

Editorial

Artificial Intelligence in Healthcare: Implications, Challenges, and Future Prospects

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Introduction

Artificial intelligence is a technology that enables machines, especially computer systems, to mimic human intelligence and problem-solving abilities. This technology is being used nowadays in many areas of the healthcare industry, from scheduling online appointments to robot-assisted, safer surgeries with better patient outcomes.¹ Just like a physician, AI can record a patient's history, signs and symptoms, and lab results, leading to an accurate diagnosis and a proper treatment plan, but in no time. This is just a small example of the implications of AI in the sector. Other areas of medicine are also being benefited by this innovation, like gastroenterology, radiology, surgery, and preventive medicine. The development of advanced algorithms has reduced the burden on radiologists by helping them identify abnormal images and pick up malignant lesions with minimal diagnostic errors. Similarly, AI-assisted colonoscopy can help identify malignant and benign polyps.² AI-powered systems, like Google's DeepMind Health, may identify malignant growth in mammograms and diabetic retinopathy, which can aid in early detection and treatment.³

Comparably, computer programs trained in precision medicine can create pharmacological or behavioural regimens customized for every patient based on their

condition, metabolic profile, microbiome composition, food, lifestyle, sleep patterns, and a host of other data points gathered and examined over an extended period of time.⁴

Although the idea of robots conducting complex surgeries may still seem far-fetched, AI technologies have been created that, through automated workflows and decision assistance, can assist doctors in minimally invasive surgical procedures. These technologies are mostly employed in endovascular procedures and stroke treatment. AI-enabled systems can assist healthcare professionals in post-acute settings by generating early warning signals that identify patient deterioration as a result of events like cardiac arrest or respiratory failure, allowing for immediate action. In addition to detecting patient deterioration, AI can predict if medical equipment needs maintenance or replacement through remote sensing. This is how AI prevents avoidable delays in clinical practice.²

Since having the wrong resources at the wrong place at the wrong time puts patients in danger and promotes wasteful bed occupancy, which is a significant administrative burden for large healthcare organizations, artificial intelligence (AI) aids in automated resource allocation and patient flow management. AI is utilized to find trends in historical and real-time data, which helps providers maximize the effectiveness of flow management. Artificial intelligence holds promise for preventive medicine due to its ability to identify groups at risk and forecast illness outbreaks. For example, AI models may analyze epidemiological data to forecast infectious



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disease outbreaks and direct public health campaigns.⁵ However, these enormous benefits also carry significant risks that cannot be overlooked. As the WHO has appropriately noted, it would also be unwise to wait to learn about the drawbacks of AI technologies until they are implemented in healthcare settings. There have been documented risks that AI could produce false, inaccurate, or incomplete outcomes. Furthermore, healthcare equity may be jeopardized by the possibility of biases in AI systems. These blind spots will be incorporated by algorithms trained on data sets that are not diverse and reflect cultural prejudices, which frequently complicate healthcare results for marginalized people.⁶ Even if AI is becoming more widely recognized in the healthcare sector, human abilities, especially compassion and empathy, are still crucial and highly valued in healthcare environments. The primary concern is that, rather than completely replacing human physicians, computer-based intelligence frameworks are designed to augment their abilities to provide more efficient and customized patient care. Although widespread use of AI technology in the health industry is being accompanied by issues of data discrepancies and privacy protection, healthcare companies are still getting benefits from it to streamline their operations because the associated issues can be resolved. AI seems to have a promising future as it offers numerous opportunities for improving early symptom prediction, accurate diagnosis, and advanced drug research.

Although Pakistan's healthcare sector has a lot of potential to employ artificial intelligence effectively, there are now a number of obstacles to be solved. Even though AI-based solutions are widely used in Western healthcare systems, Pakistan is falling behind due to financial restrictions and a lack of awareness and expertise. Research indicates that the integration of artificial intelligence (AI) into Pakistan's healthcare system is

imperative to accelerate diagnosis, treatment, and resource allocation.⁷ In order to completely fulfill AI's potential to improve healthcare outcomes in Pakistan, steps must be taken to improve healthcare professionals' and students' understanding of and proficiency with the technology.

All things considered, artificial intelligence (AI) has the potential to dramatically change the healthcare industry by enhancing diagnosis, treatment, and prevention. In order to fully realize the advantages of this strategy and ensure that everyone has access to healthcare that is ethically and equitably supplied, it is essential to address the challenges that arise during implementation.

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