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The Impact of Artificial Intelligence on Medical Science Vision and Labor Market Processes in Medical Occupational Groups

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ABSTRACT

The rapid development of artificial intelligence (AI) technology and its major effects on the economy and productivity of countries have made policymaking and regulation in this area more urgent than ever. One of the issues that is important for decision-making, regulation, and legislation in artificial intelligence is the capacity of artificial intelligence to impact various jobs and productivity growth, particularly how AI will reshape jobs, limit and create employment opportunities, and ultimately affect productivity. The purpose of this study is to investigate the impact of artificial intelligence on the medical science landscape and labor market processes in medical occupational groups. This study collected data using the library method, drawing on reliable scientific and research sources. Data gathered from scientific articles, theses, and reputable sources available in databases such as Google Scholar, PubMed, and Scopus were analyzed. The results show that artificial intelligence can significantly increase the accuracy and speed of disease diagnosis by employing machine learning algorithms and analyzing complex medical data. In addition, AI can play an effective role in predicting and preventing diseases by analyzing health data collected from millions of patients.

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Introduction and Problem Description

The rapid expansion of artificial intelligence technologies in recent years has significantly transformed the landscape of medical science (Qasemi & Taghavi, 2025). Machine learning algorithms, data-driven diagnosis systems, and intelligent medical image analysis tools have enabled faster and more accurate diagnosis of diseases, improved clinical decision-making, and increased efficiency of treatment processes. This technological transformation has not only improved the quality of health services but has also affected the way medical knowledge is produced, research methods are conducted, and health services are delivered (Mirmasoumi, 2023).

Alongside these developments, the development of artificial intelligence has had important implications for the structure and processes of the labor market in medical occupational groups. The introduction of intelligent technologies has led to changes in the nature of some professional tasks, the formation of human-machine collaboration patterns, and an increased need for digital and analytical skills among medical professionals. Rapid developments in new technologies, especially in the field of artificial intelligence, have caused profound transformation in many industries and provided new opportunities for improving the quality of services and increasing efficiency. Among them, the health system and medical science are among the most important areas that have received the greatest impact from these technologies. Advances in areas such as machine learning, big data analysis, and natural language processing have enabled intelligent systems to analyze a large volume of medical data and assist doctors in clinical decision-making. As a result, artificial intelligence has gradually become one of the key elements of digital transformation in health systems and plays an important role in improving the quality of medical care (Iqbal et al., 2024).

One of the most important applications of artificial intelligence in medicine is to improve disease diagnosis processes. Advanced machine learning algorithms are able to identify complex patterns in medical data and increase the accuracy of disease diagnosis. These technologies have shown remarkable performance, especially in the analysis of medical imaging data, such as radiology images, CT scans, and MRIs. The use of these systems can help diagnose diseases such as stroke, cancer, and heart disease more quickly and accurately and improve the decision-making process of doctors (Fan et al., 2024). In addition to diagnosis, AI plays an important role in the development of personalized medicine. Intelligent systems are able to recommend treatments tailored to the individual characteristics of each patient by analyzing clinical, genetic, and behavioral data of patients. The integration of artificial intelligence into medical devices and equipment has also enabled the provision of real-time treatment recommendations. This can increase the accuracy of treatment, reduce medical errors, and improve the quality of health care (Iqbal et al., 2024). On the other hand, artificial intelligence has also found wide applications in the field of prevention and public health. Analyzing population health data and identifying risk patterns can help predict the likelihood of disease occurrence. Such an approach allows for preventive interventions and better planning for community health management. Studies have shown that the use of machine learning methods in health data analysis can help to better understand risk factors and improve prevention programs (Ayesha et al., 2024). Applications of AI in healthcare are not limited to clinical services, but have also become increasingly important in the management and planning of the healthcare system. One important area in this context is the supply chain management of medical equipment and resources. The use of AI-based models can play an effective role in forecasting demand, optimizing resource distribution, and managing health crises. This has shown its importance, particularly in crisis situations such as the COVID-19 pandemic (Govindan et al., 2020; Kumar et al., 2024). The COVID-19 pandemic has revealed that health

systems around the world are facing widespread challenges, including the shortages of medical equipment and medicines. Research shows that the use of data-driven technologies and intelligent systems can help improve resource management and reduce disruptions in health service delivery. In this regard, the development of advanced analytical tools and the use of artificial intelligence can increase the resilience of health systems in the face of future crises (Cohen & Rodgers, 2020; Filip et al., 2022). Despite the broad benefits of AI in healthcare, the use of this technology also comes with challenges. Issues such as data security, patient privacy, and legal frameworks related to the use of medical data are among the most important issues that need to be addressed. There are also concerns among some healthcare professionals about technology replacing human resources or the possibility of algorithmic errors that could affect the adoption of this technology (Sallam et al., 2021).

In general, the spread of AI-based technologies has not only transformed the processes of diagnosis and treatment but also changed the structure of professional skills and roles in the medical labor market. The increasing need for digital skills, data analysis, and interaction with intelligent systems indicates that the future of medical jobs is moving towards the collaboration of humans and technology. Therefore, examining the impact of AI on the medical science landscape as well as labor market processes in medical occupational groups is of particular importance and can help policymakers and health system managers plan for the future of human resources in this field (Gifford et al., 2023; Moradzadeh et al., 2023).

The expansion of AI applications in the medical field, along with the vast opportunities it has provided for improving the quality of health services, is also accompanied by significant challenges. Among the most important of these challenges are issues related to data security, patient privacy, and legal frameworks for the use of medical data. Since AI systems require a large amount of clinical data for training and effective performance, protecting sensitive patient information and preventing misuse of this data has become one of the main concerns in health systems. Additionally, concerns among some physicians and healthcare professionals about the potential for human resource replacement by smart technologies or algorithmic errors could challenge the adoption and deployment of these technologies. Therefore, the future of AI in medicine depends largely on the ability of health systems to safely and effectively integrate these technologies into healthcare structures.

