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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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ALIGNMENT OF HEALTHCARE TRAINING CRITERIA IN UKRAINE WITH EUROPEAN STANDARDS

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Abstract.

Introduction: Providing medical care for the population in the context of modern societal development requires a constant review of specialist training standards in medicine. Currently, Ukraine is undergoing a process of harmonising its medical education standards with European requirements, which is an important step towards integration into the common European educational space and ensuring a high quality of medical personnel training. The study aimed to analyze the key aspects of harmonising medical education in Ukraine with European standards and the challenges and prospects of this process at the current stage of societal development.

Methods: To create a narrative review, we implemented a bibliographic method to gather and analyze the relevant literature.

Results: As a result of the research, it was identified that the most significant changes needed in the harmonisation process concern educational programmes, postgraduate education, and the accreditation system.

Conclusions: Now, medical education has a promising future. Firstly, the balance between theoretical training and practical learning of higher education students is to be improved, the postgraduate education and certification system of doctors is to be developed, international cooperation and mobility programmes to be carried out, and finally, medical education to have improved infrastructure and funding.

Key words. Critical thinking, medical students, problem-based learning, case method.

Introduction.

Containing such a vast scope of subjects and offering such outstanding possibilities, such a vast affectedness of medical education specificities, and continuous improvement in this field makes it impossible to undertake the activities statically, and the change of things takes place. Providing high-quality healthcare by medical education standards depends on an integral part of the population's urgent needs and health status [1-3].

Harmonising Ukraine's medical education standards with the European requirements is a fundamental precondition for integrating Ukraine into a common European educational space and providing high-quality medical personnel training [4-6]. This problem, in particular, is important in modern conditions because the quality of medical education directly affects the ability to provide healthcare, considering the interdisciplinary interaction in different cultural paradigms [7-9]. The unification of educational programmes facilitates mutual recognition of diplomas, simplifies professional certification works, and fulfils the typical clinical standards in the scope of the healthcare sphere.

Since gaining independence, Ukraine has been implementing medical education reforms, emphasising the best practices of European countries, taking into account EU Directive 2005/36/EC, the Bologna Process, and international medical standards that define the requirements for educational structure, assessment methods, and postgraduate training of doctors [5]. While significant progress has been made in this direction, numerous issues still require resolution [5].

Literature Review.

Medical education standards include curricula and courses that meet modern medical science requirements and global standards, particularly those of the World Federation for Medical Education (WFME) [10]. Guidelines exist for training specialists in basic, postgraduate, and continuing medical education. However, the issue of universal medical education standards remains controversial due to differences in training programmes, accreditation assessment systems for educational institutions, internship and residency systems, and the challenges of funding educational processes in different countries [11].

However, European Union (EU) countries persist in shaping common ways regarding medical education to gratify the quality of services in the region's health care [7]. To develop a standardised system of accreditation and certifying medical institutions meeting the standards for medical specialist training and for the recognition internationally of medical qualifications, as well as for the professionalism of specialists and the free circulation of such professionals, harmonisation of medical specialist training standards applies across different countries [1,12-14]. With a global focus on reforms in medical education in European countries, a competence-based and systematic European medical education framework is created globally [7,3]. Active discussions relate to the assessment of teaching processes and the inclusion of modern scientific improvements in the training of medical staff [7,15-19].

The integration of European approaches into medical training in Ukraine is carried out through changes in curricula, implementation of European knowledge assessment criteria, and adaptation of postgraduate education to international practices

[4,5,20,6]. Against this backdrop of the pandemic and the military conflict, solving several urgent challenges complicates the harmonisation of medical education [14].

The article's objective was to study the aspects of harmonising medical education in Ukraine with European norms and the challenges and prospects of such a process in the given stage of social development.

Methods.

The bibliographic method is the basis for the methodological basis of the study. The study document search was done in the PubMed, Google Scholar and Scopus databases from June 2024 to January 2025.

The keywords used in this study were: [medical education], [Ukraine], [European standards], [Bologna process], [ECTS], [postgraduate medical training], [residency], and [WFME standards].

We applied inclusion criteria that consisted of peer-reviewed articles, official documents, and strategy papers published from 2018 onward, prioritizing open access sources whenever possible.

