Editorial

AI's Transformative Impact on Healthcare and Medical Research in Pakistan

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Artificial intelligence (AI) has been emerged as a transformative force in the ever-evolving prospect of healthcare bringing unparalleled advancements in patient management and care.[1] Rapid unfolded benefits have revolutionized the landscape of healthcare delivery system. Accuracy of diagnostics in clinical, pathological and radiological settings, remote patient monitoring, shared decision-making,[1,2] precision medicine, biomedical literature, genomic, therapeutics and drug optimization, and health system management through algorithms, data analysis and predictions.[2-3]

What started as Enigma in 1942, was coined as 'Artificial Intelligence in 1956 by John McCarthy in the Dartmouth Conference. However, initially it was limited to data computing and research, through neural networks and machine learning (ML), Natural Language Process (NLP), it found its way to daily lives of many through virtual assistants, such as Apple's Siri and Amazon's Alexa.[1] Usage in health care system through automation and robotic surgery, its role in virtual health care assistant, physical and mental health support, patients' education and mitigation of burn out in health care providers, paved the way for its generalization among end users. A recent study in the USA showed that although more than half of participants felt discomfort with care providers using AI, still 80% of them expressed their willingness to use AI-powered tools to help manage their health themselves.[4]

However, equipping health system with AI itself posed challenges. The latest trends involve finding solutions to ethical considerations AI in healthcare and research settings with bias mitigation, confidentiality, transparency in shared decision-making. Development of regulatory frameworks and quality criteria ensure safe implementation of efficient performance based, robust and generalized system.[3] These methodological implementary mechanisms further ensure that AI integeration into health and biomedical research is reliable, accountable, and based on the principles autonomy, beneficence, and justice.[3-4]

Many commentators are convinced that in cooperation of AI in health system have opened the doors for innovation and entrepreneurship. This new orientation is supportive in both financial and health sector, thereby improving human life, quality of care, and economics.[5-6]

While AI is greatly shaping healthcare globally, healthcare system in Pakistan still awaits its integration. Pakistan's healthcare and disease burden falls in the lowest 25 percentile of the 195 countries.[5] It is well observed that in resource constraints settings of low and middle income countries (LMIC) like Pakistan, AI can improve efficiency, accessibility and affordability by addressing the scarcity of healthcare workforce and resources countries.[5,6] Pending digitalization of patients' record while world has moved towards cloud based Electronic Health Records (HERs), and automation clearly depicts country's slow responsiveness towards adaptation. Despite, the success story of telemedicine during Covid-19 pandemic in Pakistan, only few private and autonomous institutes in health sector have advances towards HER. This reiterates the lack of preparedness in integrating AI in healthcare delivery system and research.[3,5-7]

Despite exciting promises of AI in healthcare and research, published study trials on efficacy of AI, from Pakistan are also deficient.[5] Though many survey studies recognize the potential of AI in diagnosis, treatment, patient monitoring, capacity building and skill enhancement, the country still awaits curative evidence on algorithms generated and its generalization in regional context. Launch of telemedicine in Pakistan, HEC funded projects, establishment of public partnerships through multi-sectoral approach are examples of some steps taken to participate in the competitive and dynamic world of technology.[8-9]

Local challenges reported in the literature indicate lack of integration of AI-based system in existing workflows and infrastructure; connectivity issues, and, donor based intermittent advancement or "fashions", resulting in its lack of utility and continuity. Further, job insecurity among healthcare providers, ethical considerations and cyber security issues in low resource settings impedes its further adoption.[9]

Implementation of AI in real world settings, in healthcare is a holistic multi-factorial approach which involves facilitators and barriers in addition to the

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technical performance expertise, data security, sustainability, trust and transparency.[10]

Despite these challenges, there is a growing recognition of the importance of AI in enhancing business efficiency and competitiveness which cannot be attained without equipping health care providers and students with proper skill sets to use, harness and interpret AI in their clinical and academic settings. Incorporation of basics of AI algorithms, data sciences, ML and management is a must into current curriculum. Clinician, academicians', and students should be educated about the importance of AI in healthcare as a must.[5] Multidisciplinary mechanisms, liaison between The Medical Device Board (MDB) at Drug Regulatory Authority of Pakistan, industry and academia is essential to streamline, and commercialize AI related advancements. However, reliability, robustness, safety, transparency, ethical practices and data privacy along with detailed technical performance quality assurance must be assured in a person centric approach.[5]

REFERENCES

1. Alowais SA, Alghamdi SS, Alsuhebany N, Alqahtani S, Alahmari AK, Alotaibi NH, et al. Revolutionizing healthcare: the role of artificial intelligence in clinical practice. BMC Med Educ. 2023;23(1). doi: 10.1186/s12909-023-04698-z.
2. Rajpurkar P, Chen E, Banerjee O, Topol EJ. AI in health and medicine. Nat Med 2022;28(1):31-38. doi: 10.1038/s41591-021-01614-0
3. Umer L, Khan MH, Ayaz Y. Transforming healthcare with artificial intelligence in Pakistan: A comprehensive overview. Pak Armed Forces Med J 2023; 73(4): 955-963. doi: 10.51253/pafmj.v73i4.10852
4. Esmaeilzadeh P, Mirzaei T, Dharanikota S. Patients' perceptions toward human-artificial intelligence interaction in health care: experimental study. J Med Internet Res. 2021 Nov 25;23(11):e25856. doi: 10.2196/25856
5. Siddiqui R, Zafar A, Qazi SA. Artificial Intelligence and the future of healthcare in Pakistan: opportunities and challenges. J Pak Med Assoc. 2023;73(10):1944-1946. doi: 10.47391/JPMA.23-70.
6. Saadi H, Saadi R. Artificial intelligence and entrepreneurship in healthcare. [Internet]. 2023 [31 Jan 2025]. Available from: https://www.researchgate.net/publication/371959095_Artificial_Intelligence_and_Entrepreneurship_in_Healthcare
7. Ciecierski-Holmes T, Singh R, Axt M, Brenner S, Barteit S. Artificial intelligence for strengthening healthcare systems in low- and middle-income countries: a systematic scoping review. NPJ Digit Med. 2022 Oct 28;5(1):162. doi: 10.1038/s41746-022-00700-y
8. Kichloo A, Albosta M, Dettloff K, Wani F, El-Amir Z, Singh J. Telemedicine, the digital divide and artificial intelligence: prospective therapeutic applications in nutritional medicine and gastroenterology. BMC Med Inform Decis Mak. 2020;20(1):247. doi: 10.1186/s12911-020-01191-1
9. Naeem W, Nadeem H, Javed A, Ahmed W. Digital health and future of healthcare in Pakistan. Ann King Ed Med Univ. 2022;28(2):268-272. doi: 10.21649/akemu.v28i2.5120
10. Ahmed Z, Bhinder KK, Tariq A, Tahir MJ, Mehmood Q, Tabassum MS, et al. Knowledge, attitude, and practice of artificial intelligence among doctors and medical students in Pakistan: A cross-sectional study. Front. Public Health 2021; 9(1): 651108. doi: 10.3389/fpubh.2021.651108 23.