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O. Voloshyna
Odesa National Medical University, Odesa, Ukraine

The Use of Artificial Intelligence Technologies in Higher Medical Education: Benefits, Possible Risks and Ways to Improve

Introduction. Generative artificial intelligence (AI) technologies are rapidly being integrated into medical education due to new learning and teaching capabilities. J. S. Izquierdo-Condoy et al. categorize the impact of AI on medical education into four main areas: interactive learning tools, intelligent assessment systems, administrative and logistical support, and content creation [10]. Interactive learning tools, such as AI assistants and AI-driven chatbots like Chat Generative Pre-trained Transformation (ChatGPT), facilitate dialogue-based learning, allowing students to practice history-taking and improve communication skills through simulated patient encounters.

Furthermore, AI-based simulations, including virtual surgical assistants, patient avatars, and procedural simulators, offer a safe, immersive environment where students can refine their diagnostic and technical skills without patient risk [11].

AI technologies enable the creation of innovative educational strategies, revolutionary teaching methods, curriculum development, content design, and the evaluation of various academic processes. This makes AI an indispensable tool for medical education, contributing both to the transfer of knowledge and practical skills and to the continuous improvement of educational systems [11, 19].

N. Komasawa and M. Yokohira believe that AI technologies hold great promise for clinical practice to enhance efficiency, communication, and patient care [13]. By summarizing clinical guidelines, AI can assist physicians by generating differential diagnoses or even drafting patient-friendly explanations of medical conditions [4]. Moreover, due to its multilingual capabilities, generative AI has the potential to improve communication with diverse patient groups and overcome language barriers in global healthcare delivery. Generative AI also plays a valuable role in patient empowerment and chronic disease management [21]. Conversational AI systems can provide lifestyle advice, medication reminders, and mental health support, allowing patients to participate more actively in their care. By creating tailored educational content, these systems can improve health literacy and encourage preventive behavior among the general population [13].

However, despite the undeniable benefits of AI in teaching and learning, warnings are increasingly raised in the literature regarding ethical issues in presenting clinical cases, the risk of undermining academic integrity, and concerns over students' dependence on AI to complete assignments [10].

The aforementioned highlights the necessity for research and continuous, unbiased oversight of AI technology integration into the educational process. It is essential to highlight positive achievements while identifying problems and risks to timely build an optimal strategy for using AI in medical education.

The aim of the study. Based on the analysis of modern scientific publications, to investigate the benefits and potential risks and to determine ways to improve the use of artificial intelligence technologies in higher medical education.

Materials and methods. For this review, a targeted literature search was conducted on PubMed and Google Scholar. PubMed was selected to search for peer-reviewed literature in medical journals, while Google Scholar was used to include emerging research in interdisciplinary journals covering AI, education, and simulation that might not be indexed in biomedical databases. The search was performed using the keywords: artificial intelligence, medical education, virtual patient, and clinical simulation. This search was conducted in April 2026. A total of 268 conceptual articles, cohort studies, and literature reviews were analyzed. Articles focusing on the clinical application of AI without any educational outcomes, papers on medical education without any simulation, virtual reality / augmented reality (VR / AR), or virtual patients, and highly technical articles lacking a clear learner focus were excluded.

Duplicates were removed, and if two articles discussed the same content, the later publication was prioritized. Abstracts without full-text access, conference proceedings, or articles in languages other than English and Ukrainian were also excluded.

Results and discussion. One of the primary objectives of modern medical education is to train physicians capable of utilizing advanced technologies, particularly AI, to ensure high-quality diagnosis and treatment. Generative AI is being rapidly adopted into the educational process of future physicians, regardless of the preferences of governing bodies or the potential negative attitudes of certain educators or higher education institutions. The integration of artificial intelligence into the training of future physicians opens new perspectives for medical education, fostering the development of core professional competencies [2, 4]. I. Kryvenko, K. Chaly believe that in this context, it is crucial to consider learning strategies that promote the development of foundational AI literacy, critical analysis, and the effective integration of innovative solutions into the educational process [2]. Educational strategies oriented toward AI integration not only enhance data handling skills but also provide a deeper understanding of the ethical and legal aspects of digital technology utilization.