The documents that formed the primary sources of the analysis were the following groups of documents: European Union directives on medical education, documents from World Health Organization, Global Competence Framework of the medical education standards, regulatory acts of the Cabinet of Ministers of Ukraine, educational standards of the National Agency for Higher Education Quality Assurance of Ukraine (NAZYAVO).

In total, we included 30 sources (Figure 1).

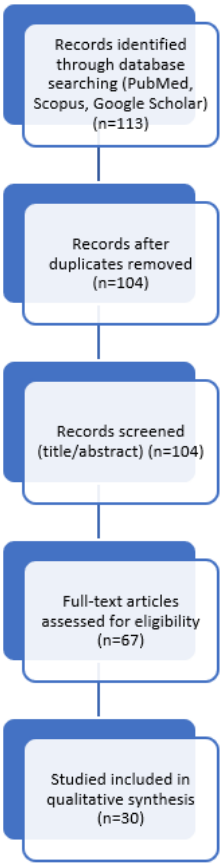

Figure 1. *PRISMA Flow Diagram of Literature Selection Process.*

Results.

Reforming medical education during independence:

The reforms to integrate the medical education sector into the European educational space have been underway in Ukraine since the country gained independence [21]. Between 1991 and 2004, a series of reforms were implemented to introduce modern curricula and new approaches to the accreditation of educational institutions [4,5]. Ukrainian educational institutions actively participated in student and faculty exchange programmes such as Erasmus+ and Tempus [22].

In 2005, at the Conference of European Ministers of Education in Bergen (Norway), Ukraine joined the Bologna education system, which was adopted in 1999 by 29 European countries [23,7]. This model is the foundation of the modern educational system in Ukrainian higher education institutions, including medical universities. The Bologna system was introduced to create a unified space that ensures mutual recognition of diplomas and qualifications; sufficient mobility of teachers and students for studying or teaching in other countries without losing status or qualification; implementation of pan-European standards for knowledge and competence assessment; alignment of curricula with international labour market requirements; and the introduction of the European Credit Transfer and Accumulation System (ECTS) [7]. Another important step was adopting European accreditation criteria for Ukrainian educational institutions [14]. As of 2024, 100% of Ukrainian medical universities officially implement the ECTS system (Eurydice, 2024).

The further development of medical education reforms has been focused on increasing the competitiveness of higher medical education in Ukraine and bringing it to a qualitatively new level [4]. According to the "Higher Education Development Strategy in Ukraine for 2022–2032" [5], the revision of the essential medical education content is based on the latest achievements in modern medical science and evidence-based medicine. A key element is the rigorous selection of students for medical specialisations. Additionally, significant attention is given to improving the quality of independent student performance assessments and the continuous professional development of medical university educators. The reform of postgraduate education includes introducing a fair allocation system for internships and standardising their content [24,5]. Furthermore, launching a residency programme and ensuring the continuous professional development of healthcare professionals based on best international practices remain priorities.

The shift in the funding mechanism for medical education includes a transition to a performance-based model and the implementation of autonomy for higher medical education institutions (academic, financial, and organisational autonomy).

Establishing academic integrity principles in educational institutions is a crucial step in combating plagiarism and other forms of academic dishonesty. The internationalisation of medical education also remains a priority.

The development of scientific research includes improving the material resources available for research, encouraging Ukrainian scientists to conduct high-quality studies published in leading international scientific journals, and enhancing the

quality of dissertations. According to the European Education and Culture Executive Agency (2024), over 1,200 Ukrainian medical students and faculty participated in Erasmus+ in the 2022–2023 academic year. Based on the Higher Education Strategy 2022–2032, the percentage of Ukrainian medical graduates participating in international clinical rotations increased from 4.3% (2015) to 11.7% (2022).

Challenges of reforming medical education in Ukraine:

Thus, since independence, there has been significant progress in harmonising Ukrainian medical education standards with European ones, but several unresolved issues remain (Table 1). First of all, there are still differences in approaches to teaching, with a predominance of theoretical part in Ukrainian higher education institutions (HEIs), while in EU countries, medical education is mainly focused on a more practical approach [25,17]. Ukrainian higher education institutions lack modern equipment, access to advanced medical technologies, and funding [5].

