Review Article

The Integration of Artificial Intelligence in Physicians' Daily Practice for Diagnosis, Prediction, And Disease Management in the Arab World

Mostafa Ahmed Arafa[1,2], Karim Hamda Farhat[1]

[1]The Cancer Research Chair, Surgery Department, College of Medicine, King Saud University, Riyadh, Saudi Arabia.
[2]Department of Epidemiology, High Institute of Public Health, Alexandria University, Alexandria, Egypt.

Corresponding Author: Dr. Karim H. Farhat

ABSTRACT

Artificial intelligence (AI) is developing rapidly. Integrating AI into healthcare practices in the Arab world will transform diagnosis, prediction, and disease management. Today, countries such as Saudi Arabia and the United Arab Emirates (UAE) are at the forefront of AI adoption in healthcare, supported by strategic frameworks such as Saudi Arabia's Vision 2030 and the UAE National Artificial Intelligence Strategy 2031. However, adopting AI in daily healthcare practice on a large scale faces many obstacles that need to be overcome.

Keywords: Artificial intelligence, AI, healthcare practice, diagnosis, prediction, and disease management, Arab world.

INTRODUCTION

Over the past ten years, artificial intelligence (AI) technologies like computer vision and natural language processing have advanced significantly. The general requirements for individual treatment, lowering the burden on a health system, cutting costs, identifying and discovering new diseases, and expanding healthcare resources in developing nations make the healthcare industry one of the most advantageous sectors for implementing recent AI technologies [1]. Various diseases that appear in patient electronic medical record (EMR) data can be automatically diagnosed, predicted, and managed by the suggested AI disease management system application. Thus, in the upcoming years, AI will possess the capacity to have a very positive effect on this field [2, 3]. Algorithms currently surpass radiologists in identifying malignant tumors and in advising researchers on the creation of cohorts for costly clinical trials [2, 4]. However, little research has been devoted to connecting the gap between the performance of AI applications in research studies and the lack of implementation into the daily practice of healthcare systems.

McKinsey & Company projects that artificial intelligence (AI) could unlock up to $580 billion in economic value throughout the Middle East and North Africa by 2025, while studies by the Arab Artificial Intelligence Council (AAIC) suggest that AI could add $200 billion to the total Gross domestic product (GDP) of Arab countries by 2030 [5].

Artificial Intelligence in Healthcare: Concepts and Applications in the Arab World

The health systems in the Middle East and North Africa (MENA) region are faced with various obstacles, such as the increasing prevalence of chronic illnesses, unequal access to healthcare services, a shortage of

medical professionals, insufficient adoption of efficient health information systems, and leadership issues [6].

AI has advanced significantly in the last ten years in several areas, including data analytics, natural language processing, and information technology. Physicians used conventional medical procedures for illness diagnosis, prognosis, and treatment; they showed resistance to change to contemporary technologies [7- 9]. AI is expanding quickly in the healthcare industry, mostly due to massive amounts of clinical and medical data production. Nonetheless, there is still a long way to go in advancing AI research and applications in healthcare [10].

Both imaging and clinical applications comprise the majority of AI research and applications in the healthcare industry worldwide. These groups are based on the field or kind of information that artificial intelligence is intended to be applied to. One of the most widely used AI applications is medical imaging, which has already achieved major advances in healthcare, particularly in the diagnosis of numerous illnesses, including diabetes, tuberculosis, and malignancies of the skin, lungs, and breast [4, 11, 12].

Such a revolution in the applications of AI in medical practices was extended to the Arab world, particularly with the emergence of the COVID-19 pandemic [13, 14]. There were numerous studies of AI implementation in breast cancer, prostate cancer, diabetes, and cardiovascular diseases [15- 19].

A survey was conducted among Arabic family physicians in Saudi Arabia to assess the current status of AI in medicine [20]. Sixty-nine physicians participated, with more than half working in primary health care centers and hospitals. Most participants were aware of AI advancements and considered chronic diseases, diabetes, and hypertension most suitable for detection and prediction by AI. Their main concerns about AI use included medical ethics and bias against less affluent countries. Participants expected an increase in AI use for diagnosis and prediction by 2030. At the United Arab Emirates clinic, AI is used with sonography, blood tests, and medication data to identify and analyze kidney disease [21].

Studies conducted in Arabic by the University of Sharjah demonstrate that AI-powered automation solutions can cut administrative burdens by up to 70%, freeing up more time for medical staff to spend with patients [22].

In Tunisia, Institute Pasteur researchers used artificial intelligence (AI) models to forecast and stop the development of germs resistant to antibiotics, a significant problem in the area. The Arab world's approach to treating cancer and managing chronic illnesses is expected to change as a result of this move toward "precision medicine" [23]. In Morocco, AI-powered systems are analyzing massive databases of public health data to predict and avert infectious disease outbreaks [24].

On the other hand, in some countries in the Arab world, some physicians still find difficulties in AI integration in their practice [25]. In order to encourage the quick adoption of AI models in standard medical procedures, a proposed smart model was designed. The proposed model consisted of two distinct components. The first component is free AI-based medical platforms for remote consultation after the AI screening of patient data. This is done via smartphone applications or web-based platforms. The AI model itself is open-source and free. Screening and consultation with a specialist medical doctor would be at no cost to the patients. The second component is hands-on training by expert medical doctors on applying the routine use of AI models in clinical practice.

In some developing countries, like Pakistan, the application of AI-based healthcare solutions has been slow. The recent study of Daniel M. et al. assessed physicians' background knowledge, expertise, and acceptance of AI usage in healthcare. The survey's findings revealed that the majority of participants were either unaware or unfamiliar with AI applications in medicine. Also, nearly 70% of physicians were

uncomfortable with or uneasy about AI usage in healthcare.

Generally speaking, doctors were willing to learn more about AI applications in medicine but were not interested in learning computer programming. In addition, more than 70% of surveyed physicians believed that routine consultation with an AI model would improve patient satisfaction [26].

CONCLUSION

We are at a turning point as it relates to the convergence of the practice of medicine and the application of technology. Although there are multiple opportunities, strong obstacles must be overcome as they relate to the real world and the scale of implementation of such innovation. Significant challenges are related to the wider adoption and deployment of AI into healthcare systems in Arab countries. These challenges include, but are not limited to, data quality and access, technical infrastructure, organizational capacity, and ethical and responsible practices, in addition to aspects related to safety and regulation. Artificial intelligence will not replace physicians but will help them to match the population's rapidly modernizing healthcare system. An expansion of translational research in the field of healthcare applications of artificial intelligence is highly recommended; alongside, the need for human expertise must be addressed for the responsible and effective implementation of AI in healthcare.

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