



UDK 378:006:615.1

PHARMACEUTICAL EDUCATION IN UKRAINE AND EUROPE

Olena Krupko

PhD Chemical Sciences

ORCID: 0000-0003-2799-3033

*Associate Professor of the Department of Medical and Pharmaceutical Chemistry Bukovyna State**Medical University, Chernivtsi, Ukraine, 58002***Holovata Khrystyna,***student**Faculty of Pharmacy Bukovyna State Medical University,**Chernivtsi, Ukraine, 58002***Udod Sofiia***student**Faculty of Pharmacy Bukovyna State Medical University,**Chernivtsi, Ukraine, 58002*

Abstract. The article examines the basic principles of pharmaceutical education in Ukraine, lists educational institutions where you can get a pharmaceutical education. A comparison of the basic principles of the educational process in pharmaceutical institutions in Ukraine and Germany, France, the Czech Republic, Italy and the UK is carried out. As an example for obtaining higher pharmaceutical education in Ukraine, more detailed information is provided about the Bukovina State Medical University, in particular, the Faculty of Pharmacy.

Keywords: pharmaceutical education, faculty of pharmacy, pharmacy, pharmaceuticals, pharmacist, higher education institutions.

Introduction.

Pharmacy is a rapidly developing industry not only in Ukraine, but also in Europe and the world as a whole. Accordingly, there is a need to train highly qualified specialists in the pharmaceutical field. A modern pharmaceutical specialist in Ukraine must possess both basic professional and cutting-edge knowledge, be a chemist, a pharmacologist, a marketer, and even a psychologist at the same time, since pharmacy employees are often the first people a sick person turns to for help.

The Minister of Health of Ukraine, Viktor Lyashko, announced on his Facebook page the concept of developing pharmaceutical education in Ukraine: “The strategic task of the state is to provide the medical system with highly qualified specialists, in particular pharmacists, and to create opportunities for their development and obtaining modern knowledge. After all, in the future this is the basis of high-quality pharmaceutical care for every Ukrainian.”

The Ministry of Health (MOH) presented a draft concept for the development of



pharmaceutical education in Ukraine. At the same time, the Ministry of Health claims that, in general, the training of pharmacists in Ukraine meets the requirements of Directive 2005/36/EC of the European Parliament and of the Council of 07.09.2005 on the recognition of professional qualifications and is harmonized with the European Qualifications Framework (2017) in terms of the duration of training, the list of mandatory educational components, and the list of competencies, but it requires certain changes.

According to the new concept in the field of pharmaceutical education, it is necessary to solve such problems as personnel, quality of education, development of scientific research in the field of pharmacy, international cooperation and exchange of experience, as well as the development of academic culture and integrity. Also, the comprehensive changes that are included in the draft concept are impossible without optimizing the network of pharmaceutical faculties of higher education institutions. The draft concept was developed by a group of experts of the Ministry of Health in the direction of "Pharmacy. Clinical Pharmacy. Clinical Pharmacology" in accordance with modern standards and experience of the European Union (EU) countries [1].

Presentation of the main material.

Pharmaceutical education in Ukraine can be obtained in 29 educational institutions at the educational-qualification or higher education level [2]. Among the best colleges where you can get a specialty "Pharmacy" are the Chernivtsi Professional Medical College of the Belarusian State Medical University, the Kyiv Basic Medical College named after P. I. Gavros, the Professional Medical College of the National Pharmaceutical University, the Vinnytsia Professional Medical College named after Acad. D.K. Zabolotny and others.

The following educational institutions were included in the ranking of the best higher medical institutions in the specialty "Pharmacy" according to the results of 2023: O.O. Bogomolets National Medical University, Danylo Halytsky Lviv National Medical University, I.Ya. Horbachevsky Ternopil National Medical University, Vinnytsia National Medical University named after M.I. Pirogov, Bukovina State Medical University (BSMU), Dnipro State Medical University, National



Pharmaceutical University (Kharkiv), Zaporizhia State Medical and Pharmaceutical University [3].

Among the best educational institutions where you can obtain the specialty "Pharmacy, Industrial Pharmacy" are recognized BSMU and the relatively young Faculty of Pharmacy of BSMU (founded in 2004).