One of the main advantages of AI in the educational process is its ability to adapt educational content and assessments to the individual needs of higher education students, facilitating more efficient knowledge acquisition and deeper conceptual understanding [18]. Furthermore, AI technologies, including virtual reality, intelligent tutoring systems, and medical robotics, provide handson learning experiences. These tools foster the development of clinical reasoning, surgical technical skills, and medical imaging interpretation, while delivering personalized feedback and adaptive, individualized learning methodologies [20].

AI-driven virtual assistants and chatbots, such as ChatGPT, facilitate dialogue-based learning, allowing students to practice history-taking and improve communication skills through simulated patient encounters [7]. Meanwhile, J. Hale et al. [7] write that while the capabilities of generative AI in higher education are expanding, there remains a lack of quantitative evidence regarding its use to improve learning outcomes.

The use of generative AI offers potential benefits for both educators and students. Engaging students with these tools can enable them to understand clinical experiences while helping them recognize their limitations [7].

Based on the analysis of literature sources, the following main benefits of implementing AI in medical education can be identified:

Personalization of learning. AI provides the opportunity to adjust the complexity of practical cases depending on the individual knowledge of a student or intern. For instance, creating a personalized 24/7 tutor, according to research by H. Lee, J. Park [14], allows students to use generative AI to explain complex biochemical processes or pharmacological interactions, adapting explanations to the specific student's level of knowledge, which significantly accelerates material retention.

Among various AI applications for educational use, Google's NotebookLM offers distinct advantages [1]. Unlike general-purpose generative AI models, NotebookLM analyzes exclusively user-uploaded materials and ensures high accuracy of responses with clear citations. Based on a comparative analysis, O. V. Bardadym, S. F. Harkavyy [1] demonstrated the key advantages of this AI application: working with structured sources, multimodal data presentation formats (text, audio, video, mind maps), as well as features for learning, analysis, and teaching. The platform serves as an effective tool for students and educators by automating routine tasks and creating an interactive, adaptive learning environment. NotebookLM is positioned as a complement to general-purpose generative AI models, focused on the deep processing of specific sources and supporting academic integrity.

Adaptability of individual learning trajectories. This is best manifested when using chatbots and virtual patients to teach clinical skills. Specifically, S. Hasan et al. believe that AI-powered Simulation-Based Medical Education (SBME) is transforming the training of physical examination and procedural skills [9]. The use of VR simulators with AI feedback, such as Surgeon Simulator VR, allows students to learn necessary surgical skills and receive assessments of manipulation accuracy (e.g., in endoscopy or blood sampling) without the constant presence of an instructor. The authors believe that the advantages of artificial intelligence in the higher medical education system can enhance learning [9].

J. Singh et al. examine in detail the advantages and disadvantages of using chatbots for primary medical care [21]. The authors note that chatbots can significantly facilitate the primary diagnostic process, but simultaneously emphasize the importance of precise AI prompts to avoid errors in recommendations that could lead to dangerous consequences for patients. This requires medical universities to integrate relevant knowledge into medical informatics and digital medicine courses so that future physicians can operate such systems at an appropriate level.

Another benefit of using AI technologies in medical education is safety during the application of chatbots, virtual patients, or AI-powered simulators. This allows students to make mistakes while practicing various clinical skills without harming a real patient, enabling them to practice the skill an unlimited number of times [20].

Objectivity of assessment. The use of automated checklists and motion analysis in simulators eliminates the issue of instructor subjectivity [6]. However, M. Liu et al. in a meta-analysis that included 45 studies on the performance of different ChatGPT versions in medical licensing examinations, concluded that GPT-4 demonstrates significant potential for future use in medical education [15]. Yet, due to insufficient accuracy, inconsistent performance, and challenges related to varying medical policies and knowledge across different countries, GPT-4 is not yet suitable for direct deployment in medical education. The authors established that question complexity affected the

performance of GPT-3.5 and GPT-4. In image-based multiple-choice questions, ChatGPT's accuracy rate fluctuated from 13.1 % to 100.0 %. ChatGPT performed significantly worse on open-ended questions than on image-based ones, which should be considered when preparing test or exam questions.

