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Araştırma Makalesi

Investigation of the Status of Artificial Intelligence Courses in Medical Education Curriculum in Turkey

Kerem Gencer*[1], Gülcan Gencer[2]

[1]*Afyon Kocatepe University, Faculty of Engineering, Department of Computer Engineering, Afyonkarahisar, Turkey*
[2]*Afyonkarahisar Health Sciences University, Faculty of Medicine, Department of Biostatistics and Medical Informatic, Afyonkarahisar, Turkey*

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ABSTRACT

Artificial Intelligence (AI) is a rapidly advancing technology with significant impacts across various sectors. Alongside advancements in healthcare, medical education is also evolving under the influence of AI. This transformation is driving major changes in the healthcare sector by improving clinical decision-making processes through increased data utilization and the support of drug-machine interactions. The aim of this study is to examine the current state of AI courses in medical education in Turkey, compare the curricula of private and public universities, and evaluate the integration of AI into medical education.The curricula of 112 universities providing medical education in Turkey were analyzed through their official websites, focusing on courses related to AI in healthcare, computer-assisted courses, and programming languages. It was observed that AI courses in healthcare have been recently incorporated into university curricula and have significant potential for further development. These courses are primarily theoretical, with practical components available only in a few universities. Additionally, AI courses are more prevalent in the curricula of public universities compared to private ones. The study concludes that AI courses should hold a more prominent place in medical education and include more practical applications. While public universities have taken greater strides in this area, there is still room for improvement. In conclusion, AI is becoming an integral part of medical education, and healthcare professionals' knowledge in this field will play a critical role in improving future healthcare services.

Türkiye'de Tıp Eğitimi Müfredatlarında Yapay Zeka Derslerinin Durumunun Araştırılması

Anahtar Kelimeler:
Yapay Zeka
Tıp eğitimi
Müfredat
Derin öğrenme
Makine öğrenmesi

ÖZ

Yapay Zeka (YZ), çeşitli sektörlerde önemli etkileri olan, hızla ilerleyen bir teknolojidir. Sağlık hizmetlerindeki ilerlemelerle birlikte tıp eğitimi de yapay zekanın etkisi altında gelişiyor. Bu dönüşüm, artan veri kullanımı ve ilaç-makine etkileşimlerinin desteklenmesi yoluyla klinik karar alma sürecini geliştirerek sağlık sektöründe önemli değişikliklere yol açmaktadır. Bu çalışmanın amacı Türkiye'de tıp eğitiminde yapay zeka derslerinin mevcut durumunu incelemek, özel ve devlet üniversitelerinin müfredatlarını karşılaştırmak ve yapay zekanın tıp eğitimine entegrasyonunu değerlendirmektir. Türkiye'de tıp eğitimi veren 112 üniversitenin müfredatları resmi internet siteleri üzerinden incelenerek sağlıkta yapay zeka ile ilgili dersler, bilgisayar destekli dersler ve programlama dilleri ele alındı. Türkiye'de sağlık hizmetlerinde yapay zeka derslerinin yakın zamanda üniversite müfredatına dahil edildiği ve daha da geliştirilmeye açık olduğu gözlemlendi. Bu dersler öncelikle teoriktir ve uygulamalı dersler yalnızca birkaç üniversitede mevcuttur. Ayrıca devlet üniversitelerinin müfredatlarında yapay zeka dersleri özel üniversitelere göre daha yaygındır. Tıp eğitiminde yapay zeka derslerinin daha önemli bir yere sahip olması ve daha pratik uygulamalar içermesi gerektiği sonucuna varılmıştır. Devlet üniversiteleri bu konuda daha fazla adım atmış olsa da hâlâ geliştirilecek noktalar var. Sonuç olarak yapay zeka tıp eğitiminin ayrılmaz bir parçası haline geliyor ve sağlık profesyonellerinin bu alandaki bilgisi gelecekteki sağlık hizmetlerinin iyileştirilmesinde kritik bir rol oynayacak.

