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Perceptions and Adoption of Artificial Intelligence (AI) in Medical Education: A Single-Center Cross-Sectional Survey among University Professors in Casablanca, Morocco

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Abstract

Artificial intelligence (AI) is increasingly being integrated into various areas of medical practice. Although it has proven effective in certain specialties, medical schools have yet to incorporate AI into their curricula. This is largely due to the lack of strong evidence supporting its educational benefits. The aim of our study was to assess the perception, use, and satisfaction of professors at the Faculty of Medicine and Pharmacy of Casablanca regarding the integration of AI-based tools into medical education. Methods: We conducted a cross-sectional study using an online and paper-form questionnaire distributed to university professors. Results: We collected 136 responses. There was a slight female predominance (52.2%). The median teaching experience was 10 years (range 1 - 35 years). Only 19.1% reported using AI in their teaching methods [CI 13.4% - 26.5%]. However, 66% believed AI could help students better understand complex concepts, and 76.5% felt it could support personalized learning. Meanwhile only 25.7% of the university professors agreed that the use of AI can free them for tasks. However, concerns from the teachers remain regarding the reduction of the human aspect of the medical profession (60%) and the potential negative impact on the doctor-patient relationship (42%). The main challenges that were anticipated were a lack of training and resistance from colleagues. Conclusion: Despite existing concerns, our study reveals a growing interest among professors in integrating AI into medical education.

Subject Areas

Global Health

Keywords

Artificial Intelligence, Education, Professors, Doctor-Patient

1. Introduction

Medical education has traditionally employed approaches like lectures, practical training, and hospital internships, which have demonstrated their effectiveness over time [1]. Nevertheless, as medical education continuously evolves to enhance its quality, artificial intelligence (AI) presents a promising opportunity for further advancement [2]. Emerging in the 1950s, AI refers to systems developed to mimic human intelligence [3].

Today, AI is widely incorporated into various areas of medical practice, including radiology, cardiology, and ophthalmology, among others [4]. It enhances diagnostic accuracy, predicts treatment outcomes, and aids in the design of personalized care plans. In the area of medical education, AI has the potential to customize learning plans, support assessments, and offer real-time feedback on student performance [5]. However, despite these advancements, limited research has examined university professors' perspectives on integrating AI into medical curricula [6].

The aim of our study is to assess Moroccan medical university professors' perceptions and usage of AI in education, explore their level of satisfaction, and identify the challenges and opportunities this integration presents.

2. Methods

This cross-sectional study was conducted among university professors at the Faculty of Medicine and Pharmacy of Casablanca, Morocco, in April 2024. The target population included university professors involved in medical teaching activities at the faculty during the study period. Professors unavailable during data collection or who declined participation were excluded.

The sample size was calculated using EPI INFO software based on a presumed proportion of 50%, a confidence level of 95%, and a margin of error of 5%, as no previous studies addressing this topic among medical university professors were identified. The resulting minimum sample size was 168 participants. A random sampling method was used to select participants from the list of available university professors provided by the institution.

A total of 168 professors were invited to participate, including 100 through paper-based questionnaires and 68 through electronic distribution. The questionnaire was distributed in both electronic and paper formats, and informed consent was implied through voluntary participation in either format.

The questionnaire was developed after a review of the literature on artificial intelligence adoption in medical education and digital learning technologies among healthcare educators. The items were adapted from previously published surveys and tailored to the local academic context. Prior to distribution, the questionnaire was reviewed by experts in medical education and medical informatics to assess clarity and relevance.

The questionnaire consisted of three sections: socio-demographic characteristics, the use of artificial intelligence in theoretical education, and its role in practical training. Descriptive statistical analysis was performed using Jamovi software.

3. Results

A total of 136 responses from university professors were obtained with a response rate of 80%. There was a 52.2% feminine predominance. The median of teaching experience was 10 years with a range of 1 - 35 years.

52.9% of the respondents had a medical specialty, 34.6% were specialized in surgery and only 12.5% were specialized in biology and pathology.

3.1. The Use of AI in the Theoretical Training of Medical Students

Only 19.1% of university teachers reported using AI in their teaching, with a confidence interval of [13.4 - 26.5]. Overall, AI was used in 5.9% of anatomy courses, 4.4% of therapeutics courses and 2.2% of radiology courses.

Regarding AI-based tools that could be useful for medical students, E-learning platforms were significantly predominant, representing 84.60%, while virtual tutoring systems and rapid feedback and evaluation tools were used by 58.10% and 52.20% of respondents, respectively (Figure 1).

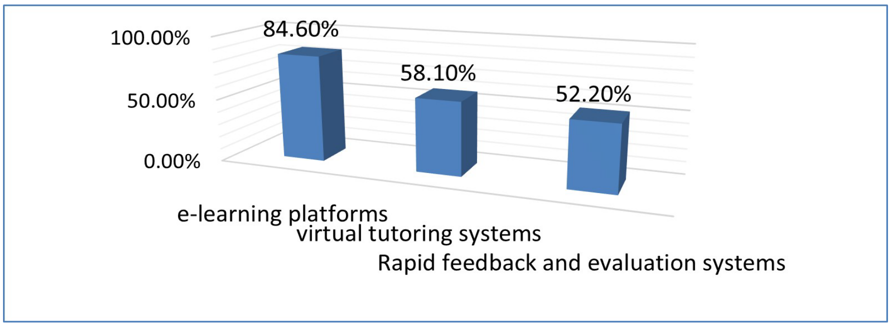

Figure 1. AI-Based tools for medical students.

