**ANALYSIS OF THE EFFECT OF CHATGPT USAGE ON CLINICAL DECISION-MAKING PROCESSES OF MEDICAL STUDENTS.**

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***Abstract:***

*In the context of the active digitalization of medical education, intelligent language models such as ChatGPT are becoming increasingly widespread. The aim of this study was to examine the impact of ChatGPT usage on the clinical thinking of medical faculty students, as well as to analyze the sources of information they prefer for academic preparation. A total of 193 students from the 4th to 6th years participated in the survey, which was conducted in Russian, Uzbek, and Kyrgyz languages. The results showed that more than 78% of respondents regularly use ChatGPT for educational purposes. However, only one-third of the students associate its use with improvements in clinical analysis and critical thinking. Most respondents critically assess the information obtained from AI, recognizing its limitations. At the same time, evidence-based medicine remains the primary reference point for the majority of students. It was concluded that ChatGPT can serve as an auxiliary tool when used methodologically and under proper supervision within the educational environment.*

***Research Objective:*** *To study the impact of ChatGPT usage on the development of clinical thinking among medical faculty students, as well as to analyze which information sources they choose for academic preparation and how this affects their critical thinking and decision-making in clinical practice.*

***Research Tasks:***

1. *To assess the level of awareness among medical students about ChatGPT and the frequency of its use in educational activities.*
2. *To identify the impact of ChatGPT usage on the development of clinical reasoning and critical analysis when working with clinical cases.*
3. *To determine the potential drawbacks and limitations of using ChatGPT in medical education from the students' perspective.*
4. *To evaluate the significance of evidence-based medicine in learning and clinical decision-making among students who use AI tools.*

***Keywords:*** *ChatGPT, clinical thinking, medical faculty students, artificial intelligence.*

**Relevance:**

Contemporary medical education demands not only the acquisition of theoretical knowledge but also the development of students' ability to critically analyze medical data, formulate diagnoses, and make well-reasoned decisions based on clinical information. In the context of rapidly evolving technologies in both medicine and education, traditional teaching methods require adaptation. One promising and innovative approach is the integration of artificial intelligence into the learning process. In particular, ChatGPT, as a language-based AI model, can be employed to foster deeper understanding and more efficient mastery of complex clinical cases among medical students.

One of the most critical aspects of medical education is the development of clinical reasoning—the ability to analyze, synthesize, and interpret information—which is directly linked to the successful preparation of students for their future professional practice. ChatGPT can serve as a valuable tool in fostering these skills. Research indicates that the use of artificial intelligence for educational purposes can enhance the quality of learning, particularly in disciplines such as medicine, where accurate diagnosis and appropriate treatment decisions are crucial to patient outcomes [1][2].

For instance, one study has shown that AI-based models such as ChatGPT help students analyze data more efficiently, generate hypotheses, and receive immediate feedback, significantly increasing their confidence in making clinical decisions [3]. In the context of clinical training, the use of such technologies can also enhance students’ ability to process large volumes of information and adapt their knowledge to the rapidly changing landscape of modern medicine [4]. This is particularly important for senior medical students, as they begin to apply their knowledge in real clinical settings and engage directly with patients and complex medical scenarios.

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Despite its potential, the use of artificial intelligence in education also presents certain risks and challenges. Some researchers have noted that excessive reliance on such tools may lead to a decline in critical thinking skills and increased dependence on machine-generated decisions [5]. Therefore, studying the impact of ChatGPT on students’ clinical reasoning is essential—not only to assess its benefits, but also to develop guidelines for its effective use while minimizing potential risks.

The relevance of this research is further underscored by the rapid integration of technology into the educational processes of medical universities such as Osh State University (OshSU) and the Kyrgyz State Medical Academy (KSMA). This technological shift necessitates the development of new methods for evaluating and monitoring the effectiveness of such approaches. Assessing the impact of ChatGPT on clinical reasoning will help determine how effectively artificial intelligence contributes to the development of critical thinking and professional competencies, which are essential for future physicians [6].

**Materials and Methods:**

This study employed a mixed-methods approach, combining both quantitative and qualitative analysis. Such a design made it possible not only to collect statistical data but also to gain deeper insights into students’ perceptions and experiences when using ChatGPT during their academic preparation.

The primary data collection tool was an anonymous online questionnaire developed using the Google Forms platform. The questionnaire included both closed- and open-ended questions aimed at examining the frequency of ChatGPT usage, attitudes toward its functionality, choice of information sources, and clinical reasoning applied in hypothetical case scenarios.

Given the multilingual environment of the student population, the questionnaire was offered in three language versions:

Form 1 — in Russian

Form 2 — in Uzbek (Cyrillic script)

Form 3 — in Kyrgyz

A total of 193 medical students from the 4th to 6th years participated in the survey. Respondents were enrolled in institutions actively incorporating digital and innovative approaches into their educational processes, including Osh State University (Faculty of Medicine) and the I.K. Akhunbaev Kyrgyz State Medical Academy.