One of the critical reasons for the importance of research in the field of artificial intelligence in medicine is the significant role of this technology in increasing the accuracy of disease diagnosis. Artificial intelligence-based systems can help diagnose diseases faster and more accurately by analyzing vast amounts of medical data and identifying complex patterns within them. This capability is especially important in diagnosing serious and costly diseases, such as cancer, heart disease, and diabetes, as timely diagnosis can have a significant impact on increasing the likelihood of treatment success and reducing disease complications. As a result, the development and application of these technologies can help improve the quality of patients' lives and reduce the mortality rate from various diseases.

On the other hand, artificial intelligence has provided significant potential for the development of personalized treatment approaches in medicine. Using clinical, genetic, and behavioral data from patients, intelligent algorithms can identify appropriate treatment patterns for each individual and recommend treatments tailored to the specific characteristics of each patient. This approach can lead to increased treatment effectiveness, reduced drug side effects, and optimized treatment processes. For this reason, research into the applications of artificial intelligence in medicine can pave the way for new solutions to improve the quality of treatment and enhance the level of healthcare.

In addition to diagnosis and treatment, AI also plays an important role in disease prevention. Analyzing population health data and patient medical records allows intelligent algorithms to identify risk patterns and underlying factors for disease. This capability can help doctors and health system managers design and implement preventive measures and early interventions. Such an approach is particularly important in the face of chronic and non-communicable diseases, such as diabetes, heart disease, and blood pressure, and can help reduce the burden of disease in society.

At the same time, one of the major challenges in the development and application of AI in health systems is related to the issue of data infrastructure. In many developing countries, including Iran, health and medical data are stored scattered in different systems and often do not have unified standards and structures. This can make the process of collecting, processing, and analyzing data difficult and limit the training and evaluation of AI models. As a result, the creation of standardized and unified data infrastructures is considered one of the basic prerequisites for the development of AI applications in the health system. Given the set of opportunities and challenges raised, it is of particular importance to examine the role of AI in the evolution of medical science and its impact on the structure of the health system and the labor market of medical occupational groups. The development of this technology can not only improve the quality of medical services and increase the efficiency of the health system but can also transform skill patterns and professional roles in medical professions. Therefore, conducting research that examines the various dimensions of AI impact on the medical science landscape and labor market processes in the health sector can help policymakers, managers, and educational institutions in planning for the future of this field.

In other words, in recent years, the rapid advancement of AI-based technologies, especially in areas such as machine learning, big data analysis, and medical image processing, has brought about a significant transformation in the structure and performance of health systems. These technologies have been able to significantly increase the accuracy of disease diagnosis, the speed of clinical data analysis, and the efficiency of medical decision-making. Despite these advances, in many countries, including Iran, the various aspects of the impact of AI on the future of medical science and the professional structure of jobs in this field have not been comprehensively examined. This further reinforces the need for systematic research to understand the implications of this technological transformation. From the researcher's perspective, one of the most important consequences of the spread of artificial intelligence in medicine is the change in the nature of tasks and skills required in health care job groups. Many repetitive and data-driven tasks that were previously performed by human resources can now be performed by intelligent systems. On the one hand, this situation can lead to increased productivity and reduced human errors, and on the other hand, it raises concerns about the future of some medical jobs and the need to redefine professional roles. As a result, it is essential to accurately understand the dimensions of these changes for human resource planning in the health system. In addition, the widespread deployment of artificial intelligence in the health system is accompanied by challenges such as ethical issues, the security and privacy of medical data, the lack of clear legal frameworks, and the level of readiness of the human resource to accept this technology. In many cases, The lack of specific policies and appropriate implementation strategies has prevented the potential capabilities of artificial intelligence from being fully utilized in the service of improving health services. Therefore, a scientific and analytical study of these challenges can help decision-makers and policymakers to design the path of development and application of this technology in a safe and efficient manner. The main innovation of this research is in providing a comprehensive and integrated view of the impacts of AI on two key dimensions of the health system, namely scientific developments in medicine

and changes in the labor market structure of health occupational groups. While most previous studies have focused mainly on the technical applications of AI in the diagnosis or treatment of diseases, the present study, with an analytical approach, attempts to simultaneously examine the relationship between technological advances and their consequences on the roles, skills, and future of medical professions. Therefore, by integrating the dimensions of technology, human resources, and health policymaking, this study provides a clearer picture of the opportunities and challenges facing the health system in the era of artificial intelligence, and can be a basis for strategic decision-making in the field of medical education, human resource planning, and the formulation of technology development policies in the health system. Accordingly, accurate understanding of the effects of artificial intelligence on the future prospects of medical science as well as on the structure and processes of the labor market in medical occupational groups is a research and strategic necessity. Such understanding can provide a basis for policymaking, educational programs, and legal frameworks appropriate to the era of smart medicine. Therefore, the present study seeks to address the fundamental question of how much artificial intelligence is affecting the landscape of medical science and labor market processes in medical occupational groups, and what consequences will this development have for the future of the health system?