Also, according to the information published on the information resource "Osvita.ua", Bukovina State Medical University is included in the list of universities in the eastern, western, central and southern regions of Ukraine that took the highest places in the consolidated ranking of higher education institutions in 2023 [4] and occupies an honorable fifth place among the best medical institutions of higher education in Ukraine [5].

According to the results of the 2023 admission campaign, more than four thousand applications for admission were submitted to BSMU. Popular among applicants are such classic specialties as "Medicine", "Dentistry" and the relatively new specialty "Pharmacy, Industrial Pharmacy".

At the Faculty of Pharmacy of BSMU (until 2025), students were recruited for the specialty 226 "Pharmacy, Industrial Pharmacy" (educational degree - Master's) in two forms of study (full-time and part-time), on the basis of complete general secondary education (after grade 11) in full-time form with a study period of 5 years and a previously obtained junior specialist's OCR, educational and professional degree of a professional junior bachelor, educational degree of a junior bachelor in the specialty "Pharmacy, industrial pharmacy" with a study period of 4 years for full-time study and 4.5 years for part-time study (for the 2nd year).

The Faculty of Pharmacy includes eight departments, among which the departments of pharmacy, medical and pharmaceutical chemistry, pharmaceutical botany, and pharmacognosy are graduate departments, which provide training in professionally oriented disciplines of the OPP "Pharmacy, Industrial Pharmacy".

It is also important to note that a structural unit of the Faculty of Pharmacy is a research and educational site for growing medicinal plants, where students undergo practical training in pharmacognosy and pharmaceutical botany. And the presence of a



training and production pharmacy allows students to acquire and master practical knowledge and skills, practice practical skills directly in the workplace, and undergo internships in pharmacy technology, organization, and economics in pharmacy. Also, students of the Faculty of Pharmacy undergo practical training in drug technology at such modern pharmaceutical plants as: JSC "HALYCHPHARM", CJSC "Pharmaceutical Firm "Darnitsa"", and the corporation "YURIA-PHARM".

In addition to the above professionally-oriented areas of activity during their studies at BSMU, students of the Faculty of Pharmacy have the opportunity to take an active part in student self-government, the student council, or develop their creative talents in the acting studio, the Trembina ensemble.

Student self-government unites all students of the institution and provides them with equal rights and opportunities to be elected or elected to the working, advisory, elective or other groups of student self-government bodies, which in turn ensure the protection of students' rights and interests, the creation of conditions for their implementation, the formation of leadership qualities and the formation of a sense of responsibility.

General provisions on student self-government at the Bukovina State Medical University, the purpose of the bodies, the main tasks of student self-government bodies, the rights and obligations of student self-government bodies, BSMU administration regarding interaction with student self-government bodies, structure and organization of work of BSMU student self-government bodies, BSMU student conferences, student council and its rights and obligations and council and chair of the student council, regulations of the Dormitory Council approved by the BSMU student conference.

The Student Council takes an active part in organizing and holding student conferences, charity events, flash mobs, round tables, career guidance events, etc., thus forming universal human values and patriotic spirit of BSMU students. All activities of the Student Council and student self-government are covered on the website "Student Council" (studrada.bsmu.ua).

The faculty pays great attention to the scientific development of students, therefore, each department has scientific student circles where students conduct



scientific research of a practical and theoretical nature, various scientific events, and actively participate in conferences, symposiums, and webinars for students and young scientists at the national and international levels.

While studying at the Faculty of Pharmacy, students study general and specialized pharmaceutical disciplines (inorganic, analytical, organic, pharmaceutical chemistry, pharmacology, toxicology, pharmacognosy, botany, biology, physiology, drug manufacturing technology, economics and organization of pharmacy, and others).

During their studies, students of the Faculty of Pharmacy take two integrated licensing tests, “Step 1” and “Step 2”, in the 3rd and 5th years, respectively. The studies end with passing the state exam and writing and defending a master’s thesis. To obtain a license for professional activity (pharmacist qualification), master’s graduates enter and study in an internship [6].

Pharmaceutical education in Europe has slightly different areas of activity compared to Ukraine: pharmaceutics (production of medicines and therapeutic agents) and pharmacology (the effect of medicines on the human body). For example, consider the specialty of a pharmacist in Germany, which is one of the most sought-after specialties.