*Inclusion criteria:*

* Enrollment in a medical faculty
* Clinical-level education (4th year and above)
* Voluntary informed consent to participate
* Completion of the questionnaire in one of the three provided languages

The collected data were analyzed using descriptive statistics. Qualitative responses were subjected to content analysis to identify key themes related to perceptions of artificial intelligence, clinical reasoning, and evaluation of information sources.

**Results and Discussion:**

**Table 1*.*** *Frequency of ChatGPT Usage*

Analysis of the responses revealed that the majority of students actively use ChatGPT in their academic activities. According to the results, 42% (81) of respondents reported using it frequently, and an additional 7.7% (15) indicated they use it always—meaning nearly every second questionnaire reflects regular use of ChatGPT. Another 29% (56) of students reported using it occasionally, suggesting situational or selective use depending on the type of task or topic.

Interestingly, only 13.6% (26) of respondents stated they rarely use ChatGPT, and just 7.7% (15) reported never using it. Thus, over 78% (152) of students use artificial intelligence to some extent as part of their academic preparation.

This trend confirms the widespread integration of digital tools into the process of independent study. It is particularly relevant for senior students who are required to analyze clinical cases, synthesize large volumes of information, and prepare for licensing or final examinations.

The predominance of the “frequently” and “occasionally” responses also indicates that ChatGPT is perceived as a convenient and accessible tool that supplements—rather than replaces—traditional and scholarly sources of information.

**Table 2.** *Impact of ChatGPT on Clinical Reasoning*

The evaluation of ChatGPT’s influence on clinical reasoning revealed a moderately positive perception, although a substantial portion of respondents expressed cautious or uncertain views.

Out of 193 surveyed students:

* 39.1% (75) reported that ChatGPT genuinely helps them better analyze clinical cases;
* 47.3% (91) selected the option “Not sure,” indicating an ambiguous perception of AI’s effectiveness in this domain;
* 13.6% (26) believed that ChatGPT does not contribute to the development of clinical reasoning skills.

Thus, just over one-third of students associate the use of ChatGPT with improvements in clinical thinking. The remainder either do not perceive a direct benefit or express skepticism toward algorithmic approaches when dealing with clinical cases.

These findings suggest that ChatGPT is more often regarded as a supplementary tool for organizing information rather than a comprehensive resource for developing clinical logic. This underscores the need to design instructional strategies for integrating AI that actively foster critical thinking, rather than substituting it.

**Table 3.** *Impact of ChatGPT on Critical Thinking*

One of the objectives of this study was to determine whether regular use of ChatGPT influences the development of students’ critical thinking skills. The results indicate that the perceived impact of AI on critical thinking is ambiguous and limited.

Out of 193 students:

* 30.2% (58) reported that their critical thinking improved with the use of ChatGPT;
* 50.3% (97) noticed no change;
* 19.5% (38) believed there was no positive effect or even noted a decline.

Thus, more than half of the respondents either did not perceive any influence of ChatGPT on their thinking processes or remained skeptical. Only about one in three participants reported a positive change.

These findings highlight that, despite ChatGPT’s popularity and frequent use, its impact on cognitive processes remains limited without proper pedagogical guidance. This may be attributed to the model's tendency to provide ready-made answers, potentially reducing the need for independent analysis, hypothesis formulation, and critical evaluation of information.

The results underscore the necessity of developing methodological guidelines for the use of AI in educational settings—guidelines that not only facilitate access to information but also promote active student thinking.

**Table 4.** *Drawbacks of Using ChatGPT*

|  |  |  |
| --- | --- | --- |
| *DRAWBACK* | *Percentage of Students (%)* | *Number of Students* |
| *Errors or inaccuracies in medical information* | *65.3%* | *126* |
| *Lack of consideration for individual patient characteristics*  | *26.9%* | *52* |
| *Decline in critical thinking and increase in passivity* | *23.3%* | *45* |
| *Inability to ask follow-up or clarifying questions*  | *19.7%* | *38* |

***Note:*** *Each student was allowed to indicate multiple drawbacks; therefore, the total number of responses exceeds the total number of participants (193 respondents).*

Students who participated in the survey identified several significant limitations associated with using ChatGPT during their academic preparation. The responses demonstrate a high level of awareness regarding potential risks and a critical perspective on the application of artificial intelligence in medical education.

The most frequently mentioned drawback was the potential for errors or inaccuracies in medical information, reported by 65.3% (126) of students. This highlights students’ understanding that ChatGPT is not a source of clinically verified information.

The second most common concern, noted by 26.9% (52) of respondents, was the lack of consideration for individual patient characteristics. This reflects awareness of the model’s limitations in tailoring responses to specific clinical scenarios—an essential aspect in the development of clinical reasoning.