Postgraduate medical education in Ukraine requires significant modernisation [5,24]: prolonged practical training with advanced specialisation; standardisation of postgraduate education programmes by WFME and EU directives, which will allow Ukrainian doctors to obtain diplomas recognised in Europe; an increase in the proportion of practical training, with an emphasis on internships in clinics and hospitals that meet international standards; the introduction of unified qualification exams and independent competence assessments; the expansion of international cooperation, taking into account internship programmes, exchanges, dual-degree programmes, and integration into the European system of continuous medical education for doctors [13].

Problems of medical education in Ukraine during the pandemic and war:

Recent years have posed significant challenges for Ukraine's medical education system. The COVID-19 pandemic and the full-scale war have had a profound impact on the reform process, accelerating specific changes while simultaneously creating new challenges [26-27].

During the pandemic, not only in Ukraine but also in many EU countries, higher medical education institutions transitioned to remote learning [26,27]. This led to the digitalisation of the educational process and the widespread implementation of online platforms, which, to some extent, positively influenced the development of medical education. However, alongside

Table 1. *The main challenges at the current stage of harmonisation of Ukrainian medical education standards with European standards.*

Challenge	Description	Level of Complexity	Recommended Actions
Differences in approaches to training	In Europe, medical education is more competence-based, while in Ukraine, the academic approach emphasising theoretical knowledge still dominates.	High	Update curricula to ensure early clinical exposure; introduce competence-based learning
Insufficient practical training	In the EU, there is more emphasis on clinical skills and patient care in the early stages of training. In Ukraine, practice often starts later and is smaller.	High	Invest in simulation centers; require practical rotations from year 1
Regulatory barriers	Significant differences exist between the licensing and accreditation of medical programmes in Ukraine and the EU, which complicates the recognition of Ukrainian diplomas.	High	Revise licensing and accreditation rules to align with EU frameworks; initiate bilateral agreements
Insufficient integration with international programmes	The limited number of student exchanges, internships and double degree programmes makes it difficult for Ukrainian graduates to adapt to the European system.	Medium	Expand Erasmus+ participation; develop joint degree and internship programs
Lack of a single standard for postgraduate education	In Europe, there are precise requirements for postgraduate studies (internships, residencies), while in Ukraine, the system is still being transformed.	High	Implement residency structure by specialty; develop national standards aligned with WFME
Language of instruction	Most European countries require knowledge of the national language or English for medical practice, which can be a barrier for Ukrainian graduates.	Medium	Offer English-medium tracks and language training; provide medical language certification
Equipment and technology	European universities have more modern equipment and access to advanced medical technologies, which are often lacking in Ukrainian institutions.	High	Secure funding for modern labs and simulation tools via public-private partnerships and EU grants
Financing of education	Medical education in Europe is better funded, which affects the quality of teaching, faculty salaries, and access to international research.	High	Introduce performance-based funding model; prioritize investments in teaching quality
Recognition of Ukrainian diplomas	Despite certain agreements, not all EU countries recognise Ukrainian medical diplomas without additional exams or confirmation of qualifications.	Medium	Develop unified EU-Ukrainian validation exam; strengthen academic mobility programs
Military and political factors	War and political instability have affected the possibility of integration into the European educational space, limiting the mobility of students and teachers.	High	Maintain continuity of reforms; promote partnerships with EU universities for displaced institutions

these advancements, limited hospital access significantly reduced the quality of students' practical training. Due to the virus's rapid spread, curricula were adjusted to focus more on infectious diseases, epidemiology, and methods of remote diagnosis and treatment. Additionally, due to the shortage of doctors at the pandemic's peak, some students graduated early and were recruited to work in medical institutions.

The war has created even more severe challenges [25,26,14]. Many medical universities and hospitals have been destroyed or forced to relocate, complicating the educational process. At the same time, there has been an increased demand for emergency medical training, leading to the introduction of courses on tactical medicine, emergency care, and fieldwork. Although Ukraine is actively adapting its medical education system to European standards during the war, issues such as a shortage of lecturers – some of whom have left the country or been mobilised – a decline in student numbers due to transfers to European universities, and insufficient funding for civilian medical education have emerged, as priorities have shifted towards military medicine.