For example, let's consider the specialty of a pharmacist in Germany, which is one of the most sought-after specialties. The peculiarities of obtaining a pharmaceutical education in Germany are related to the fact that not every university offers it. For example, the University of Bonn is only one of several dozen universities in Germany where you can get a pharmaceutical education. The number of places at the university is limited, the selection process is highly competitive, so you need to have high grades to get in. There are some advantages for foreign students, for example, there are separate quotas, which eliminates competition for places at the university with German applicants. The peculiarities of the training are related to the fact that it is possible to obtain a pharmaceutical education only in German (pharmacy is one of the specialties that is strictly controlled by the state).

Education at pharmaceutical universities in Germany is clearly structured and follows a system that requires passing state exams (Staatsexamen). However, there are



universities that train specialists in the field of pharmacy and follow the "bachelor-master" system, whose graduates are allowed to work only in industry. After receiving a bachelor's degree, you can continue your studies in a master's program and thus improve your qualifications and expand your opportunities in the labor market.

Studying according to the classical model (with passing state exams) lasts five years and takes place in three stages. The first four semesters are devoted to basic pharmaceutical education (Grundstudium). During this time, students study general subjects - mathematics, physics, general chemistry, biology. After completing this stage, students must complete eight weeks of mandatory practice in a pharmacy or pharmaceutical company (Famulatur). After successfully passing the first state exam, the main study (Hauptstudium) begins. During these four semesters, attention is paid to narrowly focused disciplines: pharmaceutical chemistry, pharmaceutical biology and pharmaceutical technology, pharmacology and clinical pharmacy. After this, there is a second state exam, which covers all five complex and voluminous subjects. After passing the state exam, the practice of pharmacist students continues [7].

It is important to note that pharmacy diplomas obtained outside the European Union are not recognized in France and beneficiaries of international protection must first complete training to obtain a French diploma and be able to work. To work as a pharmacist in a pharmacy, you must obtain a pharmacy diploma from the DEUST (Diplôme d'études universitaires scientifiques et techniques). The diploma is obtained after two years of internship after completing general secondary education. In addition, it is also possible to obtain a professional qualification for work in a hospital, and for this you already need to obtain another pharmacist diploma (internship or study for 1 year), which allows you to work in a hospital pharmacy PPH (Préparateur en pharmacie hospitalière).

In the Czech Republic, pharmaceutical education meets European standards and modern trends - during training, the emphasis is on clinical pharmacology and pharmacoeconomics. The competition for obtaining a pharmaceutical education in Czech higher education institutions is not as high as for medicine (the admission success rate is 60–80%). At the same time, the difficulty of studying at the faculties of



pharmacy in the Czech Republic is comparable to the difficulty of studying at medical specialties. Today, in the Czech Republic, pharmaceutical education can be obtained at only two faculties – the Faculty of Pharmacy in Hradec Králové of Charles University and the Faculty of Pharmacy of Masaryk University in Brno. Regarding the employment of pharmacists in the Czech Republic, it is worth noting the stable demand for pharmacist positions on the labor market (almost one hundred percent of graduates of pharmaceutical faculties are employed).

The Faculty of Pharmacy of Masaryk University in Brno is a completely new faculty with a modern concept. Until the 2020–2021 academic year, pharmacy in Brno was studied at the University of Veterinary Medicine and Pharmacy. Pharmacist training in the Czech Republic lasts five years continuously until obtaining a master's degree. The curriculum meets the current state of pharmaceutical sciences and the needs of Czech and European practice, and also meets the objectives of the European Association of Pharmaceutical Faculties. The main subjects studied include organic and inorganic chemistry, biophysics, Latin, pharmacology, and molecular biology. Part of the training is a mandatory six-month internship in a pharmacy. A graduate of the "Pharmaceuticals" educational program is a qualified medical professional with theoretical and practical knowledge in the field of drugs and medicinal products, pharmaceutical technologies, physical, chemical, biological, microbiological and clinical evaluation of drugs and medicinal products. The curriculum allows students to specialize by choosing their own subjects. Graduates are qualified to provide information on all aspects of medicine and to provide advisory services in the areas of prevention, early detection of diseases, health promotion, and the use of medicines by health professionals and the public [8].

