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## INTEGRATION OF ARTIFICIAL INTELLIGENCE INTO MEDICAL EDUCATION AND FUTURE PRACTICE: STUDENTS' EXPERIENCES, RISKS, AND PERSPECTIVES

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### ІНТЕГРАЦІЯ ШТУЧНОГО ІНТЕЛЕКТУ В МЕДИЧНУ ОСВІТУ ТА МАЙБУТНЮ ПРАКТИКУ: ДОСВІД, РИЗИКИ ТА БАЧЕННЯ СТУДЕНТІВ

**Abstract.** The article examines the features, priority goals, and risks of integrating artificial intelligence (AI) technologies into medical education. The work examines how future doctors implement digital tools in their training and assess their role in future practice. A survey of 79 4th and 6th year students of the Ternopil National Medical University named after I. Ya. Horbachevsky, who study “Obstetrics and Gynecology”, revealed a paradox. On the one hand, AI has become a part of daily routine for 67.1 % of respondents, another 31.6 % turn to it several times a week. The main advantage is the optimization of time spent: 97.5 % of respondents confirmed significant resource savings. However, the implementation is superficial, as 100 % rely on general-purpose text language models (ChatGPT, Claude) rather than specialized medical software. Expert assistants (UpToDate, Glass AI) are integrated by only 8.9 % of respondents, and image generation programs by 6.3 %.

It was found that 83.5 % of students turn to AI to search for clinical protocols; 67.1 % to prepare for the KROK/OSKI exams; 67.1 % to solve clinical problems or write case histories, and only 17.7 % to translate articles. An important aspect was the analysis of self-assessment of prompting skills on a 5-point scale: 12.7 % of students rated them 5 points, 36.7 % rated them 4 points, 46.8 % rated them 3 points, and 3.8 % rated them 2 points. Despite high confidence, 93.7 % of respondents personally encountered AI “hallucinations” – the generation of non-existent facts. Future doctors are clearly aware of the risks of degradation of clinical thinking (63.3 %,  $n = 50$ ), getting used to “easy answers” (65.3 %,  $n = 52$ ), and unconscious assimilation of false information (43.0 %,  $n = 34$ ). The introduction of mandatory discipline in medical AI was fully supported by 23.4 % ( $n = 18$ ) of respondents, actively supported with reservations by 18.2 % ( $n = 14$ ), and taken in a neutral position by 45.5 % ( $n = 35$ ).

Based on the data obtained, it is concluded that medical students demonstrate a high intensity of AI use against the background of a critical shortage of work with profile software and a high frequency of encounters with neural network errors. The results justify the need for a strategic transformation of higher medical education – a transition from ignoring technology to the implementation of systematic training in medical prompting, data verification methodology, and digital hygiene for the safe use of AI in future practice.

**Keywords:** artificial intelligence; medical education; large language models (LLM); students' digital literacy; AI hallucinations; clinical reasoning.

**Анотація.** Статтю присвячено дослідженню особливостей, пріоритетних цілей та ризиків інтеграції технологій штучного інтелекту (ШІ) у медичну освіту. У роботі вивчено, як саме майбутні лікарі впроваджують цифрові інструменти у навчання та оцінюють їхню роль у майбутній практиці. Опитування 79 студентів IV та VI курсів Тернопільського національного медичного університету імені І. Я. Горбачевського, які вивчають «Акушерство та гінекологію», виявили парадокс. З одного боку, ШІ став частиною щоденної рутини для 67,1 % опитаних, ще 31,6 % звертаються до нього кілька разів на тиждень. Головною перевагою названо оптимізацію витраченого часу: суттєву економію ресурсу підтвердили 97,5 % респондентів. Проте впровадження має поверхневий характер, оскільки 100 % застосовують текстові мовні моделі загального призначення (ChatGPT, Claude), ігноруючи профільний медичний софт. Експертні асистенти (UpToDate, Glass AI) інтегрують лише 8,9 % опитаних, а програми для генерації зображень – 6,3 %.