Theoretical Foundations and Research Background

- **Artificial Intelligence**

Artificial intelligence is a multidisciplinary topic that has fascinated researchers in many fields such as computer science, psychology, neuroscience, mathematics, and management (Amshidi et al., 2026). Computer science researchers focus more on creating intelligent systems and programs that are capable of imitating human behavior; engineering researchers place more emphasis on using AI as a problem-solving tool (Guo & Wong, 2013, Hosseini & Mohsenifard, 2025). Combining these two perspectives, artificial intelligence can be considered a branch of computer science that studies the development of hardware and software systems with human-like capabilities; these systems are able to independently pursue a defined goal to make decisions that are usually left to humans. In general, the goal of artificial intelligence is to imitate intelligent human behavior. This can be a significant challenge, since a computer must be programmed to perform many tasks (Kok et al., 2009, Vahedi & Shirazi, 2025). Attempts to limit the definition of AI have described it as having the ability to think and act like humans in a rational manner. (Rouhani, 2025; Russell & Norvig, 1995). Although AI approprietaly performs many tasks and continues to bring many benefits to our modern world, along with the benefits, there will undoubtedly be negative consequences. Further investigation of this issue can equip us to deal with this effect so that we can thoughtfully manage the risks of negative consequences (Marr, 2021). Due to the arrival of AI, many changes in big data and business analytics are increasing at an unprecedented rate, which has never been seen before (Conboy et al., 2020; Davenport & Malone, 2021). Researchers have been challenged with how to use AI-based integrated business unit analysis to create business value that helps increase competitive advantage (Davenport, 2018). An AI-based integrated business unit analysis solution is defined as an analytical solution powered by intelligent and powerful machines to make meaningful decisions (Davenport & Ronanki, 2018). Artificial intelligence refers to a set of advanced technologies and algorithms that are capable of performing tasks that traditionally require human intelligence (Mansoori, 2025), including learning from data, pattern recognition, complex information analysis, and decision support. Advances in areas such as machine learning and deep neural networks have enabled intelligent systems to analyze large volumes of complex data and play an effective role in many areas, particularly in health systems. As a

result, artificial intelligence has become one of the key technologies in the digital transformation of health systems, and its application in medical data analysis and clinical decision support is rapidly expanding (Iqbal et al., 2024). AI, as a powerful tool, enables process optimization, maintenance prediction, and quality improvement in various industries. Based on the analysis of sources, medicine is definitely considered an industry. This industry includes activities such as drug production, medical equipment, and healthcare services that use industrial management principles such as supply chain management and demand forecasting (Najafi, 2025). In health systems, artificial intelligence can be used at different stages of the healthcare value chain; from disease prevention and screening to diagnosis, treatment, and patient monitoring. This technology, by analyzing clinical and demographic data, can help improve physician decision-making, enhance the efficiency of healthcare services, and better manage health resources. For this reason, many health systems across the world are investing heavily in the development and implementation of AI-based solutions (Gifford et al., 2023). One of the most important applications of AI in medicine is to improve the accuracy and speed of diagnostic processes. Machine learning algorithms are able to analyze complex medical data, especially diagnostic images such as MRI and CT, and identify hidden patterns associated with diseases. Research has shown that models based on deep learning can perform significantly in predicting and diagnosing some diseases and help doctors make more accurate decisions. For example, the use of hybrid models based on neural networks and support vector machines in predicting stroke recurrence has been able to provide significant results in improving prediction accuracy (Fan et al., 2024). In addition to clinical applications, artificial intelligence in various sectors of the healthcare and pharmaceutical industries also plays an important role in improving process efficiency. The use of advanced algorithms in the analysis of biological and medical data can help discover new drugs, optimize manufacturing processes, and improve quality control in the pharmaceutical industry. Technologies such as machine vision and complex data analysis also enable the rapid identification of defects or contamination in manufacturing processes, increasing the quality of medical products (Ayesha et al., 2024). In addition, AI application in the management of operations and the supply chain of health services has also become increasingly important. The use of data-driven analytical models can help predict the demand for medical services, better manage resources, and reduce equipment shortages in critical situations. Experience with global health crises has shown that the use of advanced analytical tools can increase the resilience of health systems and improve resource management in emergency situations (Govindan et al., 2020; Kumar et al., 2024). Despite the wide-ranging benefits, the development and application of AI in the health sector also comes with challenges. Issues such as data security, patient privacy, and legal frameworks related to the use of medical data are among the crucial issues that need to be addressed. In addition, the lack of standardized and integrated data in some health systems can limit the process of training and evaluating intelligent models. Therefore, developing appropriate data infrastructures and ethical and regulatory frameworks for the responsible use of AI are essential requirements for the expansion of this technology in health systems (Moradzadeh et al., 2023; Sallam et al., 2021).

- **Artificial Intelligence in the Job Market**

Artificial intelligence has become one of the most important factors in the transformation of labor market structure in recent years. Advances in machine learning, big data analytics, and intelligent systems have enabled algorithms and automated systems to take over many activities that were previously performed, in whole or in part, by humans (Mansoori, 2025). This transformation has changed the nature of jobs, the skills required, and the way work is organized in many economic sectors, and has drawn the attention of researchers and policymakers to its

implications for the future of employment (Brynjolfsson & McAfee, 2014). One of the significant impacts of AI on the labor market is the automation of some job tasks. AI-based technologies can perform repetitive, data-driven, and predictable activities with high speed and accuracy. This has caused some jobs to decline in demand, while new jobs have been created in areas related to technology, data analysis, and intelligent systems development. In fact, AI is changing the structure of tasks within jobs rather than eliminating jobs altogether (Autor, 2015).

On the other hand, AI can significantly increase workforce productivity. The use of intelligent systems in the workplace helps employees make more accurate decisions, reduce errors, and complete work processes faster. This collaboration between humans and machines, sometimes known as "hybrid intelligence," can increase the efficiency of organizations and improve the quality of services and products (Brynjolfsson et al., 2018). Another impact of AI on the labor market is related to the change in the skills required by the workforce. With the spread of smart technologies, the demand for skills such as data analysis, programming, analytical thinking, and the ability to work with digital systems has increased. In contrast, skills based on repetitive or predictable activities have become less important. For this reason, many countries are paying special attention to developing digital skills training programs and lifelong learning to adapt the workforce to technological changes (World Economic Forum, 2023).