Reduction of cognitive load. AI helps structure vast amounts of clinical protocols, textbooks, and guidelines, facilitating their assimilation. J. S. Izquierdo-Condoy et al. write that AI tools like ChatGPT, Gemini, Claude, and LLaMA are increasingly integrated into medical education, assisting students with a range of tasks, including clinical reasoning, literature review, scientific writing, and formative assessment [10]. While these tools offer significant advantages in terms of productivity, personalization, and cognitive support, their impact on critical thinking - the cornerstone of medical education - remains uncertain.

Clinical decision support (CDS). Research by N. Komasawa, M. Yokohira shows that interns who used AI applications to verify drug dosages or interpret rare symptoms demonstrated 30 % fewer diagnostic errors during the training stage [13].

The application of AI tools in shaping professional competencies appears promising [3, 16]. In particular, K. Chaly, I. Kryvenko [3] view AI models as additional interactive tools in forming professional competence, capable of assisting in clinical scenario modelling and data analysis. It is emphasized that AI does not replace standardized clinical decision support systems (CDSS), and the proper application of chatbots requires an evidence-based approach [3, 16].

Publications indicate that the use of generative AI in medical education provides new opportunities for both educators and students. However, while seminars, workshops, conferences, and advanced training courses on AI basics are increasingly organized for teachers, this issue remains unresolved for students in many countries [22, 23].

Thus, the cited publications demonstrate that AI holds great promise as a learning aid and educational tool in medical education. Although research on its application in this field is encouraging, further studies with objective assessments and control groups are required to conduct more definitive comparisons. Specifically, E. Hallquist et al. believe that before integrating artificial intelligence into teaching or personal learning, educators and students must understand the principles, capabilities, and limitations of machine learning [8]. Although comfort levels with AI vary across different groups, short introductory sessions have been shown to effectively reduce anxiety when encountering this technology.

The rapid implementation of AI applications in learning and teaching demonstrates not only benefits but also certain risks and drawbacks. J. S. Izquierdo-Condoy et al. [11] point out that this primarily concerns ethical considerations, the risk of undermining academic integrity, and raises concerns about students' reliance on AI to complete tasks, triggering critical questions among educators. Artificial intelligence offers significant opportunities to transform medical education, but its implementation must be ethical, equitable, and pedagogically sound.

A serious disadvantage is the problem of "hallucinations" and false references, i. e., the risk of misinformation, where AI generates plausible-sounding but factually incorrect content [13, 24]. For example, large language models can fabricate academic references that appear authentic but do not actually exist, leading to misinformation in scientific or clinical contexts. Additionally, they may suggest implausible differential diagnoses, such as linking pneumonia with endocrine disorders without clinical justification, potentially misleading learners [26]. In a medical context, such errors can directly impact patient safety, highlighting the need for rigorous oversight and expert verification of AI-generated information [13].

In their scientific work, S. A. Wartman and C. D. Combs note that interns often fail to verify the sources provided by AI [25]. This is critical in medicine, where AI can invent the title of a protocol or reference a non-existent study, which in real practice could lead to a medical error and requires constant verification by an expert educator.

Limitation of educational medical information when students use only AI instead of textbooks, manuals, or curriculum guidelines during training. Specifically, A. M. Fazlollahi et al. in their study on surgical curriculum design and unpredictable outcomes of technical competencies in simulation training, described how integrating AI into curricula can cause unintended changes in certain areas of competence, underscoring the need for expert human oversight when using AI [5].

One of such drawbacks can be *"deskilling"* L. Zhang, D. Miller focus attention on the risk of "intellectual laziness" [27]. If a student gets used to receiving a ready-made differential diagnosis from AI, their own capacity for critical analysis and symptom synthesis may degrade. There is a risk that over-reliance on AI prompts during data analysis (e. g., ECG or X-rays) will impair the student's ability to think independently [4].

Ethical challenges and plagiarism. S. A. Wartman, C. D. Combs highlight the issue of blurring the boundaries of one's own work. Students often use AI to write case histories or scientific abstracts, which calls into question the objectivity of evaluating their real skills [25]. Students may use artificial intelligence to write essays, generate assignments, or even fabricate research data, raising complex issues related to authorship, originality, and integrity [24].