About 66% of the educators agreed that AI can improve understanding of complex medical concepts, 76.5% agreed that AI offers personalized learning experiences. Meanwhile only 25.7% of the participants agreed that the use of AI can free them for tasks (such a creating MCQ and clinical case studies) (Table 1).

3.2. The Use of AI in the Practical Training of Medical Students

Among the respondents, 16.2% of university professors had already used AI-based tools for practical medical tasks in their teaching methods, 27% of respondents gave AI-assisted simulations during their hospital internships and at the Faculty of Medicine's simulation center.

Table 1. Benefits of using AI in theoretical medical education.

	Agree N (%)	Disagree N (%)	Don't know N (%)
Better understanding of complex medical concepts	90 (66)	15 (11)	31 (23)
Personalized learning experiences	104 (76.5)	13 (9.6)	19 (14)
Freeing teachers from time-consuming tasks	35(25.7)	84 (61.8)	17 (12.5)

The majority (92%) of university professors believed that AI can increase diagnostic accuracy, as well as 80% of them expressed the belief that AI facilitates access to medical information (**Table 2**).

Table 2. Benefits of using AI in theoritical medical training.

	Agree N (%)	Disagree N (%)	Don't know N (%)
Devaluing the medical profession by reducing the role of the doctor	48 (35.3)	78 (57.4)	10 (7.4)
Negative impact on the doctor-patient relationship	57 (41.9)	66 (48.5)	13 (9.6)
Violating the confidentiality and security of medical data	58 (42.6)	53 (39)	25 (18.4)
Reducing the humanitarian aspect of the medical profession	81 (59.6)	46 (33.8)	9 (6.6)

Regarding university professors' concerns, nearly half of the responders (41.9%) agreed that AI in medical practice would impact negatively the doctor-patient relationship, while 57.4% did not agree that it would devalue the medical profession by reducing the role of the doctor (**Table 3**).

Table 3. Benefits of using ai in practical medical training.

	Agree N (%)	Disagree N (%)	I don't know N (%)
Lack of training in AI technologies	125 (92)	1 (0.7)	10 (7.3)
Need for continuous creation of educational content and feeding AI systems	109 (80)	4 (2.9)	23 (17)
Financial and technological resource constraints	93 (68.4)	17 (12.5)	26 (19.1)
Resistance to change from some university professors	75 (55)	36 (26.5)	25 (18.5)

Table 4. The challenges anticipated by university professors in integrating ai into medical education.

	Agree N (%)	Disagree N (%)	Don't know N (%)
Improving diagnostic accuracy	124 (92.0)	3 (2.0)	9 (6.0)
Improving clinical decision-making	94 (69.1)	18 (13.2)	24 (17.6)
Facilitating access to information (drug dosage, etc.)	108 (79.4)	24 (17.5)	4 (3.0)
Limit first-time experiences on the patient (Robotics training-Virtual Reality)	108 (80)	17 (12.0)	11(8)

On the other hand, university professors anticipated challenges in integrating AI into medical education. The vast majority (92%) were in favor that there is a lack of training in AI technologies, and over half of the participants fear resistance to change (**Table 4**).

A significant number of the academic staff 93.4% would be interested in additional training on AI applications. Moreover, 90% of university professors are considering adapting their teaching methods to integrate AI.

4. Discussion

We conducted this study to explore the perceptions, usage, and satisfaction levels of medical university professors regarding the integration of artificial intelligence (AI) technologies in medical education. Our findings indicate that the overall use of AI among participants is relatively low, with only 19% reporting its use in their teaching methods. This low adoption rate is consistent with a similar study carried out in six Middle Eastern and North African countries, where 22% of medical and pharmacy university professors reported limited familiarity with AI applications [7].

Despite this low usage, approximately 66% of our participants agreed that AI could facilitate the understanding of complex medical concepts, which is consistent with findings from the UK, where 74.3% of university professors acknowledged AI's potential to enhance knowledge acquisition [8]. This suggests a recognition of AI's potential benefits, even among university professors who may not yet be fully incorporating it into their teaching.

However, only 25.7% of our university professors believed that AI could reduce the burden of creating tasks such as multiple-choice questions (MCQs) and clinical case studies, in contrast to the findings of Uribe *et al.* [9].

Overall, our study reveals a positive attitude towards integrating AI in medical education, with 95% of participants expressing a preference for a blended learning approach that combines AI-driven tools with traditional teaching methods. This positive view is also reflected in studies from Germany [10] and Australia [11] where 75% and 65% of medical university professors shared similar opinions.

5. Conclusion

Our study revealed that medical university professors make limited use of AI in both theoretical and practical training. However, they agreed that AI can improve understanding of complex medical concepts. Nevertheless, they are aware of the limitations of AI in medical practice and the potential challenges of its integration.

Conflicts of Interest

The author declares no conflicts of interest.

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