Установлено, що 83,5 % студентів звертаються до ШІ для пошуку клінічних протоколів; 67,1 % – для підготовки до іспитів КРОК/ОСКІ; 67,1 % – для розв'язання клінічних завдань чи написання історій хвороб, і лише 17,7 % – для перекладу статей. Важливим аспектом став аналіз самооцінки навичок промптингу за 5-бальною шкалою: на 5 балів їх оцінили 12,7 % студентів, на 4 бали – 36,7 %, на 3 бали – 46,8 %, на 2 бали – 3,8 %. Попри високу впевненість, 93,7 % респондентів особисто стикалися з «галюцинаціями» ШІ – генерацією неіснуючих фактів. Майбутні лікарі чітко усвідомлюють ризики деградації клінічного мислення (63,3 %,  $n = 50$ ), звикання до «легких відповідей» (65,3 %,  $n = 52$ ) та неусвідомленого засвоєння помилкової інформації (43,0 %,  $n = 34$ ). Упровадження обов'язкової дисципліни з медичного ШІ повністю підтримали 23,4 % ( $n = 18$ ) опитаних, активно підтримали із застереженнями 18,2 % ( $n = 14$ ), а нейтральну позицію зайняли 45,5 % ( $n = 35$ ).

На основі отриманих даних зроблено висновок, що студенти-медики демонструють високу інтенсивність використання ШІ на тлі критичного дефіциту роботи з профільним софтом та високої частоти зіткнень із помилками нейронмереж. Результати обґрунтовують необхідність стратегічної трансформації вищої медичної освіти – переходу від ігнорування технології до впровадження системного навчання медичному промптингу, методології верифікації даних та цифрової гігієни для безпечного застосування ШІ в майбутній практичній діяльності.

**Ключові слова:** штучний інтелект; медична освіта; великі мовні моделі (LLM); цифрова грамотність студентів; галюцинації ШІ; клінічне мислення.

**Introduction.** The rapid evolution of artificial intelligence (AI) technologies, and in particular the emergence of generative large language models (LLMs) such as ChatGPT, Claude, and Gemini, has triggered fundamental shifts in the architecture of higher medical education (Ren et al., 2026). The current generation of higher education students increasingly integrates digital tools into their self-study, learning optimization, and clinical information retrieval processes. This technological leap opens unprecedented opportunities for personalized learning, rapid access to international databases, and enhanced preparation for licensing exams (KROK, OSKI). The implementation of adaptive educational tools, intelligent virtual patient simulators, and generative clinical scenarios enables students to master professional competencies in realistic settings without clinical risk (Jalali et al., 2025).

However, unlike the humanities or technical sciences, the specifics of the medical field require absolute accuracy and verification of knowledge, because the price of a future doctor's mistake is human life. This issue is especially acute when studying fundamental clinical disciplines, in particular "obstetrics and gynecology". This field requires not only a deep theoretical base but also instant clinical thinking, the ability to make decisions in urgent situations, and strict adherence to national and international clinical protocols.

The current global discourse suggests that while AI demonstrates enormous clinical potential, its systemic impact on medical education methodology remains limited because academic programs are not keeping pace with technological progress (Shaw et al., 2025; Duan et al., 2025). Studies of student acceptance of technology in different countries reveal an optimistic, yet cautious attitude: future professionals recognize the ability of AI to optimize preparation time (up to 60.3 % of respondents) and to learn complex medical concepts more effectively compared to traditional lectures (Sami et al., 2025; Li & Qin, 2023). At the same time, there are significant gender and qualification gaps: interns and graduate students demonstrate a higher level of digital awareness than junior students, and women express significantly greater concern about the legal and ethical implications of implementing AI (Duan et al., 2025; Sami et al., 2025).