***Corresponding Author**

*(keremgencer09@hotmail.com) ORCID ID 0000-0002-2914-1056
(gencergulcan@gmail.com) ORCID ID 0000-0002-3543-041X

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1. INTRODUCTION

Artificial intelligence is the ability of a machine to simulate cognitive processes like speech recognition, image identification, and captioning (Nilsson, 1998). To put it simply, AI models are employed to identify patterns in vast amounts of data in order to generate extremely precise predictions for a variety of activities. More digital and dynamic opportunities are provided to pupils. Old textbooks and the predetermined atmosphere of the classroom may not always provide these opportunities (Imran and Jawaid, 2020).

A rapidly expanding phenomena, artificial intelligence (AI) will soon have an impact on numerous industries, including medical education. AI has improved quickly due to the exponential growth in data and processing power (Lee, Wu, Li, and Kulasegaram, 2021). AI boosts learning capacity and offers a decision support system at scales that are revolutionizing the future of healthcare. According to (Noorbakhsh-Sabet, Zand, Zhang, and Abedi, 2019), this technology is employed in the diagnosis and prognosis of diseases, therapy optimization and outcome prediction, medication development, and public health. In the past ten years, the use of artificial intelligence has helped to partially address several problems in education, including language processing, reasoning, planning, and cognitive modeling.

(Kolachalama and Garg, 2018) emphasize the increasing recognition of the potential value that machine learning can bring to the medical community. If this trend continues, in the coming years, we may see numerous AI-focused products and technologies integrated into the healthcare ecosystem. In this scenario, it becomes essential to determine whether a medical professional is willing to adopt these tools as part of their repertoire and, if so, how they can receive training in the art and science of machine learning algorithms. Medical schools should start creating curriculum time for machine learning and begin recognizing the changes in healthcare by accepting machine learning.

The integration of artificial intelligence (AI) into medical education curricula is supported for several compelling reasons. AI is transforming the healthcare sector by enabling faster and more accurate medical diagnoses, improving patient treatment, and optimizing the management of healthcare services. This transformation underscores the need for medical students to understand and effectively apply these technologies. As highlighted by Ejaz et al. (2022), AI is driving significant changes in clinical decision-making processes, a shift that is increasingly reflected in medical education.

One critical aspect of AI in medical education is its role in data analysis. AI tools and techniques provide medical students with the ability to analyze large datasets and extract meaningful insights, which are essential for advancing medical research and understanding diseases (Alexandru, Radu, and Bizon, 2018). Tolentino et al. (2024) emphasize that training in AI equips students with the skills to draw meaningful inferences from complex data, a crucial competency for future healthcare professionals.

AI also has the potential to enhance communication with patients. By using AI-supported tools, medical students can improve their ability to communicate effectively, making interactions more efficient and empathetic. However, the integration of AI into healthcare also brings challenges such as security and ethical concerns. Medical students need training to address these issues and ensure patient privacy is protected, as noted by Gupta and Sao (2011).

Moreover, AI serves as the foundation for future medical applications, including telemedicine and personalized medicine. Zhang et al. (2024) stress that medical students must be equipped with AI knowledge to specialize in these areas and adapt to emerging healthcare technologies.

Incorporating AI into medical education is not only essential for preparing students for their future careers but also for ensuring that patients receive better care and the healthcare system operates more efficiently. Comparing AI-related courses in Turkish medical faculties, both private and public, highlights several benefits for students and healthcare professionals.