During the war, Ukraine received significant support from the international community, particularly in medical education [14], which played a crucial role in overcoming the challenges faced by Ukrainian medical universities. Through academic mobility programmes such as Erasmus+, Ukrainian students and lecturers can study and undertake internships abroad, gaining experience from leading European medical institutions. It facilitates curriculum adaptation to modern international standards of the specialities and gives access to the advances of the specialities of medicine.

Furthermore, great emphasis has been placed on joint research projects to analyse the influence of war on public health and develop means for improving health care. In addition, European universities contribute to Ukrainian medical institutions' humanitarian and technical support by supplying essential equipment, educational materials, and connections to modern simulation centres.

As we note here, it also includes expanding opportunities for lecturers' and student professionals' development. This has enabled Ukrainian specialists to gain access to internships at leading European clinics, where they can apply the latest technologies and treatment methods [25]. In addition, medical professionals are being trained through specialised training programmes to prepare for work in such situations, particularly in these conditions.

Innovative approaches to the development of medical education:

New approaches are introduced to modern medical education in the EU countries to form the scoring educational environment for training medical professionals who can independently provide quality patient care considering the recent advances and geopolitical processes.

These approaches include integrating digital technologies like telemedicine and artificial intelligence, intercultural competence, and the application of modern educational methods, such as Continuous Quality Improvement (CQI), Problem-Based Learning (PBL), and Case-Based Learning (CBL).

With the coronavirus pandemic motivating the inclusion of telemedicine and digital technology training in the educational process, future doctors can learn remote means of diagnosis, consultation and treatment [16]. Practical training sessions based on telemedicine platforms are included to teach students to work in a digital medical environment. Additionally, the use of electronic health records, clinical decision-making support systems, and mobile applications, among other things, and working with artificial intelligence are all necessary to the subject.

Introducing cultural competence modules to the educational curriculum will help students engage with patients from different ethnic and sociocultural backgrounds [28,29,19,27]. Simulation training and educational case studies will provide a mechanism for students to acquire the necessary skills for working in multicultural environments.

Continuous Quality Improvement (CQI) is one of the key concepts in modern medical practice, which involves constant analysis and improvement of clinical processes [15]. Thus, incorporating CQI into medical curricula helps students sharpen skills that include assessing healthcare quality, implementing changes, and enhancing the use of evidence-based medicine and treatment approaches.

The use of problem-based learning (PBL) and case-based learning (CBL) methods is implemented to enhance student motivation and actively engage them in studying both fundamental disciplines (histology, physiology, biochemistry) and clinical practice [30, 18]. Both methods aim to integrate science and practice, fostering students' collaboration and critical thinking skills, yet they are based on different approaches and objectives.

The PBL approach involves students working on solving a specific problem, which is typically unstructured and may have multiple possible solutions [18]. The learning process includes independent information retrieval, data analysis, hypothesis development, and the formulation of an action plan. Incorporating PBL into medical education programmes allows students to learn through real clinical cases, ensuring a deeper understanding of medical processes, preparing them for real-world work conditions, and enhancing their clinical reasoning skills.

The CBL (Case-Based Learning) method involves instructor-led learning through an in-depth analysis of specific real-life cases that are carefully prepared and have clearly defined circumstances and outcomes [30]. This method also fosters the development of clinical reasoning, decision-making skills, and teamwork abilities. The use of case-based learning in medical education enables students to apply theoretical knowledge in practice, develop analytical and synthesis skills, and prepare for real-life clinical situations.

Discussion.

The study of the state of harmonisation of Ukrainian medical education with European standards has been conducted to identify critical differences in the standards of the two education spheres that need to be improved.

Ukraine continues to predominantly utilise an academic/critical theoretical stance, as opposed to competence, by adopting a

clinical approach whereby students' involvement in clinical practice is involved from much earlier during their education [25]. Such requires further modernisation of curricula in which students actively participate in hospital work. Furthermore, improving the educational process by increasing integration within the international educational space through participation in Erasmus+ and Horizon Europe programmes and cooperation with foreign medical universities [14] will occur. With the introduction of problem-based learning, case-based learning, simulation techniques and online learning platforms, it is possible to align medical education with the updated standards of medical practice [30,15,18].