In addition, AI can create new jobs and career fields. The development of new technologies has created job opportunities in fields such as data science, machine learning engineering, AI ethics, data management, and intelligent systems design. These new jobs often require specialized and interdisciplinary skills, demonstrating that technological change not only eliminates some jobs but also creates new ones (Frey & Osborne, 2017).

At the same time, the spread of AI could also exacerbate existing inequalities in the labor market. Some studies suggest that automation technologies will affect mostly middle-skilled jobs, leading to a polarization of labor market, with demand for high- and low-skilled jobs increasing and middle-skilled jobs decreasing. Such a trend may have significant social and economic consequences for societies (Acemoglu & Restrepo, 2020).

From an organizational perspective, the use of AI can also change the structure of human resource management and recruitment processes. Many organizations use intelligent algorithms to screen resumes, evaluate employee performance, and predict staffing needs. These tools can make HR processes faster and more accurate, but at the same time, concerns have also been raised about transparency and algorithmic bias (Bogen & Rieke, 2018).

In general, AI, as one of the most important technologies of the digital age, plays a decisive role in shaping the future of the labor market. This technology provides opportunities for increasing productivity and creating new jobs, and challenges the areas of changing skills, job inequality, and the adaptation of the workforce to new technologies. Therefore, managing this transformation requires appropriate policymaking, investment in education and skills development, and the development of ethical and legal frameworks for the responsible use of intelligent technologies (Acemoglu & Restrepo, 2020).

The rapid development of artificial intelligence technology in recent years has had significant effects on the structure of economies and labor productivity, which has increased the need for policymaking and regulation in this area. One of the crucial issues in macro decision-making is assessing the impact of artificial intelligence on different jobs and measuring its capacity to change the structure of the labor market. International studies show that the degree of exposure of jobs to AI automation varies greatly and, depending on the type of job activity, can range from a few percent to about half of the tasks of a job. However, global estimates suggest that in many jobs, AI will act more as a complementary tool than a complete replacement for human labor. In fact, a significant portion of job tasks can only be partially

automated, and the use of AI will lead to increased efficiency, improved decision-making, and improved productivity, rather than complete elimination of jobs (Cazzaniga et al., 2024).

Research on the potential of AI to perform job tasks also shows that a large proportion of work activities are only partially susceptible to automation. In many cases, less than half of the tasks of a job can be performed by AI systems, and therefore the main role of this technology in the short term will be to enhance and complement the capabilities of the human workforce. According to these studies, in the majority of jobs, AI either has a negligible impact or is used as an auxiliary tool to increase the speed, accuracy and quality of task performance, and only in a small proportion of activities is it possible to completely replace the workforce. This suggests that the impact of AI on the labor market will be more in the form of "changing the nature of jobs" and "evolving skills requirements" than in the widespread elimination of job opportunities (Eloundou et al., 2023).

At the macroeconomic level, the extent of the impact of AI on a country's labor market depends on factors such as the level of digitalization, technological infrastructure, access to data, and the level of economic development. Advanced economies, due to their stronger digital infrastructure, tend to experience a greater share of the benefits as well as the transformative consequences of AI, while developing economies are less likely to experience this. Some estimates suggest that around one-fifth of jobs in many economies are exposed to some form of AI impact; however, the bulk of this impact will come in the form of increased productivity and the complementation of human activities, with the contribution of full labor replacement being more limited. As a result, although AI can reallocate labor and capital and bring about profound changes in some sectors, in the short and medium term, it will act more as a strengthening force in the economy than as a factor in widespread job elimination (Briggs & Kodnani, 2023).

- **Artificial Intelligence in Healthcare**

Artificial intelligence has become a key driver of the digital transformation of healthcare systems over the past decade. The exponential growth of health data, from electronic patient records to genomic data and medical imaging, has enabled machine learning algorithms to recognize complex patterns and play a complementary role in clinical decision-making. This development has not only increased the accuracy of diagnosis but also enabled disease risk prediction and early intervention (Topol, 2019).

One of the most prominent applications of artificial intelligence is in the field of medical diagnosis. Deep learning algorithms, especially convolutional neural networks, have been able to perform on par with, or in some cases, superior to, human experts in analyzing medical images such as radiology, pathology, and dermatology. This progress shows that intelligent systems can reduce the workload of physicians and increase the accuracy of diagnosis as a clinical decision support tool (Esteva et al., 2017).

Artificial intelligence is also playing an increasing role in the prediction and management of chronic diseases. Predictive models based on big data can estimate the risk of complications in patients with heart disease, diabetes, or cancer, and recommend personalized treatment plans. This approach, based on the analysis of clinical and behavioral data, has enabled the move from reactive treatment to preventive care (Rajkomar et al., 2018; Khalilzadeh Bonab et al., 2026).

In the field of population health and epidemiology, AI is a powerful tool for monitoring and predicting disease outbreaks. The analysis of demographic data, social networks, and environmental data can help to more quickly identify patterns of infectious disease spread (Gorgi et al., 2025; Sarvestani et al., 2026). This capability is particularly important during pandemics and can be effective in designing public health interventions (Shilo et al., 2020).

Another application of AI is in personalized medicine and genomics. By combining genetic, molecular, and clinical data, intelligent algorithms can recommend treatments tailored to the individual characteristics of each patient. This approach not only increases the effectiveness of treatment but also prevents unnecessary side effects and represents an important step towards precision medicine (Bandegi et al., 2026; Krittanawong et al., 2017).

