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A Review of the Ethical and Legal Challenges of Using Artificial Intelligence in the Health System

Abstract

Today, artificial intelligence technologies can provide unimaginable benefits to the health system. While artificial intelligence has significant potential to improve the performance of the health system, on the other hand, it also comes with challenges that sometimes lead to harm in the health system. Therefore, the aim of the present study is to review the ethical and legal challenges associated with the use of artificial intelligence in the health system. This is a review study. To collect information, an evidence search was used in the Web of Science, PubMed, and Scopus databases using the keywords artificial intelligence, medical ethics, health rights, health care, and human dignity. In all stages of the present research design, honesty and trustworthiness were observed, while respecting the originality of the text. The research findings regarding ethical challenges can be attributed to trust in artificial intelligence, violation of human dignity in artificial intelligence, respect for the principle of individual autonomy and its rules, artificial intelligence in the diagnosis of complete treatment, and artificial intelligence and emotional function. Legal challenges include standardization of artificial intelligence in medicine, artificial intelligence and civil liability, artificial intelligence and medical guarantees, artificial intelligence and violation of data privacy, and Artificial Intelligence and Cybersecurity are.

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Sağlık Sisteminde Yapay Zeka Kullanımının Etik ve Yasal Zorlukları Üzerine Bir İnceleme

Öz

Günümüzde yapay zekâ teknolojileri sağlık sistemine hayal bile edilemeyecek faydalar sağlayabilmektedir. Yapay zeka, sağlık sisteminin performansını artırma konusunda önemli bir potansiyele sahip olsa da, diğer yandan, bazen sağlık sisteminde zarara yol açan zorlukları da beraberinde getirmektedir. Bu nedenle, bu çalışmanın amacı yapay zekânın sağlık sisteminde kullanımıyla ilgili etik ve yasal zorlukları gözden geçirmektir. Bu bir derleme çalışmasıdır. Bilgi toplamak için Web of Science, PubMed ve Scopus veri tabanlarında yapay zekâ, tıp etiği, sağlık hakları, sağlık hizmetleri ve insan onuru anahtar kelimeleri kullanılarak bir kanıt taraması yapılmıştır. Mevcut araştırma tasarımının tüm aşamalarında, metnin özgünlüğüne saygı gösterilirken dürüstlük ve güvenilirlik gözetilmiştir. Etik zorluklara ilişkin araştırma bulguları, yapay zekaya güven, yapay zekada insan onurunun ihlali, bireysel özerklik ilkesine ve kurallarına saygı, tam tedavinin teşhisinde yapay zeka ve yapay zeka ve duygusal işlev olarak atfedilebilir. Yasal zorluklar arasında ise tıpta yapay zekânın standardizasyonu, yapay zekâ ve hukuki sorumluluk, yapay zekâ ve tıbbi garantiler, yapay zekâ ve veri gizliliğinin ihlali ve Yapay Zekâ ve Siber Güvenlik yer almaktadır.

Anahtar Kelimeler: *Yapay Zeka, Tıp Etiği, Sağlık Hakları, Sağlık Hizmetleri, İnsan Onuru*

Introduction

With recent advances in digital data collection, machine learning, and computational infrastructure, applications of Artificial Intelligence (AI) are expanding into areas previously thought to be the domain of human experts (Yu, Beam & Kohane, 2018). AI is rapidly moving to transform the healthcare system. By combining big data and powerful machine learning techniques, innovators have created the conditions to begin developing tools to improve the clinical care process, advance medical research, and improve efficiency. These tools rely on algorithms, programs that are created from healthcare data and can make predictions or recommendations. However, the algorithms themselves are often too complex to be understood or even explicitly stated (Price et al., 2017) or artificial intelligence is the study of ideas that enable computers to perform tasks that make humans appear intelligent. The main goals of artificial intelligence are to make computers more useful and understandable (Pashkov, Harkusha & Harkusha, 2020).

1. Artificial Narrow Intelligence (ANI): Artificial Intelligence currently has very high capabilities in recognizing unexpected patterns in data sets.

2. Artificial General Intelligence (AGI): Intelligence that could one day have the full cognitive capacity of a human and be able to reason, remember, and solve problems like you do. (Ibid)

3. Artificial Super Intelligence (ASI): Artificial Super Intelligence (AI) can theoretically have the combined cognitive capacity of humanity or even more. It is obvious that humanity will not be able to understand it.