Approximately one-quarter of students (23.3%, or 45 respondents) indicated that the use of ChatGPT encourages passivity in information-seeking and may reduce critical thinking. These concerns point to the risk that overreliance on AI-generated answers could dull the analytical skills required of future physicians.

Additionally, 19.7% (38) of participants highlighted the inability to ask clarifying questions, which makes interaction with the model less flexible compared to learning with an instructor or engaging with real patients.

In summary, while ChatGPT is widely used among students, most demonstrate a conscious awareness of its limitations and articulate specific drawbacks that must be considered when integrating AI into the educational process.

**Table 5.** *The Role of Evidence-Based Medicine in Decision-Making*

|  |  |  |
| --- | --- | --- |
| *Perception of the Role of Evidence-Based Medicine (EBM)* | *Percentage of Students (%)* | *Number of Students* |
| *EBM is the primary source of information (trust only validated clinical guidelines and scientific publications)* | *46.7%* | *90* |
| *EBM is an important reference, but alternative sources are sometimes used* | *30.8%* | *59* |
| *EBM principles are not always applied; preference is given to instructors’ experience or familiar methods*  | *10.1%* | *19* |
| *EBM is useful, but difficult to apply in practice*  | *10.1%* | *19* |
| *Not familiar with the concept of EBM* | *0.6%* | *1* |

***Note:*** *Each student selected one primary response. A total of 193 students participated in the survey.*

The question regarding the significance of evidence-based medicine (EBM) (“In your opinion, what role does evidence-based medicine play in your education and clinical decision-making?”) revealed that most students view EBM as a foundational element in clinical training.

Out of 193 respondents:

* 46.7% (90) stated that evidence-based medicine is their primary source of information, and they trust only validated clinical guidelines and peer-reviewed scientific publications;
* 30.8% (59) recognized EBM as an important reference point but admitted they occasionally rely on more accessible or alternative sources;
* 10.1% (19) reported that they do not always apply EBM principles, preferring the experience of instructors, peers, or familiar methods;
* Another 10.1% (19) acknowledged the value of EBM but found it difficult to apply in practice, particularly due to limited access to English-language resources or real-world clinical constraints;
* Only one student (0.6%) admitted being unfamiliar with the concept.

Overall, more than 75% of students perceive evidence-based medicine as a key guiding principle in clinical education. However, a quarter of the respondents either face challenges applying it or tend to supplement it with less formal sources of information.

These findings highlight the need to improve the accessibility, contextualization, and teaching of evidence-based medicine—especially in the context of integrating.

**Conclusion:**

The findings of this study indicate that ChatGPT occupies a prominent role in the educational practices of medical students. More than 78% of respondents regularly use this tool to some extent, reflecting its widespread integration into self-directed learning.

However, perceptions of its effectiveness remain mixed. Only about 39% of students associate ChatGPT use with improved clinical case analysis, and fewer than one-third reported a positive impact on their critical thinking. This suggests that without intentional pedagogical guidance, the potential of AI to foster key cognitive skills is limited.

Students are also aware of ChatGPT’s limitations: the most frequently cited concerns include the risk of inaccurate information, lack of clinical individualization, and the potential reduction in motivation for independent learning. At the same time, most students exhibit a strong commitment to evidence-based medicine, providing a solid foundation for the critical evaluation of digital tools.

Thus, ChatGPT can serve as an effective supplementary tool in medical education when implemented through appropriate instructional design and pedagogical oversight. Its use should aim not to replace clinical reasoning, but to support the development of students’ analytical and clinical competencies. Future research is needed to develop strategies for integrating AI into medical education that align with ethical, cognitive, and evidence-based principles.

**Conclusions:**

1. Widespread Integration: Over 78% of students regularly use ChatGPT to some extent in their independent study, indicating the prominent role of AI in current educational practices.
2. Limited Effectiveness: Only about 39% of respondents reported improved clinical case analysis due to ChatGPT, and fewer than one-third noted a positive impact on their critical thinking. This highlights the need for targeted pedagogical support when using AI tools.
3. Awareness of Limitations: Most students are aware of the risks associated with ChatGPT use, including the possibility of inaccurate information, lack of patient-specific adaptation, and reduced motivation for independent knowledge acquisition.
4. Commitment to Evidence-Based Medicine: A strong orientation toward evidence-based medicine among students provides a foundation for the conscious and critical use of AI tools in medical education.

**Recommendations:**

To ensure the effective integration of ChatGPT into medical education, the following methodological strategies are recommended:

* Promote the development of students’ critical thinking when interacting with AI;
* Teach verification skills based on the principles of evidence-based medicine;
* Foster a culture of responsible digital tool usage;
* Provide pedagogical supervision and support in the use of ChatGPT during training;
* Conduct further research to optimize strategies for AI integration in education, considering cognitive, ethical, and clinical requirements.

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