Artificial intelligence has also made significant advances in the fields of surgery and medical robotics. Robotic surgical systems, based on intelligent algorithms, can increase movement precision, reduce human errors, and enable minimally invasive interventions. This technology has improved the quality of treatment outcomes, especially in complex and sensitive surgeries (Yang et al., 2017).

Despite all these benefits, challenges such as patient data privacy, algorithmic bias, legal liability for potential errors, and the need for appropriate regulatory frameworks remain. The safe and ethical use of AI requires the development of transparent standards, continuous oversight, and human resource training. Without addressing these considerations, sustainable exploitation of AI capabilities in healthcare will not be possible (Morley et al., 2020).

- **National Research Background**

Rezaei and Karimi (2024) in a study, titled "Analyzing the Impact of Artificial Intelligence on Digital Marketing Strategies in Technology Startups," showed that the use of artificial intelligence tools such as predictive analytics and natural language processing can significantly increase customer conversion rates and reduce marketing costs. This study emphasizes that startups can improve their customer acquisition and retention processes and outperform their competitors by utilizing these advanced technologies. The findings also point to the optimal use of financial resources and time for startups, as the use of artificial intelligence in this field automates and targets marketing processes. The research results show that digital marketers can achieve more accurate analysis of customer behavior and make better plans by using artificial intelligence.

Rahimi et al. (2024) conducted a study to investigate the level of acceptance, awareness, attitude, and readiness of medical students towards artificial intelligence. The findings of this study showed that the level of knowledge, readiness, and acceptance of students towards the applications of artificial intelligence in medicine was assessed as average, while their attitude towards this technology was at a desirable level. The results also indicated that participation in AI-related training courses can play a decisive role in increasing students' readiness to use this technology in medical environments and is considered one of the most important predictors of its acceptance in their professional future.

In another study, Abdolahi Shahvali et al. (2024) surveyed 200 nursing students to assess their attitudes towards the use of artificial intelligence in the nursing profession. The results of this study showed that most students have a positive attitude towards the use of artificial intelligence in nursing care processes and services. In addition, the findings indicated that increasing age is associated with improving students' knowledge about artificial intelligence, and male gender in this study was associated with a higher level of attitude and performance in the application of this technology.

MirMasoumi (2023), in a study reviewing recent advances in artificial intelligence in healthcare and medicine based on systematic sources, presented that the implementation of AI at an accelerated pace is creating significant changes in the administrative and clinical workflow of healthcare organizations. These changes highlight the significant impact that artificial intelligence has on a variety of tasks, especially in healthcare procedures related to early diagnosis. Past papers show that artificial intelligence has the potential to increase the overall quality of services provided in the healthcare industry. There are reports that AI-based

technology can make life safer and more productive. A comprehensive analysis of the use of AI in the health sector is presented in this study in the form of systematic sources. In order to provide a classification framework, 132 articles drawn from scientific sources were considered. This study covers the benefits and issues that AI capabilities provide for individuals, medical professionals, companies and the health industry. In addition, the social and ethical implications of AI are examined in the context of value-added medical service outputs for healthcare decision-making processes, privacy and security measures for patient data, and health monitoring capabilities.

- **External Background**

In foreign studies, Shafa (2025) systematically examined the role of AI-based business intelligence models in improving organizational decision-making. The study used the PRISMA framework to review 97 articles across industries such as finance, healthcare, retail, and manufacturing. The results showed that business intelligence has evolved from traditional reporting to predictive, prescriptive, and causal models that guide managerial choices. The study highlighted the importance of data ecosystems, governance, and organizational capabilities such as data literacy and collaboration. Ethical considerations and risk management, including fairness and privacy, were identified as essential safeguards. Finally, performance measurement methods, such as balanced scorecards and OKRs, showed a strong correlation with AI adoption and organizational performance.

In the research, Machucho and Ortiz (2025) examined the impact of AI on business innovation and how it is changing industrial strategies and operations. Key themes of this paper include AI-based business model innovation, human-AI collaboration, ethical governance, operational efficiency optimization, customer experience personalization, and organizational capability development. The paper also addresses the cultural, technical, and ethical challenges in implementing AI, emphasizing the importance of its ethical acceptance in increasing consumer trust and promoting competitiveness. The paper provides frameworks for aligning AI with business goals and suggests sustainable innovation pathways for researchers. It also provides specific roadmaps for leveraging AI for competitive advantage and sustainable development, especially for small and medium-sized businesses.

In the same manner, Zamilinski et al. (2025) focused on the systematic development and justification of theoretical and methodological principles, along with recommendations for creating an information and analytical infrastructure for managing the development of medical institutions through the use of artificial intelligence. The analysis covers contemporary and international research devoted to the study of the scientific foundations of the information-analytical aspect of development. A global approach is proposed to create a sustainable structural framework of a separate medical institution and a structure with a more complex functional role. The analysis and assessment of the benefits of using AI, as well as the risks that may arise after the introduction of AI in medicine, have been carried out. A number of risks that may be associated with the development of science in this area have been described. Technological developments, which form the basis for the creation and management of artificial intelligence in medical institutions, allow the integration of various types of communication based on modern decision-making methods and procedures. The use of artificial intelligence to create integrated data and analytical management systems has become an essential factor in increasing the flexibility and efficiency of the management system of medical institutions. The subject of this study is the theoretical, methodological, and practical foundations of creating informational-analytical support for sustainable development management with the help of artificial intelligence in medical institutions. A review of previous studies shows that a significant portion of research has addressed the applications of AI in areas such as marketing,

banking, digital businesses, or organizational management, and in the health field, it has mainly focused on student attitudes or improving the management of medical institutions. However, the simultaneous study of the impact of AI on the scientific landscape of medicine and labor market changes in health occupational groups has received less attention. Therefore, by focusing on these two complementary dimensions, the present study attempts to cover the gap in the research literature and provide a comprehensive picture of the scientific and occupational consequences of AI in the health system.

