

INTELIGÊNCIA ARTIFICIAL NA EDUCAÇÃO MÉDICA: POTENCIALIDADE E DESAFIOS NA FORMAÇÃO DE ESTUDANTES DE MEDICINA

ARTIFICIAL INTELLIGENCE IN MEDICAL EDUCATIONS: POTENTIALITIES AND CHALLENGES IN MEDICAL STUDENT TRAINING

João Pedro Cardoso Faccio¹, Maria Júlia de Miranda Santolin²

1. Professor do Centro Universitário de Pato Branco.

2. Acadêmica de medicina do Centro Universitário de Pato Branco

E-mail: maju.santolin02@gmail.com

Eixo Temático: 01

RESUMO

A inteligência artificial tem sido inserida na educação médica, com diferentes aplicações em estratégias de aprendizagem, ensino, simulação e avaliação. Diante da expansão dessas tecnologias, torna-se relevante compreender suas possibilidades e os desafios relacionados à sua utilização na formação médica. O presente estudo teve como objetivo analisar os desafios e as potencialidades da utilização da inteligência artificial na educação médica, com foco em sua aplicação na formação de estudantes de Medicina. Foi realizada uma revisão narrativa da literatura, com busca na base PubMed/MEDLINE, considerando publicações entre 2020 e 2025. Foram utilizados os descritores “Artificial Intelligence”, “Medical Education” e “Medical Students”, combinados pelos operadores booleanos AND e OR. Após a aplicação dos critérios de seleção, cinco artigos foram incluídos na análise. Os estudos identificaram diferentes aplicações da inteligência artificial na educação médica e resultados positivos em determinados contextos de aprendizagem. Entretanto, as evidências apresentaram resultados heterogêneos, não sendo possível afirmar superioridade das estratégias baseadas em inteligência artificial em relação aos métodos tradicionais em todas as situações. Também foram identificados desafios relacionados à efetividade das ferramentas, à integração curricular e à preparação de estudantes e docentes para sua utilização. Conclui-se que a inteligência artificial apresenta potencial como recurso complementar à educação médica.

Palavras-chave: Inteligência Artificial. Educação Médica. Estudantes de Medicina. Tecnologia Educacional.

ABSTRACT

Artificial intelligence has been increasingly incorporated into medical education, with applications in different learning, teaching, simulation, and assessment strategies. As these technologies continue to expand, it is important to understand their potential as well as the challenges associated with their use in medical training. This study aimed to analyze the challenges and potential of artificial intelligence in medical education, focusing on its application in the training of medical students. A narrative literature review was conducted using the PubMed/MEDLINE database, including publications from 2020 to 2025. The descriptors “Artificial Intelligence,” “Medical Education,” and “Medical Students” were combined using the Boolean operators AND

and OR. After applying the selection criteria, five articles were included in the analysis. The studies identified several applications of artificial intelligence in medical education, with positive results in certain learning contexts. However, the findings were heterogeneous, and it was not possible to establish that artificial intelligence-based strategies were superior to traditional methods in all situations. Challenges related to the effectiveness of these tools, their integration into the curriculum, and the preparation of both students and educators for their use were also identified. In conclusion, artificial intelligence shows potential as a complementary resource in medical education.

Keywords: Artificial Intelligence. Medical Education. Medical Students. Educational Technology.

INTRODUÇÃO

Artificial intelligence (AI) has been increasingly introduced into medical education and offers different possibilities for use in the teaching and learning process. Its applications include interactive learning, simulation, student assessment, and the use of tools to assist in the production and interpretation of educational content.^{1,2} In undergraduate medical education, interest in these technologies has grown, along with an increasing number of studies investigating their applications and effects on student training.³

The use of AI may expand the strategies available for medical education, allowing its application in different educational activities. Recent studies have described its use in simulations, assessments, learning activities, and other strategies aimed at medical training.²⁻⁴ In addition, research has sought to determine whether these tools provide concrete benefits for learning.^{1,5} Therefore, discussions surrounding the use of AI in medical education involve not only its potential applications but also the need to understand the situations in which its use may contribute to the training process.

Despite the growing number of studies on the subject, there are still limitations in the available evidence. Studies differ in their methods, the tools evaluated, and the outcomes assessed, making it difficult to draw broader conclusions about the effectiveness of AI in medical education.^{1,2} In undergraduate medical education, questions also remain regarding the integration of these technologies into the curriculum and the preparation of students to use them appropriately.³ Therefore, further analysis of the available evidence is needed to better understand the benefits and challenges associated with the use of AI in medical training.

In this context, analyzing the available evidence may provide a clearer understanding of the role artificial intelligence can play in medical education, considering both its potential and its limitations. Therefore, this study aims to analyze the potential and challenges of using artificial intelligence in medical education, focusing on its application in the training of medical students.