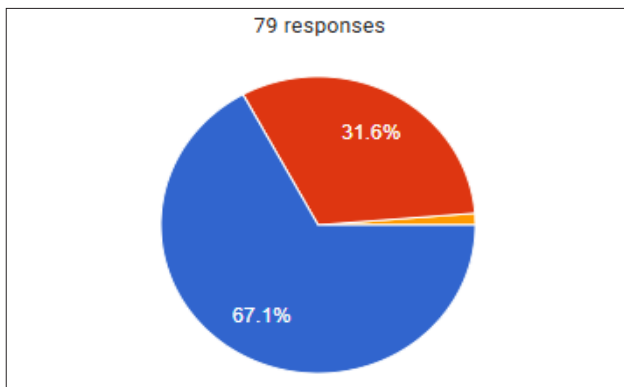
Leading international researchers are increasingly paying attention to the phenomenon of AI "hallucinations" – the system's generation of plausible but completely false medical information,

the invention of sources, or the distortion of drug dosages – because LLM algorithms are not constrained by strict medical rules (Mess et al., 2025). In addition, there are well-founded concerns about the decline in critical thinking among students, the formation of cognitive dependence on "quick answers" and the erosion of the principles of academic integrity (Jalali et al., 2025; Sun et al., 2023). No less critical in obstetrics and gynecology practice is the bioethical aspect – the protection of patients' personal data and confidentiality when using AI assistants, AI scribes, and language models in clinical documentation (Jalali et al., 2025; Mess et al., 2025; Tierney et al., 2024).

Despite a significant number of publications in Western journals, where bibliometric analysis records an exponential growth in interest in educational AI since 2018 (Li & Wu, 2025), similar studies remain rare in Ukraine. Most existing work focuses on general theoretical aspects of AI in radiology or surgery (Shaw, 2025; Sun, 2023), whereas research on the real-world experiences, behavioral patterns, digital literacy, and subjective attitudes of medical students in clinical departments during obstetrics and gynecology studies is fragmentary. There is a clear lack of empirical data on whether Ukrainian students can formulate accurate medical prompts, whether they are willing to openly disclose the use of AI to teachers, and how they assess legal liability for algorithmic errors. This makes our work highly relevant and practical.

**The aim of the article** is to analyze the experience of using artificial intelligence tools by fourth- and sixth-year higher education students while studying the discipline of "Obstetrics and Gynecology," to investigate their attitudes toward the integration of AI technologies into the educational environment, and to assess their perceptions of the benefits, risks, and prospects of applying these tools in future professional and clinical medical practice.

**Methods.** The study was conducted at the Department of Obstetrics and Gynecology No. 2 of the I. Ya. Horbachevsky Ternopil National Medical University of the Ministry of Health of Ukraine. The scientific work lasted during the fall semester of 2025 and the spring semester of 2026 (the total period covered September 2025 – April 2026). 79 (40 4th-year students and 39 6th-year students) from the medical faculty (Ukrainian students) studying the discipline "Obstetrics and Gynecology" participated in the study on a voluntary, anonymous basis. A specialized questionnaire was developed



**Fig. 1. Distribution of respondents by frequency of use of neural networks**

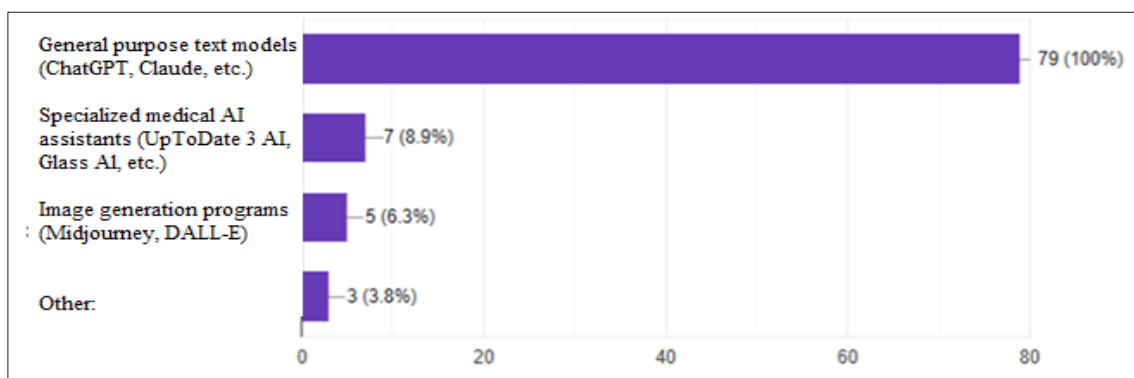
to assess medical students' experience, level of awareness, and subjective attitudes towards the use of artificial intelligence (AI) in the educational space and in their future profession. The survey instrument consisted of 8 questions, including closed-ended questions with one or more answer options and Likert-type rating scales (1–5). Primary data collection was conducted digitally via Google Forms. The survey results were analyzed using descriptive statistics. The data are presented in the form of absolute values (number of students, n) and relative values (percentages, %).