AI currently encompasses a wide range of subfields, from the general (learning and perception) to the specific, such as playing chess, proving mathematical theorems, writing poetry, driving on a busy street, and diagnosing diseases. As robots are actually objects that can take on different physical forms and communicate independently with humans. They are capable of caring for humans in need of help, such as the elderly, although they certainly cannot have a compassionate understanding of care.

However, artificial intelligence technology is still in its infancy and more studies are being conducted, as it becomes more advanced each year than the previous one. The development of AI-based technologies raises some of the key practical issues surrounding AI implementation, including data sharing and privacy, algorithm transparency, data standardization, and cross-platform interoperability, as well as concerns for patient safety (He, et.al., 2019). AI should be designed to reduce health disparities, report meaningful clinical outcomes, and improve diagnosis and treatment. It should increase the value of healthcare, take into account the biographical drivers of health, be easily designed for the local population, improve the healthcare and medical care system, and facilitate shared decision-making (Badal et al., 2023). Artificial intelligence is expected to significantly impact medical practice and healthcare delivery in the near future, so it is crucial that primary care physicians Understand new technologies so that they can evaluate studies and research based on artificial intelligence and clinical research. Therefore, the current research aims to answer the question: What legal and ethical challenges does artificial intelligence technology pose in the health system?

The present study has taken into account the ethical aspects of library research, including text authenticity, reliability, and trustworthiness. This study is a review. To collect information, an evidence search was used from the Web of Science, PubMed, and Scopus databases, and the Google Scholar search engine. Articles published in 2014-2023 were also included; This study was conducted from April to October 2023 and used the English equivalents of key terms such as artificial intelligence, medical ethics, health rights, health care, and human dignity. The number of articles searched was 50, of which 22 were cited. The methodology is through an extensive literature review, analysis, scholarly research, and the views of leading individuals in this field and the nature of the guidelines.

1.Findings

Despite the widespread use of artificial intelligence technologies in healthcare and medicine, there are still challenges in the healthcare system, which are discussed in the following sections: Ethical Challenges of the Application of Artificial Intelligence in the Healthcare System, as described in Table 1, and Legal Challenges of the Application of Artificial Intelligence in the Healthcare System, as described in Table 2.

Table 1: Ethical Challenges of Using Artificial Intelligence in the Health System

Manifestations of the ethical challenges of artificial intelligence
Trust in artificial intelligence
Violation of human dignity in artificial intelligence
Respect for the principle of individual autonomy and its rules
Artificial Intelligence in Diagnosis and Treatment
Artificial Intelligence and Emotional Functioning

Table 2: Legal Challenges of Using Artificial Intelligence in the Health System

Manifestations of the legal challenges of artificial intelligence
Standardization of Artificial Intelligence in Medicine
Artificial Intelligence and Civil Liability
Artificial Intelligence and Medical Insurance
Artificial Intelligence and Cybersecurity
Artificial Intelligence and Data Breach

It is important to note that the challenges mentioned in the present study are general, therefore they include Afghanistan as well as other countries internationally.

2. Discussion

1. Ethical Challenges of Artificial Intelligence in the Health System: Along with the increasing use of artificial intelligence technology in medical sciences and healthcare, there are also some ethical challenges, which are referred to in the following as the most important ethical challenges of artificial intelligence in the health system.

2.1 Trust in Artificial Intelligence

Among the ethical challenges of artificial intelligence in the health system, the discussion is about trust in artificial intelligence. People expect similar performance standards for AI doctors and human doctors, and trust in AI does not increase when people are told that AI doctors are better than human doctors. The important point is that we find that the trust gap between AI and human diagnoses narrows when individuals are encouraged to choose AI in a

free-choice model between human and AI diagnoses, with trust in AI diagnoses increasing significantly when participants are able to choose their own doctor (Juravle, et. al. 2020). People are more concerned about AI technology and programs. Most people have a positive attitude and believe that AI doctors will completely or partially replace human doctors. The general public also has a more positive attitude towards medical AI. Distrust of AI and lack of humanistic care are important reasons why some people still have a negative attitude towards medical AI.

Instead of focusing solely on technical issues, stakeholders need to pay more attention to improving the credibility of technology companies and addressing the emotional needs of patients, because relying on the intelligence of health and medical centers will improve health care (Gao, et, al.. 2020).

2.2. Violation of human dignity in artificial intelligence

Among the ethical challenges to be addressed in artificial intelligence in the health system, one can point to the violation of human dignity. Social awareness of the "worth" of a person is at the core of the concept of human dignity. However, some actions may disregard this value of a person and therefore there may be a need to protect against such actions. Furthermore, failure to anticipate the unintended consequences of artificial intelligence may impact human dignity.