MÉTODO

A narrative literature review was conducted on the use of artificial intelligence in medical education, focusing on its potential and challenges in the training of medical students. The literature search was carried out in the PubMed/MEDLINE database, considering publications from 2020 to 2025. The descriptors “Artificial Intelligence,” “Medical Education,” and “Medical Students” were used and combined with the Boolean operators AND and OR.

Articles published within the established period, available in full text, and related to the use of artificial intelligence in the teaching and learning process in medical education were included. Studies that did not directly address medical education or training, duplicate publications, and studies unrelated to the research objective were excluded. Study selection was initially based on the analysis of titles and abstracts, followed by a full-text review of the studies considered relevant to the topic.

After applying the established criteria, five articles were selected for inclusion in the present review. The studies were analyzed according to the applications of artificial intelligence in medical education, learning-related outcomes, and the main potential benefits and challenges described in the literature. As this was a narrative review, no specific protocol, such as PRISMA, JBI, or a scoping review protocol, was used.

RESULTADOS

The five selected studies addressed different ways of using artificial intelligence in medical education, with emphasis on applications related to teaching, learning, assessment, and simulation. The reviews analyzed show that AI has been used in various educational strategies, including interactive learning tools, teaching support systems, simulations, and resources aimed at student assessment.²⁻⁴

Regarding educational outcomes, the evidence was varied. Feigerlova et al.¹ identified benefits associated with the use of AI-based educational strategies in some contexts, but highlighted that the number of available studies remains limited. Similarly, Shaw et al.² reported promising results across different applications of AI in medical education, while pointing out important differences between studies in terms of the methods used and outcomes assessed. In undergraduate medical education, Simoni et al.³ identified applications of AI related to the learning process and the integration of these technologies into student training.

The use of generative artificial intelligence was also analyzed in comparison with traditional teaching methods. Li et al.⁵, in a meta-analysis of randomized controlled trials, found no statistically significant difference in knowledge acquisition between generative AI-based strategies and traditional methods, although favorable results for AI were observed in certain educational contexts. This finding suggests that the use of this technology does not necessarily lead to better outcomes than conventional methods in all settings.

In addition to its potential applications, the studies highlighted challenges related to the use of AI in medical education. These included the need to further assess the effectiveness of the tools, integrate these technologies into the curriculum, and prepare both students and educators for their appropriate use.¹⁻⁴ Differences in the tools used, assessment methods, and educational contexts also make it difficult to directly compare the findings across studies.

Overall, the selected studies indicate that artificial intelligence offers several possibilities for application in medical training, although educational outcomes are still inconsistent. The available evidence suggests that AI may serve as a complementary resource in education, while also highlighting the need for further research into its effectiveness and the most appropriate ways to integrate these technologies into medical education.¹⁻⁵

CONCLUSÃO

The studies analyzed indicate that artificial intelligence offers different possibilities for application in medical education, particularly in learning, assessment, and simulation activities. Despite the promising results identified in some contexts, the available evidence

remains heterogeneous and does not allow AI-based strategies to be considered superior to traditional methods in all situations. In this regard, this review contributes to bringing together recent evidence on the main applications of AI in medical training and highlights the importance of using it as a complement to existing educational strategies.

In practice, the use of AI in medical education may expand the resources available to students and educators, but its implementation should take into account the characteristics of each educational context and the preparation of those involved in using these tools. Future research should further investigate educational outcomes associated with AI, particularly through studies with more consistent methodologies and across different training contexts, allowing for a clearer understanding of its contributions to medical education.

REFERÊNCIAS BIBLIOGRÁFICAS

- Feigerlova E, Hani H, Hothersall-Davies E. A systematic review of the impact of artificial intelligence on educational outcomes in health professions education. *BMC Med Educ.* 2025;25:129. doi:10.1186/s12909-025-06719-5.
- Shaw K, Henning MA, Webster CS. Artificial intelligence in medical education: a scoping review of the evidence for efficacy and future directions. *Med Sci Educ.* 2025;35:1803-1816. doi:10.1007/s40670-025-02373-0.
- Simoni J, Urtubia-Fernandez J, Mengual E, Simoni DA, Royo M, Egaña-Yin D, et al. Artificial intelligence in undergraduate medical education: an updated scoping review. *BMC Med Educ.* 2025;25:1609. doi:10.1186/s12909-025-08188-2.
- Ahsan Z. Integrating artificial intelligence into medical education: a narrative systematic review of current applications, challenges, and future directions. *BMC Med Educ.* 2025;25:1187. doi:10.1186/s12909-025-07744-0.
- Li J, Yin K, Wang Y, Jiang X, Chen D. Effectiveness of generative artificial intelligence-based teaching versus traditional teaching methods in medical education: a meta-analysis of randomized controlled trials. *BMC Med Educ.* 2025;25:1175. doi:10.1186/s12909-025-07750-2.