Chapter 2
Artificial Intelligence in Health and Applications

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ABSTRACT

Artificial intelligence technologies are tools that develop with the contribution of different disciplines from statistics to computer science. These tools contribute to the health sector in many ways, from reducing medical errors, especially in costs, to increasing the patient's accessibility to health services. In addition to the contributions of artificial intelligence technologies, there are ethical concerns and concerns about the use and dissemination of these technologies. The recent COVID-19 pandemic has supported the increase in the level of patient participation in healthcare processes and the transfer of personalized applications to digital environments. Within the scope of this research, artificial intelligence concepts and applications in the field of health will be included. The advantages and disadvantages of artificial intelligence applications in the field of health service delivery will be evaluated.

INTRODUCTION

One of the reasons why artificial intelligence and machine learning applications are becoming popular today is big data. In recent years, topics such as big data analysis, medical imaging, medical record, the pharmaceutical industry, robot applications, early diagnosis, and treatment, ensuring error-free application, and preventing unnecessary treatments come to the fore in artificial intelligence applications in health.

In the prediction, diagnosis, and treatment processes of diseases, artificial intelligence applications that will help healthcare professionals make decisions are greatly utilized. In addition, the excessive growth in digital health data has increased the need for artificial intelligence studies. The most important process that accelerated this need was experienced with the COVID-19 pandemic. Artificial intelligence is an important technology of the fourth industrial revolution to overcome the current global health crisis and be prepared for new pandemics (El-Sherif et al., 2020).

Despite the advantages of artificial intelligence applications, some factors hinder their development in the health sector. One of these factors is the barriers to the adoption of artificial intelligence applications. In a study conducted in German hospitals, it was determined that there is no awareness of these practices that are not used in routine work (Müller et al., 2021). There are uncertainties regarding the benefit it provides to patients. There is no clear understanding of why patients will need artificial intelligence or how Artificial intelligence can support patients with their health needs. In a study conducted in France, it was determined that public institutions and private sector managers agreed on the development of artificial intelligence applications in health services. In addition, it was emphasized that the opinions of the patients benefiting from these services should be taken about the practices (Laï et al., 2020).

In the future, artificial intelligence applications will have an important role in the health service delivery models that are renewed according to the health needs of the elderly population. In a study, it is stated that artificial intelligence applications developed cause age discrimination by excluding the elderly (Chu et al., 2022). As the role of medical technologies continues to grow, clinical medicine will be forced to grow. As in other industries, this challenge will create winners and losers in the healthcare industry. The determinant of the future of artificial intelligence in medicine will depend on how well the confidentiality and security of health data can be ensured.

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In addition, the ethical integrity and public role of the health professions depend on maintaining public trust. The success of artificial intelligence in healthcare and the reputation of healthcare professionals using artificial intelligence will depend on resolving these ethical challenges. Sociocultural factors should also be considered among the main challenges in transforming artificial intelligence systems into healthcare services. There is a need for regulations that will increase the awareness of patients and ensure that they are not deprived of innovations (Reddy et al., 2020). For the next generation of doctors, the use of artificial intelligence technology will transform into a necessity. It is estimated that these technologies can compete with physicians in areas involving radiology and the examination of anatomical images. Physicians can use artificial intelligence technologies not only as a support tool but also to get advice about diagnosis and treatments (Char et al., 2018). To use artificial intelligence effectively in improving the quality of care and optimizing patient outcomes, education programs that will provide healthcare professionals with technological competence should be included in the curriculum (Charow et al., 2021). Within the scope of this research, artificial intelligence concepts and applications in the field of health will be included. The advantages and disadvantages of artificial intelligence applications in the field of health service delivery will be evaluated.

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