As well as the uncertainty in creating a balance between innovation and the protection of fundamental rights, or the uncertainty about whether current regulations are sufficient or vice versa, researchers are forced to develop new regulations for new technologies and artificial intelligence, while there are concerns about the impact of artificial intelligence on human rights, which can be referred to in the recommendation of the Council of Europe Commission on Human Rights to ensure the strengthening of And ensuring that AI does not undermine human rights is a key factor in the world we live in. This recommendation, entitled "Unpacking AI: 10 Steps to Protect Human Rights," presents a number of steps that national authorities can take to maximize the potential of AI systems and prevent or mitigate their negative impact on people's lives and rights.

This recommendation focuses on 10 main areas of action, which include: 1) human rights impact assessment; 2) public consultation; 3) human rights standards in the private sector; 4) information and transparency; 5) independent oversight; 6) non-discrimination and equality; 7) data protection and privacy; 8) freedom of expression, freedom of association and association and the right to work; 9) access to healthcare; 10) promoting AI literacy. Ethics Guidelines for

Trustworthy Artificial Intelligence (Ethics Guidelines for Trustworthy Artificial Intelligence) is another recommended resource in this field (Balthazar, et,al. 2018). For the development of artificial intelligence in Iran, a guideline in the form of a national document on artificial intelligence has been submitted to the Supreme Council of the Cultural Revolution to guide the discussion of artificial intelligence in a centralized manner. Therefore, in order to prevent violations of human dignity, it is proposed to compile a comprehensive document on artificial intelligence in medicine.

2.3. Respect for the principle of individual autonomy and its rules

Based on the findings of the present study, other ethical challenges of artificial intelligence in the health system include respect for the principle of individual autonomy and its rules, such as respect for privacy and informed consent.

Just as the Bactrian and Belmont oaths set out basic principles for how physicians should interact with patients and individuals under investigation, the increasing use of big data and artificial intelligence techniques These principles need to be reexamined in light of potential issues around privacy, confidentiality, data ownership, informed consent, epistemology, and inequality (Balthazar, et,al. 2018). Among the standards and values in the principles of medical ethics is respect for justice in equal access to health and medical services. The principles of "ethical AI" are increasingly being developed with the recent proliferation of directives, including the EU Artificial Intelligence Law proposed by the European Commission on April 21, 2021, and the statement of the G7 leaders in the so-called Hiroshima Process on Artificial Intelligence, which seek to establish ethical rules and boundaries for this new technology. With few exceptions, they interpret the ethics of AI within the liberal political framework of concerns about privacy, transparency, governance, and non-discrimination. One of the main obstacles to creating "ethical AI" is how to operationalize high-level principles so that they translate into the design, development, and use of technology in the work process.

This is because organizations can interpret ethics as ad hoc and without any oversight, and view ethics as just another technological problem with technological solutions. There is a lack of clear, formal standards for fair, appropriate, or just AI in areas where people depend on and work with it (Cole, Cant, Spilda & Graham, 2022). There are concerns that medical AI models could perpetuate prejudices and harm marginalized populations. They can acquire biases during training, when they underrepresent particular datasets or groups of patients (Obermeyer, et,al.2019). Just as every technological advance opens up ethical debate, the implications of AI for medical ethics must be identified, anticipated, and addressed so that AI

can be used without compromising important professional ethical principles. It can perhaps be said that in some cases, the interference of human factors, including sexual and racial bias, leads to the emergence of ethical issues for artificial intelligence in healthcare and medical care.

2.4. Artificial Intelligence in Diagnosis and Treatment Completion

Another ethical challenge of artificial intelligence in the health system is the issue of determining the benefit of treatment or treatment completion by artificial intelligence. Although robots have been generally accepted in diagnosis and treatment, there is no clear evidence that people with dementia benefit from robots for cognition, neuropsychiatric symptoms, or quality of life (Yu, C. et al., 2022.) Models Medical AIs typically lack prior knowledge of the medical domain, in contrast to a full-fledged physician, before being trained for their specific tasks. Instead, they must rely solely on statistical correlations between the characteristics of the input data and the prediction target, without having any background information (e.g., on pathophysiological processes). This lack of background makes them more difficult to perform specific medical tasks, especially when task-related data is scarce (Moor, et al., 2023). It seems that complex medical conditions such as depression and mental health can be better managed by AI than humans, because AI can use an individual's comprehensive medical data in decision-making. The strength of AI systems is that they can predict and usually can provide a statistical probability of an outcome. However, a statistical probability does not necessarily hold true for individual cases. It matters who makes the diagnostic decisions and, more importantly, what the outcomes will be for resource allocation cases; Undoubtedly, artificial intelligence will replace the diagnosis and treatment in a wide and increasing number of areas, whether it is desired or not, and only with the development of knowledge and technology, so the final decisions must be made by humans.