If we consider employment statistics in Italy, then out of 10 new jobs, 8 are in the IT or pharmaceutical sectors. That is, the specialty of a pharmacist is on the list of top and promising. In Italy, there are 12 large enterprises and a large number of small and medium-sized companies (174 enterprises) employing 63 thousand employees with constant employment growth for more than 10 years. The development of the pharmaceutical industry is rapidly growing and developing thanks to investments in



technological renewal. Thus, financial companies finance more than 90% of pharmaceutical research. It is this approach that stimulates the development of pharmaceutical education in Italy.

A prerequisite for admission to educational institutions for obtaining a pharmacist's education is knowledge of the Italian language and passing an entrance exam. The bachelor's program involves 3 years of study with courses: medical and pharmaceutical biotechnology, pharmaceutical biotechnology, chemical and toxicological environmental safety, herbal science, scientific information about medicines and medical products, applied pharmaceutical sciences - quality control. And the Master of Pharmacy diploma, as a single cycle, studies chemical and pharmaceutical technologies and pharmaceutical business [9].

The UK pharmaceutical industry has a greater impact on the UK economy than any other high-tech sector. The pharmaceutical industry offers graduates the chance to play a major role in the development of new medicines at all existing product stages with employment opportunities. The Bachelor of Pharmaceutical Sciences course is designed to create a new generation of pharmaceutical scientists capable of working at all stages of the drug development process as part of an interdisciplinary research team.

Queen's University Belfast's School of Pharmacy is consistently ranked among the best British pharmacy schools in the Times Good University Guide (for excellence in teaching and international reputation in research). The School of Pharmacy has developed close links with a variety of industry partners through research and teaching at local, national and international levels, which are sponsored by the school. Thanks to this approach, the school uses a wide range of modern teaching tools and methods, and has a well-equipped laboratory for pharmaceutical engineering, analytical, molecular biology, advanced microscopy, tissue culture, and microbiology. Graduates with a Bachelor of Pharmaceutical Sciences degree in the UK have high employment prospects, or can pursue a career in the pharmaceutical and medical device industries, in areas related to research, development, or manufacturing of pharmaceuticals. And local employers and professional organizations sponsor prizes annually for the best students in their level and module [10].



Conclusions.

Despite such different approaches to pharmaceutical education, starting with educational programs and ending with employment opportunities in Ukraine and European countries, a common task remains - high-quality professional training of pharmaceutical education applicants.

To this end, it is necessary to improve the quality of pharmaceutical education by constantly reviewing and updating its content, through the creation of an industry-wide system of qualifications for pharmaceutical workers, and through constant monitoring of international requirements for the knowledge, skills, abilities, and professional competencies of pharmaceutical workers.

It is important to note the active participation in the development of pharmaceutical institutions in Europe of the so-called sponsors (industry, business) who invest in the development of the pharmaceutical industry and education.

In Ukraine, for the better development of pharmaceutical education and pharmaceutical institutions in general, it is necessary to attract international grants, support small and large pharmaceutical businesses, and create new and modern laboratories with the necessary instrumental equipment at the European level.

References:

1. <https://thepharma.media/uk/news/35699-farmosvita-v-ukrayini-rozvivatimetsya-za-novoyu-koncepcijeyu-04092024>
2. <https://osvita.ua/vnz/guide/search-17-0-0-74-0.html>
3. <https://buki.com.ua/news/specialnist-farmacevt-osoblivosti-navcannia-i-pracevlastuvannia-u-2024-roci/>
4. <https://osvita.ua/vnz/rating/25716/>
5. <https://osvita.ua/vnz/rating/42226/>
6. <https://www.bsmu.edu.ua/pharm/>
7. https://osvita.ua/abroad/higher_school/germany/30411/
8. <https://www.gostudy.cz/uk/blog/sovety-eksperta/farmaczevtika-v-vuzah-chehii>



9. <https://shumska.wordpress.com/2016/04/08/farma/>

10. <https://www.bakalavratosvita.com/institutions/queens-university-belfast/bakalavr-farmacevtichnih-nauk>