Research Method

The present research is a library type in which the researcher uses resources available in libraries, scientific articles, online databases and other secondary sources to collect data. This type of research is especially useful for reviewing the research background, analyzing existing theories and concepts on specific topics, and is based on the study and review of reliable sources.

In this study, the statistical population directly includes existing scientific and research resources in the field of artificial intelligence and medicine. Specifically, this study seeks to analyze the research background, review published articles, authoritative reports, and resources available in scientific databases. To select resources, criteria such as credibility, freshness of information, and their impact on the research field have been selected.

The data collection method in this study is library-based. In this method, the required data are extracted from various and reputable scientific sources. These sources include books, scientific and research articles published in reputable domestic and foreign journals, theses and dissertations of postgraduate studies, research reports, conference papers, as well as online scientific databases such as Google Scholar, PubMed, Scopus, and other reputable scientific sources. The researcher uses these sources to collect the necessary information and data in order to analyze them and achieve the research objectives and to conduct a deeper investigation into the concepts, challenges and opportunities of artificial intelligence in medicine.

In this study, the main data collection tool includes studying and reviewing reliable library and online resources. The researcher analyzes scientific articles, books, and research resources and uses them to collect data and information related to AI applications in medicine. No technical tools such as questionnaires or interviews are used in this study, because this study is completely based on the analysis of existing information.

The data collected in this study will be processed through content analysis and qualitative analysis. In this stage, the information extracted from different sources will be categorized and then analyzed analytically on different topics. These analyses will lead to the identification of patterns and major consequences regarding the applications of artificial intelligence in medicine, the challenges and opportunities of AI in the field of health and hygiene.

To assess the validity and reliability of the research, the researcher used reputable and well-known sources. Moreover, to ensure the comprehensiveness and accuracy of the data, the sources used were selected from reputable scientific databases and up-to-date articles and books on AI and medicine. This helps increase the validity of the research and ensures that the research results are obtained accurately and based on valid scientific data.

Findings

Artificial intelligence has emerged as a powerful tool in the medical world in recent years, significantly increasing the accuracy and speed of disease diagnosis. The use of machine learning algorithms allows doctors to simulate complex patterns in medical data and identify diseases with greater accuracy. Especially in the diagnosis of complex diseases such as cancer, heart disease, and rare diseases that require high accuracy, artificial intelligence can reduce

diagnostic errors and speed up the diagnosis process. One of the main applications of artificial intelligence is the analysis of image data such as MRI, CT-scan, and radiology images, which help identify abnormalities and make more accurate diagnoses (Rahmani & Fallahi, 2020). Artificial intelligence also plays an effective role in identifying specific diseases such as breast and lung cancer and reduces the possibility of errors in diagnoses, so that this technology can help identify diseases in the early stages and facilitate appropriate treatment measures (Iqbal et al., 2024). In general, AI in medicine has been able to significantly transform the way medical services are provided by improving the accuracy and speed of disease diagnosis and helping doctors make better decisions.

Artificial intelligence plays an important role in disease prediction and prevention. By analyzing health data collected from millions of patients, AI algorithms are able to simulate patterns and predict the risk of developing diseases. These predictions allow doctors to take preventive measures and early interventions, which can prevent the onset of diseases or reduce their severity (Rahmani & Fallahi, 2020). Especially in heart diseases, AI can predict the risk of heart attacks by analyzing data such as blood pressure and cholesterol levels and provide appropriate preventive strategies (Rahmani & Fallahi, 2020). Furthermore, in the context of chronic diseases, such as diabetes and neurological diseases, AI can suggest preventive measures to reduce the risk of developing these diseases (Saeed et al., 2025). These applications of AI can help improve public health and reduce the financial and social burden of diseases.

Table 1 shows that AI in the field of disease diagnosis has gone beyond a purely technical tool and has become an important pillar of medical decision-making. The first notable point is that AI algorithms, with the ability to simultaneously process a huge amount of clinical, laboratory data, and health records, enable the identification of hidden patterns of disease in the early stages. This capability allows the diagnosis of diseases to be made not only based on the observation of obvious symptoms but also based on data-driven and predictive analysis. As a result, doctors can identify the disease in its earliest stages and prevent the occurrence of more severe complications, an issue that plays an important role in improving the quality of care and reducing medical costs (Iqbal et al., 2024).

The second important axis in this table is the role of artificial intelligence in increasing the accuracy and personalization of the diagnostic process. As can be seen in the sub-concepts of the table, this technology can adapt the diagnosis to the individual characteristics of each patient by analyzing multifaceted data, including biological, environmental information, and specific history of each patient. Such a capability is especially important in complex diseases such as neurological disorders, vascular diseases, and problems caused by environmental factors, because in these cases, accurate diagnosis requires the simultaneous examination of various variables. In this way, artificial intelligence not only helps to reduce human errors but also paves the way for the development of personalized medicine and the provision of interventions tailored to each patient's condition (Ayesha et al., 2024; Fan et al., 2024).

Third, the table provides a clear picture of the future of smart health systems, a future in which artificial intelligence plays a complementary and supportive role to the physician in the diagnostic process. The integration of this technology into medical equipment and real-time recommender systems shows that disease diagnosis is moving towards a smarter, faster, and more accurate structure. However, the full realization of this potential requires appropriate data infrastructure, clinical validation of models, and professional acceptance by healthcare professionals. Therefore, the impact of artificial intelligence in disease diagnosis should be examined simultaneously from two perspectives: an opportunity to improve diagnostic accuracy on the one hand, and a requirement to prepare the health system to accept new technologies on the other hand (Iqbal et al., 2024).