The main issue is standardising postgraduate medical education. The system of medical specialisation through residency in the EU is strictly regulated, and in Ukraine, it is in the embryonic stage. Implementing a residency system following the European model requires financial resources, updates to the regulatory framework, and improvements in mechanisms for assessing graduates' competences.

Another pressing issue is the insufficient material and technical support for the educational process, including the availability of modern medical equipment and simulation centres. Addressing this problem requires increased state funding, the attraction of grants and international investments in medical education, and the implementation of transparent accreditation mechanisms [20,7].

One of the primary factors influencing the state of reforms in medical education is the ongoing war, which has lasted for almost three years [14]. The full-scale hostilities in Ukraine, the destruction of medical institutions, and large-scale migration processes have shifted priorities in workforce training towards the need to prepare specialists in emergency and tactical medicine, as well as an increased demand for mental health professionals. At the same time, this crisis period has accelerated the reform of the medical education sector and expanded international cooperation.

The Proposed Roadmap for Medical Education Reform in Ukraine (2025–2027) is shown in Figure 2.

The reform of medical education in Ukraine from 2025 to 2027 will follow a structured plan focusing on four key areas:

1. Curriculum Modernization (2025–2026).

- Fully integrate competence-based education with early clinical exposure throughout all years of training.
- Expand simulation-based learning using EU-accredited platforms.
- Implement digital modules nationwide on telemedicine, artificial intelligence (AI), and intercultural competence.

2. Postgraduate Education and Residency (2025–2027).

- Pilot structured residency programs in high-priority specialties, including internal medicine, family medicine, and mental health.
- Develop a national framework for residency accreditation based on World Federation for Medical Education guidelines.
- Introduce unified final assessments and digital portfolios for residents.

3. Accreditation and Quality Assurance (2025–2026).

- Transition medical universities to outcomes-based internal and external quality evaluations.
- Partner with European accreditation bodies for joint evaluation exercises.
- Mandate the inclusion of Continuous Quality Improvement (CQI) indicators in university reporting.

4. Internationalization and Mobility (2025–2027).

- Increase participation in Erasmus+ and Horizon Europe programs by 30%.
- Launch at least five dual-degree or co-supervised PhD programs with EU universities.
- Establish regional centers of excellence for training in English and facilitate cross-border cooperation.

This roadmap aims to enhance the quality and competitiveness of medical education in Ukraine, aligning it with international standards and practices.

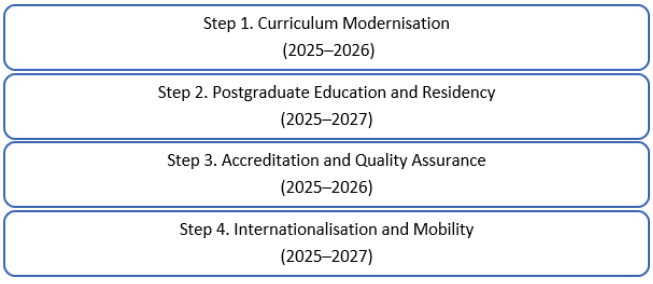

Figure 2. *Proposed Roadmap for Medical Education Reform in Ukraine (2025–2027).*

Conclusion.

Ukraine is actively harmonising its medical education with European standards; however, this process is still far from complete. The areas requiring the most significant changes include curricula, postgraduate education, and the accreditation system. Promising directions for the further development of medical education include improving the balance between theoretical training and practical learning for higher education students, enhancing postgraduate education and the physician certification system, expanding international cooperation and mobility programmes, and improving the infrastructure and funding of medical education.

Statements of Declarations.

Ethics approval: This research did not involve human participants, animal subjects, or any material that requires ethical approval.

Consent to participate: This study did not involve human participants, and therefore, informed consent was not required.

Availability of data and materials: The data will be available with the corresponding author and will be made available upon request via email.

Competing interest: Authors declare no competing interests.

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