In parallel, there is growing concern that over-reliance on AI tools in education and practice could undermine critical thinking and clinical reasoning skills among healthcare professionals. As the use of generative artificial intelligence becomes more widespread, healthcare systems must establish clear guidelines for its ethical and responsible use. N. Komasawa, M. Yokohira believe that over-reliance on AI tools can hinder the development of essential abilities, such as clinical reasoning, diagnostic acumen, and ethical decision-making [13]. These skills are fundamental to the medical profession and require conscious cultivation through problem-solving,

reflection, and guided practice. Generative AI, if used without constraints, may inadvertently undermine these developmental processes and promote superficial learning.

M. M. Mir et al. write that medical education should include awareness regarding the use of artificial intelligence as a component of professionalism, teaching future healthcare providers not only how to use AI tools but also how to recognize their limitations, critically interpret their results, and adhere to the principles of patient-centred care [17].

Technological gap and cost. Unequal access to advanced AI simulators among different educational institutions and the need for specialized training for the educators themselves [4, 13, 16].

Insufficient awareness of AI technologies in education among students. H. Sorg et al., using an online survey of medical students from 38 German faculties, asked about various topics related to digitalization [22]. The majority of students (70.0 %) indicated that they had not had any university courses on digital topics. The authors note that digitalization in medicine is progressing faster than it can be implemented in practical work. Higher education students have varying understandings of technology, and medical schools lack educational training. M. Teng et al. analyzed the results of a survey involving 2.167 students from 10 different medical professions across 18 universities in Canada [23]. The study showed that students, even those opposed to AI, identified the need to include basic training on AI use in their program.

Absence of a unified strategy for the implementation and application of AI in medical education in Ukraine and many countries worldwide. L. Zheng, Y. Xiao, based on data from a global cross-sectional survey involving 4.596 students across 48 countries, concluded that the positive impact of using AI in education exerts a stronger positive effect on the knowledge of students from developing countries [28]. Conversely, the negative impact on enthusiasm for AI adoption is more pronounced among students from developed nations, where advanced AI programs are more prevalent. These results emphasize the importance of balanced AI education to enhance knowledge while addressing the challenges of its integration into education. The authors propose prioritizing empirical and practice-oriented learning.

Thus, generative AI technologies are becoming a significant part of the educational process due to their numerous advantages. However, chaotic, uncontrolled use of AI poses certain risks and drawbacks for medical education, which requires serious attention to the implementation of AI applications in the learning process.

Ways to improve the application of AI technologies in medical education.

- *Formulating a state strategy* for the implementation of AI technologies in medical education, considering both the benefits and risks of its application. Implementing personalized AI education considering disciplinary and regional needs. It is advisable to develop and offer specialized programs for students and healthcare professionals to acquire and certify knowledge and skills in the field of AI use.
- The basis for the optimal use of AI in medical education is the *regular updating of the educational program*, incorporating specific knowledge of AI technologies as well as the ethical issues of its application. Medical curricula must be revised to include structured modules on AI ethics, protection of patient personal data, and data confidentiality within the diagnostic and treatment process.
- *Improving educators' knowledge and skills* regarding the use of AI technologies in the educational process, emphasizing training in proper prompt formulation to obtain accurate clinical information (*Prompt engineering for medical professionals*).
- *Enhancing AI literacy for students.* Students must be taught to distinguish evidence-based data from AI "hallucinations," to use verified data, and to master the skill of structuring AI prompts to obtain precise responses (*Prompt engineering for higher education students*).
- *Transformation of clinical simulations*, meaning the transition from static manikins to adaptive systems, particularly the use of AI to create virtual patients that change their status in real-time depending on the treatment prescribed by the student (intern or physician).
- The *objectification of competence assessment using AI* appears promising. Instead of single-choice tests, dynamic assessment is proposed, meaning that AI analyzes the student's trajectory of thinking while solving a clinical problem, rather than just the final result. To evaluate competencies, it is advisable to compile a competency portfolio, utilizing AI to track the progress of each intern's skill throughout the entire training period.
- It also appears necessity to *improve regulatory control* regarding the use of AI in medical practice. N. Komasawa, M. Yokohira believe that physicians must bear professional responsibility for reviewing and verifying any results generated by AI before utilizing them in patient care [13].