First, the quality of education varies between institutions, with differences in course content, resources, and teaching methods. Comparing these elements helps students identify universities that offer more comprehensive and up-to-date AI education. Second, some universities provide opportunities for students to develop AI projects or gain practical experience through internships, enabling them to apply theoretical knowledge in real-world settings. Third, collaborations and research initiatives between universities enhance the depth of knowledge students gain in AI. Access to research projects and laboratory facilities enriches their learning experience. Finally, knowledge of AI can significantly benefit students in their future careers. Proficiency in AI, regardless of their university, makes students more competitive and better prepared to excel as healthcare professionals in an increasingly technology-driven field. In conclusion, comparing AI courses in healthcare between private and state universities helps provide better educational opportunities and future career prospects. Therefore, it is essential to carefully assess education programs, opportunities, and costs when making decisions (Cleophas and Zwinderman, 2015; Topol, 2019).

1.1. Artificial intelligence and medical education

Due to its capacity to facilitate learning, artificial intelligence (AI) is mostly used in medical education to deliver individualized feedback. The assessment of

students' learning has received less attention, in part because of the lack of digitization and the delicate nature of exams. Data integrity must also be protected when manipulating massive data. The technical difficulties of developing AI applications and the need for new approaches to evaluating AI's efficacy must be addressed if methodological advancements are to promote the acceptance of AI (Chan and Zary, 2019). This is especially true given that AI has the ability to provide individualized learning. It should be remembered that producing capable and skilled doctors is the ultimate goal to comprehend AI's potential in medical education better. The dilemma of whether we should strive to modify teachers or target learning emerges when contemplating the learning capacity of AI, just as any improvements in medical education should be driven by this ultimate goal (Masters, 2019).

1.2. Curriculum and artificial intelligence

The evaluation of curricula is a complex and administrative procedure that strongly supports the need for automation. It's interesting that not many of the studies we evaluated discussed the use of AI in reviewing medical curricula. There isn't much usage of AI in curriculum evaluation, despite any possible advantages it might offer over conventional approaches (C.-K. Chen, 2010).

1.3. Artificial intelligence and clinical applications

The use of AI in medicine has been covered by (Noorbakhsh-Sabet et al., 2019) the importance of machine learning for clinical applications, translation, and public health has been the authors' primary attention. They have suggested that AI may be implemented in medical education at three levels: curriculum development and analysis, learning and assessment, and curriculum evaluation, as it is crucial for the future growth of medicine and healthcare services.

1.4. Artificial intelligence and learning support

As it is crucial for the education of future doctors, (Garg, 2020) has recommended using AI to control the effectiveness of the curriculum and the general happiness of medical students. With the use of AI, instructional materials can be tailored and adaptive for students, and they can be further developed with their input. It enables students to recognize their knowledge gaps and take appropriate action to fill them, making learning assessments more thorough, efficient, and objective.

1.5. Artificial intelligence and data privacy

On the other side, due to technical improvements, much data must be collected and shared, raising privacy issues. Healthcare machine-learning applications require a broad assessment of the significance of privacy in clinical, translational, and public health applications, focusing on data sharing and genetic information (Noorbakhsh-Sabet et al., 2019).

1.6. Artificial intelligence and telemedicine

In particular, the Virtual Inquiry System is an online virtual patient system that uses AI technology to educate hospitals, medical faculties, and interns. The system aggregates many actual patient records as well as expert and AI-compiled particular instances. Medical students make diagnoses through questions, simulated physical examinations, and additional studies of virtual patients. Medical remote education is a form of instruction that is conducted both online and offline in real-time and is not location- or time-bound. Web-based teaching techniques like Twitter enable learning, communication, and sharing. In particular, virtual hospital tours and mobile nursing in clinical application teaching play a key role in medical education (Zhao, Li, and Feng, 2018).

1.7. Artificial intelligence and curriculum analysis

Modern information technology, such as data centers, instructional resource libraries, cloud platforms, student recruitment, educational process administration, and evaluation, is the foundation for the influence of artificial intelligence technology. This increases the administration of continuous medical education's efficacy and service quality. Through computer systems, common elements in the processes of student recruiting, announcement, acceptance, instruction by instructors, and course setup can be exchanged. Through information technologies (web pages, mobile phones), essential hospitals, health administrative departments, clinical instructors, and departments can communicate the same information. Synchronizing lessons through computer information systems can facilitate data exchange, information sharing, and course collaboration (Imran and Jawaid, 2020). It is essential to develop medical education curricula to include artificial intelligence (Paranjape, Schinkel, Nannan Panday, Car, and Nanayakkara, 2019).