**Results and Discussion.** The analysis of the respondents' baseline experience (fig. 1) showed

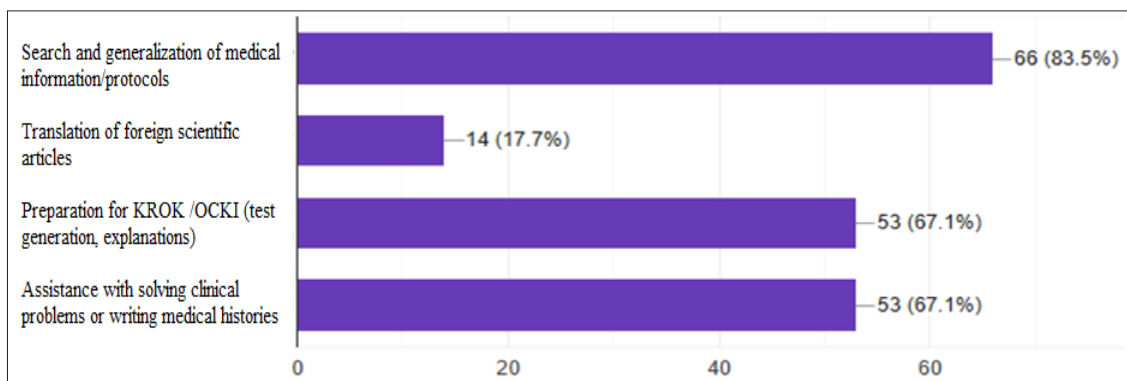
a high frequency of integration of AI technologies into learning. In particular, the majority of students (67.1 %, n = 53) reported using AI tools daily. Another 31.6 % (n = 25) of respondents turn to neural networks several times a week, and only one student (1.3 %) uses these technologies several times a month.

When studying the software students prefer (provided that multiple-choice options were available), it was found (fig. 2) that all respondents (100 %, n = 79) most often use large general-purpose text language models (ChatGPT, Claude, etc.). Only 8.9 % (n = 7) of respondents integrate specialized medical AI assistants (such as UpToDate with AI functions, Glass AI, etc.) into their work. Image generation programs (Midjourney, DALL-E) are used by 6.3 % (n = 5) of students, and 3.8 % (n = 3) indicated using other AI tools.

The priority goals of using AI assistants when studying clinical disciplines were distributed as follows (multiple options were allowed): 83.5 % (n = 66) of students turn to AI to search and summarize medical information and clinical protocols; 67.1 % (n = 53) of respondents use technologies to prepare for licensing and practically-oriented exams (KROK, OSKI), including the generation of test tasks and explanations for them; 67.1 % (n = 53) of respondents use AI as an auxiliary tool for solving clinical tasks or writing case histories; Only 17.7 % (n = 14) of students use AI assistants to translate foreign scientific articles.



**Fig. 2. Distribution of AI programs and tools by popularity of use among respondents**



**Fig. 3. Main directions of integrating artificial intelligence into the educational process of medical students**

An important aspect of the study was the analysis of students' subjective assessments of their own skills in formulating accurate medical prompts (requests) for AI, rated on a 5-point scale (1 = "I don't know how to do it at all" and 5 = "I write professional requests"). The analysis showed (fig. 4) that none of the respondents (0 %) chose the minimum score ("I can't do it at all"). Overall, students demonstrated a high level of confidence in their digital competencies: 12.7 % (n = 10) of students rated their skills at a maximum of 5 points, indicating that they were able to create professional medical queries; 36.7 % (n = 29) of respondents rated themselves at 4 points ("very well informed"). The majority of respondents – 46.8 % (n = 37) – rated their skills at 3 points ("I can"). Only 3.8 % (n = 3) of students rated their level as low, selecting 2 points on the rating scale.