Researchers and educators should further evaluate different learning approaches to enhance students' integration of generative AI tools for both non-clinical and clinical medical training and practice.

Conclusions. The prospects of implementing generative AI in medical education are primarily driven by its advantages: personalization and adaptability of learning; new educational technologies, including virtual reality, intelligent tutoring systems, and the objectivity of assessing knowledge, skills, and other professional competencies.

However, when applying AI, "AI hallucinations" (i. e., incorrect answers), the risk of impairing the student's ability to think independently, and ethical issues can arise. All these risks and problems require oversight, regulatory control, and close attention from all members of society to improve the public healthcare system.

Among the ways to improve the implementation of AI in education, the following are proposed: creating a unified strategy for the implementation and application of AI in medical education in Ukraine; facilitating the improvement of knowledge and skills of educators and students regarding the use of AI technologies in the educational process; and regularly updating educational curricula to ensure the ethical use of AI technologies in teaching and training future physicians.

References

1. Бардадим ОВ, Гаркавий СФ. Learnlm (llm) як сучасна модель самоосвіти. Електронні інформаційні ресурси: створення, використання, доступ і управління. Збірник матеріалів Міжнародної науково-практичної інтернет-конференції 20–21 лист 2025 р. Суми / Вінниця: НІКО / КЗВО «Вінницька академія безперервної освіти»; 2025. 39–40 (Bardadym OV, Harkavyy SF. Learnlm (llm) as a modern model of self-education. Electronic information resources: creation, use, access and management. Collection of materials of the International scientific and practical Internet conference Nov 20-21, 2025. Sumy / Vinnytsia: NIKO / KZVO "Vinnytsia Academy of Continuing Education"; 2025. 39-40).
2. Кривенко І, Чалий К. Штучний інтелект у підготовці майбутніх лікарів: освітні стратегії та практичні підходи. Інтеграція штучного інтелекту в освіту – виклики та можливості. Збірник тез науково-методичних доповідей Всеукраїнського науково-педагогічного підвищення кваліфікації (Київ, 10 груд 2024 р. – 20 січ 2025 р.). Київ; Львів; Торунь: Національний університет фізичного виховання і спорту України, Liha-Pres; 2025. 415–419 (Kryvenko I, Chaly K. Artificial intelligence in the training of future doctors: educational strategies and practical approaches. Integration of artificial intelligence into education - challenges and opportunities: collection of abstracts of scientific and methodological reports of the All-Ukrainian Scientific and Pedagogical Advanced Training (Kyiv, Dec 10, 2024 - Jan 20, 2025). Kyiv; Lviv; Torun: National University of Physical Education and Sports of Ukraine, Liha-Pres; 2025. 415-419). doi: 10.36059/978-966-397-477-4
3. Чалий К, Кривенко І. Медичні чат-боти на основі штучного інтелекту: аспекти формування професійної компетентності. Перспективи та інновації науки. 2025;1(47):1261–1273 (Chaly K, Kryvenko I. Medical chatbots based on artificial intelligence: aspects of forming professional competence. Prospects and Innovations of Science. 2025;1(47):1261-1273). doi: 10.52058/2786-4952-2025-1(47)-1261-1273
4. Шостакович-Корецька ЛР. Застосування штучного інтелекту в клінічній медицині, наукових дослідженнях та освіті в умовах воєнного стану. Інфекційні хвороби. 2025;2(120):71–77 **(**Shostakovich-Koretska LR. Application of artificial intelligence in clinical medicine, scientific research and education under martial law. Infectious Diseases. 2025;2(120):71-77). doi: 10.11603/1681-2727.2025.2.15302
5. Fazlollahi AM, Yilmaz R, Winkler-Schwartz A, Mirchi N, Ledwos N, Bakhaidar M et al. AI in surgical curriculum design and unintended outcomes for technical competencies in simulation training. JAMA Netw Open. 2023;6(9):e2334658. doi: 10.1001/jamanetworkopen.2023.34658