1.8. Artificial intelligence in medical applications

Numerous studies have been conducted on artificial intelligence in the field of medicine. These include the detection of lung nodules from lung X-rays (Deo, 2015), risk prediction models for anticoagulant therapy, automatic defibrillator implantation in cardiomyopathy (Lip, Nieuwlaat, Pisters, Lane, and Crijns, 2010), stroke and stroke mimicry (O'Mahony et al., 2013), modeling CD4+ T-cell heterogeneity, outcome prediction in infectious diseases (Lu et al., 2015), arrhythmia detection in electrocardiography (Y. Chen et al., 2018), and cancer

susceptibility detection, including histological or pathological assessments, in the development of high-throughput technologies such as genomics, proteomics, and imaging (Cruz, 2007; Kourou, Exarchos, Exarchos, Karamouzis, and Fotiadis, 2015).

In general, it can be observed that artificial intelligence is being more actively used in medical education and is becoming widely integrated into curricula. However, there is significant heterogeneity and weak consensus among studies regarding the content and presentation of artificial intelligence curricula. To address these inconsistencies and facilitate the broader adoption and implementation of standardized artificial intelligence curricula in medical education, further research is needed to establish a standard competency framework (Lee et al., 2021).

2. MATERIAL AND METHODS

This study aimed to evaluate the curricula of state and private universities providing medical education in Turkey, utilizing an observational descriptive research approach. The research was conducted by collecting and analyzing curriculum data through the official websites of universities. The data focused on the presence and distribution of courses related to artificial intelligence, computer-assisted courses, and programming languages within medical education curricula. Among the universities, 81 were state universities, and 31 were private universities. The examined data were collected from universities' course programs, websites, and information packages. The data includes the names of courses in medical education curricula, their distribution by semester/class, course hours, credits, and ECTS (European Credit Transfer and Accumulation System) information. Information on introductory information technology/computer courses offered as compulsory or elective in any university class was excluded. The data analysis process for this study was conducted using R version 4.0.2. Descriptive statistics were employed to calculate the frequencies and proportions of AI-related courses offered in state and private universities, providing a clear overview of the prevalence of these courses within the medical education curricula. A comparative analysis was also performed to identify differences in the availability and structure of AI-related courses between state and private universities, highlighting variations in their integration into the educational framework. Additionally, the distribution of AI-related courses across different semesters was examined to understand how these courses are positioned within the overall curriculum. The tidyverse package in R was utilized for efficient data cleaning and manipulation, ensuring the reliability and accuracy of the analysis.

3. RESULTS

This study provides a detailed examination of the curricula of private and state universities offering medical education in Turkey. The investigation focused on courses such as Artificial Intelligence in Healthcare, Computer-Aided Courses, and Programming Languages within the provided curricula. The curricula of a total of 112 universities in Turkey offering medical education were researched via their official websites and course programs. Among these, 81 were state universities, and 31 were private universities. Figure 1 illustrates the number of universities with a direct "Artificial Intelligence in Medicine/Healthcare" course in their medical education curriculum and the average course hours. There were 11 state universities, 9.8%, and six private universities, 5.3%. Notably, these courses were offered electives in state and private universities (Figure 1).