The main advantage of integrating AI into learning was the optimization of the time spent. Significant savings in time resources during preparation for classes were confirmed by 97.5 % of respondents (fig. 5): for 32.9 % (n = 26) AI saves "a lot of time", for 34.2 % (n = 27) – "a lot of time", and for 30.4 % (n = 24) – "just saves time". Only 2 students (2.5 %) reported that technology does not optimize their time.

At the same time, a critical problem is the low reliability of the generated content. The absolute majority of respondents – 93.7 % (n = 74) – confirmed that they had personally encountered the phenomenon of AI "hallucinations" when systems issued false, non-existent, or fabricated medical information. Only 6.3 % (n = 5) of students had never registered such errors.

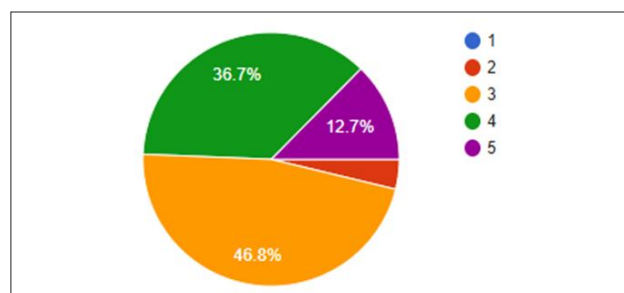
Awareness of this problem directly correlates with the assessment of the main dangers of using AI (respondents could choose up to 2 options): 65.3 % (n = 52) of students see a threat in getting used to "easy answers" without independent in-depth analysis; 63.3 % (n = 50) of respondents fear a decrease in critical and clinical thinking skills; 43.0 % (n = 34) of respondents called the main risk the unconscious assimilation of erroneous medical information.

The block of questions devoted to predicting the future demonstrated a restrained-positive, but balanced attitude of future specialists towards AI. When assessing the statement "Fundamentals of working with medical AI should become a mandatory discipline in medical universities" on a 5-point scale, the respondents' opinions were distributed as follows (fig. 6). 45.5 % (n = 35) of students took a neutral position (3 points), while 18.2 % (n = 14) of respondents actively supported this idea (4 points), recognizing its importance for the future of healthcare, although they expressed some reservations about the readiness of universities, the quality of teaching, or the potential overload of

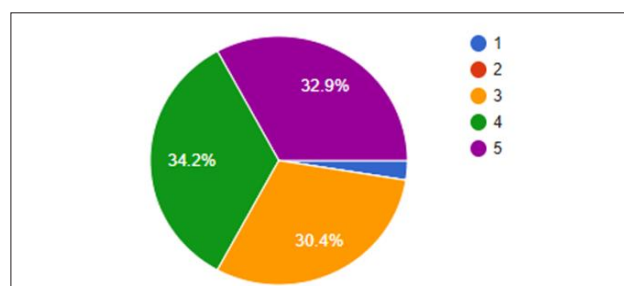
the curriculum. The idea that the basics of working with medical AI should become a mandatory subject in medical universities was strongly supported by 23.4 % (n = 18). Only one student categorically disagreed with the need to introduce such a course (1 point).

In their future direct medical practice, students see AI exclusively as an auxiliary tool, not a replacement for human capital (fig. 7): 57.0 % (n = 45) of respondents consider AI as a quick interactive reference guide to modern clinical protocols; 25.3 % (n = 20) plan to delegate routine work to technologies, using them as an assistant for maintaining medical documentation; 13.9 % (n = 11) of respondents intend to use AI to obtain a "second opinion" during differential diagnosis of complex clinical cases. Only 3.8 % (n = 3) of students see AI as a real threat that can fully or partially replace the functions of a doctor in the future.