2.5. Artificial Intelligence and Emotional Function

Another ethical challenge of artificial intelligence in the health system is the issue of artificial intelligence and its emotional function. Intelligent humanoid robots will likely be integrated into nursing and care functions. However, their proper integration requires a detailed explanation and explanation of their basic capabilities, especially regarding their competences in replicating and depicting emotional functions such as empathy. Current humanoid robots can demonstrate rudimentary forms of empathy.

As these machines become increasingly common in healthcare settings, they are expected to express empathy as a natural function, rather than simply displaying artificial empathy as a replication of human empathy (Pepito et al., 2020). Of course, AI and robotics practitioners

have sought to change the nature of relationships and increase the human power of these types of interactions by increasing the resemblance and design of humanoid robots. However, scientific research has proven that body language, eye contact, and tone of voice have an important effect on establishing empathetic and compassionate connections between observers and receivers. It is important to note that the use of AI technology also raises important ethical and moral issues. Certainly, much work is needed to understand and respond to the social implications of AI and responsible innovation algorithms.

2. Legal Challenges of Artificial Intelligence in the Health System

Considering that the increasing use of artificial intelligence technology improves the level of quality in the health system, there are also some legal challenges, which are referred to below as the most important legal challenges of artificial intelligence in the health system.

3.1. Standardization of Artificial Intelligence in Medicine

Another legal challenge of artificial intelligence in the health system is the discussion of standardization of artificial intelligence in medicine. The purpose of standardization is to ensure the ethical consideration of the benefit of patients, because the main challenge is not in the AI technology itself, which is rapidly developing, evolving, and discovering new areas of use, but in the legal framework, which clearly lacks appropriate regulations and some political, ethical, and financial developments (Rodrigues, 2020). Therefore, the use of AI technology in medicine requires standardization and the definition of a specific mechanism in the form of The Health System Laws on the Use of Artificial Intelligence in Medicine. Since artificial intelligence tools are currently being developed towards clinical implementation and there is currently a lack of educational opportunities for artificial intelligence in medicine, it is proposed that artificial intelligence be considered for inclusion in the formal medical education program. As an interim step, the Editorial Board of the Journal of Radiology has developed a list of nine key considerations that will help in evaluating AI research. The goal of these considerations is to improve the safety and application of AI research in diagnostic imaging.

These considerations are for the authors, but reviewers and manuscript readers may also find these points useful: 1. - Define all three image sets (training, validation, and test image sets) of the AI experiment carefully; 2. Use an external test set for the final statistical report; 3. Preferably use images from multiple vendors for each stage of AI evaluation (training, validation, test sets); 4. Justify the size of the training, validation, and test sets; 5. Train the AI algorithm using a reference standard that is widely accepted in our field; 6. Explain any image preparation for the AI algorithm; 7. Test the performance of AI for radiologists; 8. Demonstrate

how AI algorithms make decisions; 9. AI algorithms should be publicly available to validate performance claims (Bluemke et al., 2020). The above points can be useful as a preliminary guide to improving the robustness of scientific results in AI and machine learning in radiology.

3.2. Artificial Intelligence and Civil Liability

Another challenge of artificial intelligence in the health system is the debate over civil liability. If a deep learning algorithm loses its diagnostic power, does the doctor accept the judgment and the patient suffer the consequences? What happens if an autonomous surgical robot injures a patient during a procedure? It is an ongoing debate about who will be liable in the future when robots and artificial intelligence act independently to harm patients. The current consensus is that a professional is liable if they use a tool in a situation outside its regulatory approval, or misuse it, or use it despite reasonable professional doubts about the reliability of the evidence surrounding the tool. With the knowledge of the toolmaker who hides negative facts. In any other case, the responsibility lies with the developers and the companies behind them (Meskó & Görög, 2020). Integrity, transparency, and consideration for human dignity are among the things to consider. The use of artificial intelligence in medicine can cause harm and, as a result, civil liability. There is no mandatory law in this field for the development of the use of artificial intelligence technology in healthcare and medical care. Of course, artificial intelligence technology and deep learning should be used in practice in healthcare and medical care in order to address the emerging challenges.