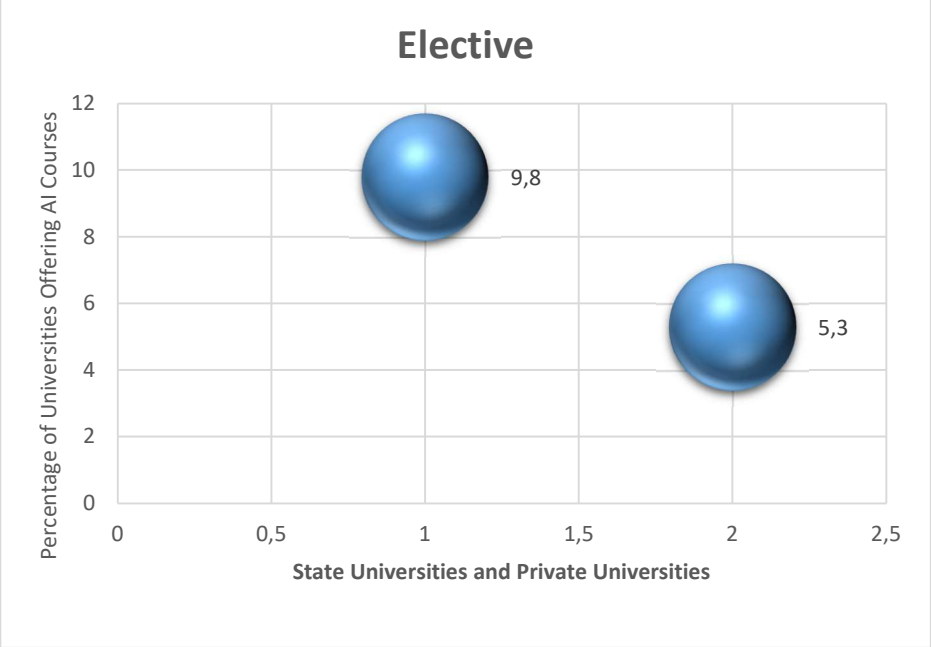

Figure 1. Number of Universities Offering a Course with the title "Artificial Intelligence in Medicine/Healthcare" in the Medical Education Curriculum.

Table 1 shows the number of universities offering courses related to computers and technology in the medical education curriculum, even though they do not have the title "Artificial Intelligence," All of these courses are elective. These courses are taught with various labels such as Image Processing Analysis, Computer-Aided Design, Information and Technology Management, Computer Applications, Web Design, Medical Informatics, Bioinformatics, Web Technologies, Robotic Medicine, Network Fundamentals, Medical Computing and Applications, and the Use of Computers in Medicine. It can be observed that State universities are leading in this aspect with 23 universities (20.5%), while private universities have two universities (0.02%).

Table 1. Distribution of Universities Offering Elective Computer and Technology Courses in Medical Education Curricula.

Compulsory/ Elective	Some course names in the curriculum	Public University		Private University	
		n	Mean	n	Mean
Elective	Image processing analysis, Computer-aided design, Information and technology management, Computer applications, Web design, Medical informatics, Bioinformatics, Web technologies, Robotic medicine, Network fundamentals, Medical computers and applications, Computer use in medicine	23	% 20.5	2	% 0.02

* Mean (%) values indicate the proportion of universities (state or private) offering the listed courses as part of their medical education curricula.

Table 2 reveals that when universities were examined, it was determined that there were courses covering different programming languages. In state universities, it was found that 6.2% of them offer programming language courses. However, in the case of private universities, no programming language courses were identified during the survey.

Table 2. Distribution of Universities Offering Elective Programming Language Courses in Medical Education Curricula.

Compulsory/ **Elective**	**Course Names**	**Public University**		**Private University**	
		n	**Mean**	**n**	**Mean**
Elective	Introduction to Python Programming Language, Linux Operating System, Introduction to Python Programming/Data Science, Programming with Matlab, Robotic Coding, Python coding, Programming languages, software, Technology and Software	7	% 6.2	-	-

*Mean (%) values indicate the proportion of universities (state or private) providing elective programming-related courses in the curricula

Table 3 provides information on the availability of artificial intelligence courses in medical education curricula, specifically focusing on whether these courses are offered during the pre-clinical or clinical phases of education. The data reveals that artificial intelligence courses are not offered during the clinical phase in either state or private universities. Generally, these courses are provided in state universities during Semester 2, while private universities provide them during Semesters 1, 2, and 3.