6. Grévisse C. LLM-based automatic short answer grading in undergraduate medical education. BMC Med Educ. 2024;24(1):1060. doi: 10.1186/s12909-024-06026-5
7. Hale J, Alexander S, Wright ST, Gilliland K. Generative AI in undergraduate medical education: A rapid review. J Med Educ Curric Dev. Jan 2024;11:23821205241266697. doi: 10.1177/238212052412666
8. Hallquist E, Gupta I, Montalbano M, Loukas M. Applications of artificial intelligence in medical education: A systematic review. Cureus. 2025;17(3):e79878. doi: 10.7759/cureus.79878
9. Hasan S, Ahmed A, Ismail FW. The evolving role of AI in simulation-based medical education: A narrative review. Adv Med Educ Pract. 2026;17:581691. doi: 10.2147/AMEP.S581691
10. Izquierdo-Condoy JS, Arias-Intriago M, Tello-De-la-Torre A, Busch F, Ortiz-Prado E. Generative artificial intelligence in medical education: Enhancing critical thinking or undermining cognitive autonomy? J Med Internet Res. 2025;27:e76340. doi: 10.2196/76340
11. Izquierdo-Condoy JS, Arias-Intriago M, Montero Corrales L, Ortiz-Prado E. Artificial intelligence in medical education: Transformative potential, current applications, and future implications. JMIR Med Educ. 2026;12:e77127. doi: 10.2196/77127PMID
12. Jalali A, Harbi Houssein K, Fotsing S. Twelve practical tips for integrating AI into medical education: Tutorial to support educators across teaching, research, administration, and ethical domains. JMIR Med Educ. 2025;11:e81297. doi: 10.2196/81297
13. Komasawa N, Yokohira M. Generative artificial intelligence (AI) in medical education: A narrative review of the challenges and possibilities for future professionalism. Cureus. 2025;17(6):e86316. doi: 10.7759/cureus.86316
14. Lee H, Park J. Artificial intelligence in health professions education: qualitative study of student experiences. J Med Int Res. 2026;28:e82432. doi: 10.2196/82432
15. Liu M, Okuhara T, Chang X, Shirabe R, Nishiie Y, Okada H et al. Performance of ChatGPT across different versions in medical licensing examinations worldwide: Systematic review and meta-analysis. J Med Internet Res. 2024;26:e60807. doi: 10.2196/60807
16. Masters K. Artificial intelligence in medical education: AMEE Guide No. 171. Med Teach. 2025;47(3):215-230.
17. Mir MM, Mir GM, Raina NT, Mir SM, Miskeen E et al. Application of artificial intelligence in medical education: Current scenario and future perspectives. J Adv Med Educ Prof. 2023;11(3):133-140. doi: 10.30476/JAMP.2023.98655.1803
18. Narayanan S, Ramakrishnan R, Durairaj E, Das A. Artificial intelligence revolutionizing the field of medical education. Cureus. 2023;15(11):e49604. doi: 10.7759/cureus.49604
19. Pedro L. Applications of artificial intelligence in medical education. Int J Clin Med Res. 2026;4:78. doi: 10.61466/ijcmr4010003
20. Riddle EW, Kewalramani D, Narayan M, Jones DB. Surgical simulation: Virtual reality to artificial intelligence. Curr Probl Surg. 2024;61(11):101625. doi: 10.1016/j.cpsurg.2024.101625
21. Singh J, Sillerud B, Singh A. Artificial intelligence, chatbots and ChatGPT in healthcare. Narrative review of historical evolution, current application, and change management approach to increase adoption. J Med Artif Intell. 2023;6. doi: 10.21037/jmai-23-92
22. Sorg H, Ehlers JP, Sorg CGG. Digitalization in medicine: Are German medical students well prepared for the future? Int J Environ Res Public Health. 2022;19(14):8308. doi: 10.3390/ijerph19148308
23. Teng M, Singla R, Yau O, Lamoureux D, Gupta A, Hu Z et al. Health care students' perspectives on artificial intelligence: Countrywide survey in Canada. JMIR Med Educ. 2022;8(1):e33390. doi: 10.2196/33390
24. Walters WH, Wilder EI. Fabrication and errors in the bibliographic citations generated by ChatGPT. Sci Rep. 2023;13(1):14045. doi: 10.1038/s41598-023-41032-5

