce mechanisms for verifying the accuracy of information.

RESEARCH ON VACCINATION ISSUES IN THE EASTERN MEDITERRANEAN REGION

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Introduction. Immunization is a key component of the global public health strategy, preventing the spread of more than 30 infectious diseases. In the Eastern Mediterranean region, which includes countries with different levels of economic development, the effectiveness of vaccination programs plays a crucial role in maintaining public health. Studying the level of vaccination coverage and existing challenges in this region is relevant in view of the need to achieve the Sustainable Development Goals, in particular SDG 3 – "Ensure healthy lives and well-being for all at all ages".

Aim. To analyze the current state of vaccination coverage in the Eastern Mediterranean region, to identify the main trends

Materials and methods. The WHO reports on immunization coverage were studied using the methods of substantive, comparative analysis and synthesis.

Results and discussions.The analysis of WHO statistics for the period 2010-2023 showed that as of 2023, the region demonstrates a relatively high level of coverage with basic vaccines: DTP (1 dose – 85%, 3 doses – 79%), BCG – 84%, polio (3 doses) – 80%, hepatitis B (3 doses) – 79%. Thus, most countries in the region successfully vaccinate children against major infections and most children receive the necessary doses of vaccine to ensure their protection against these dangerous infections.

Low coverage of the first dose of hepatitis B (46%) and rubella vaccines (68%) indicates the need to strengthen newborn immunization. During the COVID-19 pandemic, a temporary decline in vaccination coverage was recorded, but in subsequent years, the recovery of indicators shows the adaptability of health systems. There has been a gradual increase in coverage of new vaccines, such

Annex B


НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ
МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ
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