Table 3. Semester-Wise Distribution of Artificial Intelligence Courses in Medical Education Curricula.

Compulsory/ **Elective**	**Public University**				**Private University**		
	Sem.1 (n-Mean)	**Sem. 2 (n-Mean)**	**Sem. 1-2 (n-Mean)**	**Sem. 1-2-3 (n-Mean)**	**Sem. 1 (n-Mean)**	**Sem. 2-3 (n-Mean)**	**Sem. 1-2-3 (n-Mean)**
Artificial intelligence/artificial intelligence in medicine/health	(1-0.012)	(4-0,.49)	(3-0.037)	(2-0.024)	(1-0.032)	(2-0.064)	(3-0.096)

*Mean (%) values indicate the proportion of universities (state or private) providing artificial intelligence-related courses in the specified semesters.

Table 4 examines artificial intelligence in healthcare courses in the medical education curriculum regarding course hours, credits, and ECTS (European Credit Transfer and Accumulation System) credits. In public universities, these courses generally have one theoretical hour, one credit, and 1 ECTS credit per week. In private universities, however, these courses typically have two academic hours, two credits, and 2 ECTS credits per week. Practical methods are available in public universities but not in private universities. Additionally, it is noted that in private universities, the theoretical hours, credits, and ECTS credits allocated to these courses are relatively higher (e.g., 3 ECTS, 5 ECTS, 8 ECTS...).

Table 4. Comparison of Course Hours, Credits, and ECTS for Artificial Intelligence Courses in Medical Education Curricula.

Compulsory/ **Elective**	**Public University**

	Theoric course hour			Pr. Cour. Hour	Credit			ECTS		
	1	2	Oth	2	1 Credit	2 Credit	Oth	1	2	Oth
Artificial intelligence/artificial intelligence in medicine/health	0.061	0.024	0.037	0.024	7	2	2	6	-	5
	Private University									
	Theoric course hour			**Pr. Cour. Hour**	**Credit**			**ECTS**		
	1	**2**	**3**	**2**	**1 Credit**	**2 Credit**	**Oth**	**1**	**2**	**Oth**
	0.064	0.096	0.032	-	-	3	3	-	2	4

*Oth: Other, Mean values indicate the average course hours (theoretical and practical), credits, and ECTS credits for artificial intelligence-related courses in public and private universities.

The aims and learning outcomes of artificial intelligence in health courses at public and private universities in Turkey were investigated. It was observed that the curricula generally had similar dreams and learning objectives. Table 5 presents the aims and learning outcomes of general artificial intelligence in health courses taken from the medical education curriculum as an example.

Table 5. Examples of Aims and Learning Outcomes for Artificial Intelligence Courses in Medical Education Curricula.

Section	Details
Aim	To recognize artificial intelligence (AI) technologies in healthcare for diagnosing diseases, improving treatment outcomes, and reducing costs. The course provides foundational knowledge on AI principles, applications in healthcare, privacy considerations, and programming techniques for developing AI applications with medical images and data.
Objectives	Students will learn to select and apply modern methods of AI in healthcare.
Learning Outcomes	
Knowledge	1. Understand the fundamentals of programming. 2. Learn the basic principles of artificial intelligence. 3. Comprehend the impact of AI in medicine. 4. Familiarize with examples of AI applications in healthcare. 5. Use programming to create AI applications with medical images and data.
Skills	1. Develop AI applications using medical images and data through programming.
Attitude	1. Recognize the significance of artificial intelligence applications in medicine.