3.3. Artificial Intelligence and Medical Assurance

Another challenge of artificial intelligence in the health system is the discussion of medical assurance. Therefore, the legal regulation regarding the liability of doctors in Afghanistan is being reviewed.

According to Islamic penal law, "Whenever a doctor causes death or bodily injury in the treatment he performs, he is liable unless his actions are in accordance with medical regulations and technical standards, or he has been acquitted before the treatment and has not committed any negligence. If the acquittal of the patient is not valid due to his being a minor or insane, or if it is not possible to obtain an acquittal from him due to unconsciousness or the like, the acquittal of the patient's guardian is required." It is the same as Comment 1 of the same article, if the doctor is not at fault or has committed any fault in his knowledge or practice, there is no guarantee for him, even if he has not been acquitted. Now the question is, is the use of artificial intelligence based on technical considerations? In this case, it should be viewed as a new medical tool. And what if an error occurs on the part of the artificial intelligence device or

algorithm itself when using artificial intelligence that works with deep learning? Is AI responsible, or is the device manufacturer or the doctor? It seems that in this context, the doctor should inform the patient that he or she is going to benefit from the new technology in treatment and absolve him or her of it. There are also generally ethical questions regarding obtaining consent from the patient, which are: Are patients aware of the data collection? Have they given consent? What have they given consent to? And if so, is this consent given voluntarily? It is essential that doctors, before obtaining consent, clarify the consequences of data collection by artificial intelligence, how this data will be used, and obtain the patient's consent to the use of the data in the field of treatment or research.

3.4. Artificial Intelligence and Cybersecurity

Another challenge of artificial intelligence in the healthcare system is the discussion of cybersecurity. It has been previously shown that humanoid robots are useful in healthcare. To ensure successful interaction with humanoid robots, it is necessary to understand the factors that affect users' sense of security. Ensuring patients feel safe is considered a key principle of good care (Nyholm, Santamäki-Fischer & Fagerström, 2021). Safety is a variable concept that varies over time and place, but it has its own specific characteristics. Issues related to patient security are issues that must be considered in promoting health rights, as the security of the cyberspace in which information flows must be ensured and the theft of patient and health system information, which can be vital for a country, must be prevented.

3.5. Artificial Intelligence and Data Breach

Another legal challenge of artificial intelligence in the health system is the breach of data confidentiality and patient privacy, which is a matter of organizational responsibility. Artificial intelligence's access to medical and treatment information of patients today is an influential factor in the treatment process.

Patient medical records contain data that is very valuable to their owners. This information is also used for health system policy-making. Given the large volume of patient data being collected, there is a risk of privacy violations. A partial solution to the problem of data protection and privacy is to anonymize patients (Narayanan & Shmatikov, 2009) because data anonymization or re-identification, in which data is cross-referenced with other data sets and individuals are re-identified, is well developed.

With the increasing number of data sets used by Big Data and the increasingly powerful capabilities of artificial intelligence, the risk of data anonymization increases. When combined with social media databases, all the information available is easily accessible. However,

although data anonymization is fraught with risks, the effort to do so is better than no effort. (Masters, 2023). Artificial intelligence in medicine needs access to medical records and health data. Sensors, medical algorithms, applications, and any other source of information it can learn from. The data can come from healthcare institutions or from individuals, even if the institutions generate the data anonymously. In many cases, it has been proven that individual profiles can be traced (Meskó & Görög, 2020). Since healthcare, medical, and biomedical science institutions work with vast amounts of patient information, they need to protect patient data from cyberattacks.

Conclusion

When it comes to the technologies we use for healthcare and medical services and the health system, our decisions should be based on compliance with ethical and legal principles and rules and regulations that do not violate human dignity, so efforts should be made to standardize artificial intelligence applications in all fields of medical sciences.

Health policymakers should develop policies on the use of artificial intelligence in medicine and the production of medical technologies based on artificial intelligence, as well as create guidelines for doctors and other medical personnel who use new technologies in health care and treatment, in order to prevent potential risks and consequences. Any AI-based technology considered for use in healthcare and the health system must be efficient, safe, standardized, and regulated. New technologies focused on AI applications in the health system should be guided in a way that ensures that the AI tools used primarily help address the emerging challenges, therefore, for the better use of AI in the health system, suggestions are presented in the form of fundamental, applied, and research approaches. In order to effectively use AI technology, proactive preparation for its emerging challenges is essential. It is necessary to strengthen research on the ethical and legal issues of AI and its applications in an interdisciplinary manner.

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