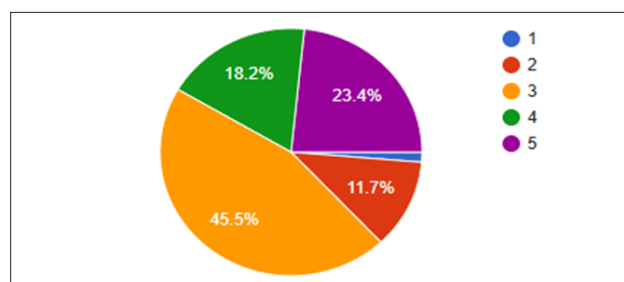
The professional maturity and high level of legal awareness of future doctors are clearly visible



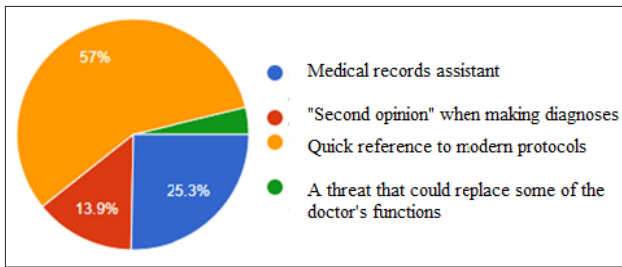
**Fig. 4. Medical students' confidence level in medical prompting skills (on a 5-point scale)**



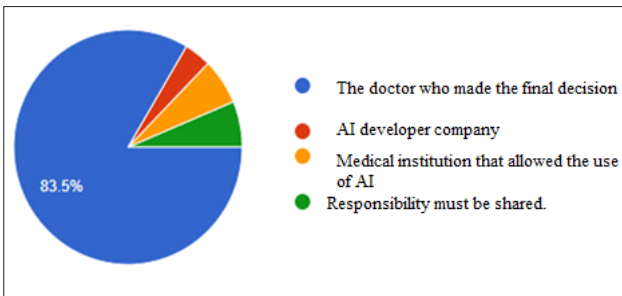
**Fig. 5. The level of time savings by medical students through the use of AI technologies**



**Fig. 6. Respondents' attitudes towards the introduction of the basics of working with medical AI as a mandatory academic discipline**



**Fig. 7. Students' vision of artificial intelligence as an auxiliary tool in the work of a doctor**



**Fig. 8. Distribution of respondents' answers regarding legal liability for establishing a false diagnosis based on AI prompts**

in the answers to questions about legal liability for establishing a false diagnosis based on the prompts of AI algorithms (fig. 8). The absolute majority of respondents – 83.5 % (n = 66) – are convinced that the full legal responsibility should be borne exclusively by the doctor, since it is he who makes the final clinical decision. Other opinions were equally divided: 6.3 % (n = 5) of students believe

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that responsibility should be divided between the doctor and the technology or placed on the medical institution that authorized the use of AI. Only 3.8 % (n = 3) of those surveyed blame the software development company.

**Conclusions.** Medical students demonstrate high intensity of AI use against the background of a critical shortage of specialized software and a high frequency of encountering neural network errors. The data obtained substantiate the need for a strategic transformation of higher medical education – a transition from ignoring technology to implementing systematic training in medical prompting, data verification methodology, and digital hygiene.

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**Conflict of Interest.** None.

**Author Contribution.** The author is the sole researcher responsible for the study's conceptualization, data collection, and analysis, as well as the writing and editing of the manuscript. The author has reviewed the final version of the article and consents to its publication.

**Information on the use of artificial intelligence.** The author certifies that, in the course of conducting the research and preparing this manuscript, they did not use any generative artificial intelligence tools or services to perform any of the tasks listed in the Generative Artificial Intelligence Delegation Taxonomy (GAIDeT, 2025). All stages of the work – from conceptualization to final editing – were carried out exclusively by the author, without the use of generative artificial intelligence.

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