Table 2 shows that AI plays a role far beyond mere diagnosis in the field of disease prediction and prevention, and has become a strategic tool for managing individual and collective health. By analyzing extensive medical, behavioral, environmental, and demographic data, this technology is able to identify the likelihood of disease occurrence before clinical symptoms appear. Such a capability allows health professionals to adopt a preventive approach instead of focusing solely on treatment and, by identifying individuals at risk, plan intervention measures at the right time. In this way, AI can play an effective role in reducing the burden of diseases, improving public health, and optimizing health system resources.

On the other hand, one of the most important functions of artificial intelligence in this field is to increase the accuracy of prediction and target prevention programs. Machine learning algorithms and predictive models, using multidimensional data, can identify complex and nonlinear relationships between different risk factors, relationships that are difficult or even impossible to detect with traditional methods. Accordingly, the health system can classify population groups or specific patients based on the level of risk and design a tailored prevention strategy for each group. This paves the way for a move from general prevention to precise and personalized prevention.

Finally, the content of this table indicates that the use of artificial intelligence in disease prediction and prevention, in addition to clinical benefits, also has important managerial and policy implications. If this technology is properly integrated into health infrastructure, it can lead to more informed decision-making, better resource allocation, reduced healthcare costs, and improved health system efficiency. However, the effective use of such capacity requires access to high-quality data, the protection of patient privacy, algorithmic transparency, and the trust of healthcare professionals and patients in the results obtained from intelligent systems. Therefore, artificial intelligence in this area is not only a technological tool but also part of a forward-looking transformation of health systems towards prevention.

Conclusions and Recommendations

Artificial intelligence has become one of the most effective transformative technologies in the health system in recent years, and existing evidence shows that this technology has the potential to transform many medical processes from diagnosis and treatment to prediction, prevention, and management of health services. A review of the concepts presented in this study indicated that AI not only plays a role in increasing the speed and accuracy of medical data analysis but also can predict the likelihood of disease occurrence by identifying hidden patterns and help make more targeted clinical decisions. This transformation is moving medicine from traditional disease-response models to predictive, intelligent, and data-driven models (Fan et al., 2024; Iqbal et al., 2024).

One of the most important findings of this research is that artificial intelligence has a significant ability to diagnose diseases early. Algorithms based on machine learning and deep learning can simultaneously process clinical, laboratory, imaging, and health history data to identify signs that may be less noticeable in human assessment. This feature is especially important in complex, chronic, and multifactorial diseases, as faster diagnosis can prevent disease progression and improve treatment outcomes. From this perspective, artificial intelligence is not considered a substitute for doctors, but rather an enabling tool to improve the quality of diagnosis and reduce clinical errors (Fan et al., 2024).

On the other hand, the findings showed that the importance of AI is not limited to diagnosis, but this technology also has a prominent place in the prediction and prevention of diseases. By analyzing data related to lifestyle, family history, environmental status and health indicators, predictive models can identify individuals or groups at risk and pave the way for preventive

interventions. This approach moves the health system from a treatment-oriented to a prevention-oriented one, allowing human and financial resources to be allocated more efficiently. In fact, AI can be one of the main foundations of public health policymaking and preventive medicine in the future (Ayesha et al., 2024).

Despite these capabilities, the review of resources showed that the effective use of AI in health systems also comes with significant challenges. The most important of these challenges include data security, patient privacy, data quality and standardization, algorithmic bias, and the reliability of model outputs. If the data used is incomplete, unbalanced, or unrepresentative, the results obtained from AI systems may also be misleading or unfair. In addition, in many developing countries, technological infrastructure and coherent databases have not yet reached a level that can support the widespread deployment of this technology. Therefore, the success of AI in health depends not only on the power of algorithms but also on the quality of the data system and the health governance framework (Morley et al., 2020; Shilo et al., 2020).

Another important dimension highlighted in this research is the impact of AI on the future of jobs and professional roles in the medical field. Contrary to concerns about the elimination of human resources due to the spread of smart technologies, evidence suggests that AI will lead to a redefinition of job tasks rather than the complete elimination of jobs. Doctors, nurses, and other health workers in the future will need skills that go beyond traditional specialist knowledge—skills such as data interpretation, interaction with intelligent systems, assessment of the validity of algorithmic recommendations, and ethical management of technology. Therefore, digital transformation in health should be pursued simultaneously with the maintenance and empowerment of human resources so that technology becomes a factor for strengthening professional capacities, not a factor for organizational resistance or job anxiety (Yakusheva et al., 2024; Huo et al., 2025).

From a management and policymaking perspective, the results of this study suggest that the successful use of AI in health systems requires a multifaceted approach. Developing clear rules for protecting health data, establishing ethical frameworks for the use of algorithms, continuously evaluating the performance of models in real-world settings, and monitoring the social and occupational consequences of this technology are among the actions that should be prioritized. It is also necessary for health systems to move away from a project-based and ad hoc approach and toward long-term planning for the gradual and responsible integration of AI. In this direction, collaboration between medical professionals, data scientists, health managers, and policymakers is essential to align technology development with the real needs of patients and the healthcare system (Gifford et al., 2023; Wachter & Brynjolfsson, 2024).

Accordingly, the first practical suggestion of the present study is that medical and educational centers design and implement training and retraining programs in the field of digital literacy and AI applications for doctors, nurses, and health managers. Without human resource preparation, even the most advanced intelligent systems may encounter resistance, misunderstanding, or ineffective use. Training should include not only the technical aspect but also the ethical, legal, and professional dimensions of working with artificial intelligence so that users can use these tools consciously and responsibly.