4. LIMITATIONS

When collecting curriculum information through university websites, there is a risk of encountering incomplete or inaccurate information due to some university websites being outdated or lacking essential details. There may have been changes in curricula or course programs during your research process. Such changes could impact the results of your study. Limitation of Research Method: Observational studies aim to describe observed situations rather than establish cause-and-effect relationships. Therefore, this study seeks to define the current status of artificial intelligence courses in medical education rather than directly assessing their effects.

5. RECOMMENDATIONS

Based on the reasons discussed in the article and the current situation, we propose a series of recommendations aimed at enhancing the integration of artificial intelligence (AI) into medical education curricula. In the short term, AI courses should be made compulsory across public and private universities to raise awareness about its applications and benefits in healthcare. Additionally, Biostatistics and Medical Informatics courses should be updated to include topics like data analysis, AI, and machine learning, supplemented with sessions led by experts to provide practical knowledge. Competitions and hackathons can be organized to foster creativity and problem-solving skills, while educational resources such as books, videos, and software tools should be developed and distributed to support learning.

For the medium term, hands-on training programs and projects should be introduced into medical school curricula to help students apply theoretical AI knowledge in practical scenarios. Establishing bioinformatics departments with compulsory AI-focused courses during pre-clinical and clinical stages of education is essential. Workshops and conferences for interns and specialty students can be used to teach clinical applications of AI, such as diagnostic tools and patient management systems. Collaborating with healthcare companies to provide internship opportunities and real-world project experience, as well as developing AI-driven virtual patient simulations, will create immersive and practical learning environments.

In the long term, professional development programs should be created to update existing healthcare professionals on advancements in AI and machine learning. Universities should establish dedicated research centers to support AI research and innovation in healthcare. Faculty specializing in AI should be recruited and trained to ensure high-quality teaching in medical education. Postgraduate AI training programs can enhance the career prospects of healthcare professionals, and mechanisms should be developed to regularly revise AI-related curricula, ensuring alignment with emerging technologies and trends.

To address challenges in implementing these recommendations, practical solutions have been proposed. Regional AI hubs equipped with the necessary infrastructure and software can bridge technological gaps, supported by government grants and public-private partnerships. National AI educator training programs, coupled with scholarships and grants, can address the shortage of qualified educators. Streamlined academic approval processes, including fast-track committees and pilot programs, can accelerate curriculum changes. Resource shortages can be mitigated by creating centralized repositories of open-access AI educational materials, collaborating with global platforms like Coursera and edX. Flexible, online postgraduate training programs can accommodate healthcare professionals' schedules, while university liaison offices can expedite industry collaborations.

To enhance student participation, strategies such as gamification, offering certifications, and organizing AI-themed competitions and hackathons have been recommended. Reliable evaluation systems can be designed using AI-based adaptive testing tools, and advisory panels can be established to ensure continuous curriculum updates in line with rapid advancements in AI. Finally, cost-sharing initiatives among universities, along with government and private sector funding, can address the high implementation costs.

These recommendations are designed to strengthen medical education in Turkey, align it with global advancements in artificial intelligence, and prepare healthcare professionals for an AI-driven future. By addressing challenges with practical solutions, this framework provides a comprehensive roadmap for educators and policymakers.

6. CONCLUSION AND DISCUSSION

In recent years, health-related artificial intelligence courses have begun to be taught in Turkish classrooms. This rate is more significant in public universities than in private universities. In the future, new positions for medical students and doctors based on their proficiency with artificial intelligence will become available due to technological advancements in medical education. Medical education must engage with technology-enhanced learning and artificial intelligence in addition to its conventional biomedical and clinical sciences concentration. It is time for medical institutions to update their curricula to include material on artificial intelligence and machine learning, as well as a focus on empathy and honesty. This will guarantee that graduates use these AI technologies and are prepared to operate in the healthcare setting that AI has revolutionized. The purpose of education is to gather knowledge and leave a legacy by passing it on to succeeding generations and inspiring them to create using educational resources.When the literature is studied, it becomes clear that artificial intelligence is being employed more actively and extensively across the curriculum in medical education on a global scale. However, there is a considerable variety and a lack of agreement among research on the delivery and content of AI curricula. Although there is a lot of research on the subject, there is little agreement on what and how to teach AI in medical schools. More study is required to overcome these discrepancies and provide a consistent competency framework that can promote increased adoption and implementation of a standardized AI curriculum in medical education. To identify the values that medical educators should incorporate in curricula to adapt medical education to different healthcare contexts, including digitalized healthcare systems and the digital