25. Wartman SA, Combs CD. Medical education must move from the information age to the age of artificial intelligence. Acad Med. 2018;93(8):1107-1109. doi: 10.1097/ACM.0000000000002044
26. Xu X, Chen Y, Miao J. Opportunities, challenges, and future directions of large language models, including ChatGPT in medical education: A systematic scoping review. J Educ Eval Health Prof. 2024;21:6. doi: 10.3352/jeehp.2024.21.6
27. Zhang L, Miller D. AI hallucinations in medical pedagogy: Risks of using large language models for clinical reasoning. BMC Medical Education. 2025;25(1):445. doi: 10.1186/s12909-025-06789-x
28. Zheng L, Xiao Y. Refining AI perspectives: Assessing the impact of ai curricular on medical students' attitudes towards artificial intelligence. BMC Med Educ. 2025;25(1):1115. doi: 10.1186/s12909-025-07669-8

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The Use of Artificial Intelligence Technologies in Higher Medical Education: Benefits, Possible Risks and Ways to Improve

O. Voloshyna

Introduction. The integration of generative artificial intelligence into medical education is driven by its innovative teaching and learning technologies.

The aim of the study. Based on the analysis of contemporary scientific publications, to investigate the benefits, potential risks, and to identify ways to improve the utilization of artificial intelligence technologies in higher medical education.

Materials and methods. Publications in English and Ukrainian that were included in the databases PubMed and Google Scholar until May 2026 were analyzed. The search was carried out using the following keywords: artificial intelligence, medical education, virtual patient, chat bots.

Results. The analysis of publications allowed for the formulation of the main benefits, as well as the potential risks and drawbacks of applying AI in higher medical education. The advantages of artificial intelligence are personalization and adaptability of learning; new learning technologies, including virtual reality, intelligent tutoring systems, objectivity in assessing knowledge and skills and other professional competencies. On the other side risks and challenges require oversight and regulatory framework, alongside close attention from all members of society to this issue, aiming to improve the public healthcare system.

Conclusions. The study highlights the necessity of establishing a unified strategy and regulatory framework for the application of artificial intelligence in medical education in Ukraine, as well as promoting the improvement of knowledge and skills of both educators and learners at both undergraduate and postgraduate stages of medical education.

Keywords: artificial intelligence, higher medical education, virtual patient, chat bots.

Використання технологій штучного інтелекту у вищій медичній освіті: переваги, можливі ризики і шляхи вдосконалення

О. Б. Волошина

Вступ. Упровадження генеративного штучного інтелекту (ШІ) у медичну освіту зумовлено його новітніми технологіями викладання і навчання.

Мета. На підставі аналізу сучасних наукових публікацій дослідити переваги, можливі ризики, визначити шляхи вдосконалення використання технологій ШІ у вищій медичній освіті.

Матеріяли й методи. Проаналізовано публікації англійською й українською мовами, які увійшли до наукометричних баз PubMed та Google Scholar до травня 2026 р.

Результати. Аналіз публікацій уможливив сформулювати основні переваги та ймовірні ризики й недоліки застосування ШІ у вищій медичній освіті, які вимагають нагляду та нормативного регулювання.

Висновки. Визначено потребу створити єдину стратегію та нормативне регулювання застосування ШІ в медичній освіті в Україні, що сприятиме поліпшенню знань і вмінь викладачів і здобувачів освіти на додипломному та післядипломному етапах медичної освіти.

Ключові слова: штучний інтелект, вища медична освіта, віртуальний пацієнт, чат-боти.

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Information about the author

Olena Voloshyna; Odesa National Medical University, Head of Department of Internal Medicine No. 2 with Postgraduate Education (2 Valikhovsky Lane, Odesa, 65082; 380(48) 723 42 49); Professor, Doctor of Medical Sciences; +380(67) 484 01 16; obv5@ukr.net; https://orcid.org/0000-0002-7685-7313