The second suggestion is that the development and implementation of AI systems in the health sector should be based on local, reliable, and standardized data. Many existing models are trained on data from developed countries and may not perform the same in other social, cultural, and medical contexts. Therefore, the creation of national and regional databases, the standardization of health information registration, and support for interdisciplinary research can lead to the localization of algorithms and increased accuracy and fairness in medical applications. This is especially important for countries facing infrastructure constraints.

Finally, it is suggested that future research should delve deeper into the real-world impacts of AI on clinical outcomes, equity in access to services, patient satisfaction, and changing job roles in the health system. Future studies should not focus solely on the technical capabilities of models but also examine the human, social, and organizational implications of deploying this technology. The overall conclusion of this research is that AI, if coupled with appropriate infrastructure, ethical oversight, human resource training, and smart policymaking, can become one of the significant tools for improving the quality, efficiency, and sustainability of the health system; however, in the absence of these requirements, this same technology may become a source of inequality, distrust, and disruption in treatment processes.

Finally, the following suggestions can be made based on the research results:

- Using AI systems for remote examination and treatment of patients in underserved areas can help reduce problems related to doctor shortages and increase access to medical services. Therefore, it is essential to develop applications and provide these technologies in these areas.
- Instead of worrying about replacing doctors, AI systems should act as a partner to doctors. Creating training platforms and support programs for doctors to facilitate collaboration between humans and AI can improve the efficiency of healthcare systems.
- Given the capabilities of artificial intelligence in predicting diseases, it is suggested that tools for prediction and preventive interventions in various diseases such as heart disease and diabetes be provided to doctors and specialists to prevent the occurrence of these diseases or reduce their severity.

The present study showed that artificial intelligence plays a fundamental role in improving medical processes. The results of the clarity analysis show that artificial intelligence can significantly increase the accuracy and speed of disease diagnosis using advanced machine learning algorithms. Especially in the diagnosis of complex diseases, such as cancer and heart disease, AI has been able to increase the accuracy of diagnosis and reduce the time required for diagnosis (Kolkov, 2023). These findings are consistent with previous studies that show that artificial intelligence algorithms in the analysis of medical image data, such as MRI and CT-scan, can simulate abnormalities and improve the accuracy of diagnosis (Rahmani & Fallahi, 2020; Mohseni et al., 2018). Another important aspect addressed in this research is the use of artificial intelligence in designing personalized treatments. The findings showed that artificial intelligence, using medical and genetic data, can suggest specific and effective treatments for each patient, leading to increased effectiveness of treatments and reduced side effects of drugs. In addition to diagnosis, artificial intelligence also has many applications in the field of treatment. Using advanced algorithms to design personalized treatments is one of the main perspectives of AI in medicine.

Artificial intelligence systems can collect extensive data from various aspects of patients, including medical history, genetic data, lifestyle, and previous responses to treatments, and recommend specific and effective treatments for each patient (Islam, 2025). These results indicate significant advances in designing treatments tailored to the individual needs of patients. According to the results of the analysis, it can be concluded that AI has great potential to improve medical processes, from diagnosing diseases to designing personalized treatments, predicting and preventing diseases, and increasing access to medical services. This technology has been able to significantly increase the accuracy of diagnosis, reduce treatment costs, and improve access to medical services. However, challenges such as privacy concerns, physician resistance, lack of training in developing countries, and lack of legal regulations need to be addressed to facilitate the adoption of AI in health systems. Ultimately, AI can act as a useful

partner for doctors and play an important role in improving the quality and access to healthcare services. Finally, the following suggestions can be made based on the research results:

- Using AI systems to remotely examine and treat patients in underserved areas can help reduce the problems related to the shortage of doctors and increase access to medical services. Therefore, it is essential to develop applications and provide these technologies in these areas.
- Instead of worrying about replacing doctors, AI systems should act as colleagues of doctors. Creating training platforms and support programs for doctors to facilitate collaboration between humans and AI can improve the efficiency of healthcare systems.
- Given the capabilities of artificial intelligence in predicting diseases, it is suggested that tools for prediction and preventive interventions in various diseases such as heart disease and diabetes be provided to doctors and specialists to prevent the occurrence of these diseases or reduce their severity.
- It is recommended that managers and decision-makers in relevant fields create the necessary capabilities and expertise among medical staff to maximize the benefits of artificial intelligence capabilities by planning and implementing training courses and motivational incentives in the medical community.

Managerial Applications

The results of this study can help healthcare system managers and human resource managers in medical organizations to gain a more accurate understanding of the implications of the expansion of artificial intelligence on the structure of medical jobs and the future of the labor market in this field. Given the change in the nature of some tasks from purely human activities to hybrid human-machine patterns, managers can formulate strategic plans to redesign jobs, develop digital skills, and enhance the capabilities of medical staff so that employees can keep pace with smart technologies.

The research findings can also provide a basis for educational planning in healthcare organizations and medical universities. Managers can use these results to design continuing education, professional empowerment, and skills retraining programs so that medical human resources can play an effective and complementary role alongside artificial intelligence systems, thereby enhancing the quality of healthcare services and organizational efficiency.

Theoretical Applications

From a theoretical perspective, this study contributes to the development of scientific literature at the intersection of three important areas, namely human resource management, smart technologies, and the health system, by explaining the dimensions and consequences of AI application in the medical field. The conceptual framework presented in this study can be a basis for a better understanding of how the structure of tasks, skills, and professional roles in medical professions is changing in the age of artificial intelligence.

In addition, the results of the study can be used as a basis for future studies on the evolution of the health labor market, human-machine interaction in healthcare environments, and the organizational implications of the use of artificial intelligence. Researchers can use the findings of this study to develop new analytical models to examine the effects of smart technologies on employment structure, professional productivity, and the future of health careers.

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