student generation in a hyperconnected world, (Han et al., 2019) synthesized and introduced representative educational programs. Artificial intelligence was used by (Güner and Çomak, 2011) to predict student success not only in the field of medicine but also in the field of engineering.

(Zhao et al., 2018), an AI system may grasp clinical information, outperform the majority of human test takers, and make accurate clinical diagnoses based on electronic medical records, sometimes more precisely and consistently than humans, according to research conducted by a team of scientists in China. Doctors and other health professionals are usually defined by their knowledge and skill.

(Pucchio et. al, 2021) suggest including formal training on these topics in resident medical curricula and continuing medical education. Although teaching big data, digital technologies, artificial intelligence, and machine learning is urgent in health education, medical schools cannot teach students how to use, interpret, and apply these technologies in clinical settings and deliver health care. Therefore, the existence of artificial intelligence courses and computer-aided courses in private and public universities has been investigated, and the current situation has limitations when Turkey is considered within the scope of developing countries among OECD countries. Within the context of curriculum development studies, this research is anticipated to offer recommendations on how much technology should be incorporated into medical education.

Çalışkan et al. (2022) conducted an e-Delphi study focusing on the competencies required for the integration of AI in medical education. This study emphasizes that AI courses should go beyond providing only technical knowledge and provide students with the skills necessary to interpret AI outputs and apply them in clinical decision-making processes. Similarly, in our study, it was observed that AI courses in universities in Turkey were mostly theoretical and lacked practical components. The findings of Çalışkan et al. support the need to add practical applications to curricula.

Sridharan and Sequeira (2024) provide examples of how AI can be applied in classroom teaching and student assessment processes. Through a case study on pharmacology and therapeutics, they emphasize that AI can enhance personalized learning experiences and provide dynamic feedback to students. Our study similarly determined that AI has the potential to transform teaching methods in medical education, and this article further reinforces the importance of AI in course design to improve the quality of learning and support student success.

Zhang et al. (2024) examined the integration of AI into medical education from a global perspective and revealed the challenges encountered in this process. The study highlights issues such as lack of resources, lack of instructor training, and lack of standardized curricula. Our study also revealed similar obstacles in Turkey, and the findings of Zhang et al. support the need for Turkish universities to align their AI education initiatives with international standards. In addition, the role of AI in future medical practices, especially in personalized medicine and telemedicine, is highlighted. This further increases the importance of our recommendations for AI education.

Author contribution statements

Author1 and Author2 assisted in planning and implementing the study, conducted data analysis, wrote the manuscript, and contributed to critical discussions. Author1 supported study planning and implementation, data analysis, and manuscript drafting and offered constructive feedback. Author2 and Author1 played a role in study planning, execution, data analysis, and manuscript writing. Author2 conducted laboratory work and was responsible for manuscript writing. The final manuscript was reviewed and approved by Author2 and Author1.

Ethics committee approval and conflict of interest statement

Afyonkarahisar University of Health Sciences Clinical Research Ethics Committee has unanimously decided that the ethics committee approval is not required for the study "Artificial Intelligence Course in Medical Education Curriculum: University Evaluation in Turkey," at the meeting numbered 2023/4 dated 07.04.2023. Relevant regulations and guidelines are conducted in all methods. Informed consent is not required for this study. The author declares that they have no competing interests with this article.

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