Kurdish Studies
August 2024
Volume: 12, No: 5, pp. 715 - 720
ISSN: 2051-4883 (Print) | ISSN 2051-4891 (Online)
www.KurdishStudies.net

DOI: 10.53555/ks.v12i5.3317

Perception of Pakistani Doctors Towards Facilitation of Artificial Intelligence in Diagnosis of Cancer

Maeesa Wadood[1*], Khuntalha Shah[2], Zubia Zia[3], Shazia Azhar[4], Muhammad Rizwan[5], Shahid Pervez Shaikh[6]

[1*]Associate Professor, Department of Pathology, Baqai Medical University, Karachi, Pakistan
[2]Lecturer Pharmacology, Isra College of Pharmacy, Hyderabad, Pakistan
[3]Associate Professor, Baqai Institute of Pharmaceutical Sciences, Baqai Medical University, Karachi, Pakistan
[4]Assistant Professor, Deputy Director, Baqai Institute of Medical Technology, Baqai Medical University, Karachi, Pakistan
[5]Associate Professor, Baqai Institute of Hematology, Baqai Medical University, Karachi, Pakistan
[6]Associate Professor Anatomy, Baqai Medical University, Karachi, Pakistan

***Corresponding author:** Maeesa Wadood
*Email: drmaeesasajeel@gmail.com

Abstract:
Background: The healthcare industry received the largest share of investments in Artificial Intelligence (AI) research in 2016. The majority of cancer patients receive their diagnosis after their symptoms start, and many of them arrive at emergency rooms with potentially fatal symptoms that they were unaware of when their illness went undetected. Computer engineers and health scientists are now able to work closely together to improve prognoses through the use of technological breakthroughs in computer software and statistics. In this regard, the current study was designed to assess the Perception of Pakistani Doctors Towards Facilitation Of Artificial Intelligence In Diagnosis Of Cancer.

Methodology: It was a cross sectional study conducted at tertiary care hospital of Karachi. The calculated sample size at 50% proportion of total doctors was n=50. The participants were recruited through convenient sampling technique. A preform proforma with questions related to application of AI in cancer diagnosis was administered in the doctors who gave consent to participate in the study.

Results: A total of 75 participants were included in the study, the mean age of the study participants was 39.3 ± 7.4 years. Among them 64 (85.3%) were aware of concept of AI in healthcare, 53 (70.6%) AI can assist in the early detection and diagnosis of cancer, 67 (89.33%) would like to integrate the idea of AI into their diagnostic processes, 71 (94.6%) think AI can improve the accuracy of cancer diagnoses, 75 (100%) would be willing to undergo training to effectively use AI tools, 68 (90.6%) do not think that AI can replace human judgment in cancer diagnosis.

Conclusion: There is still a clear awareness of AI's limits and the indispensable necessity of human judgment. A readiness to accept AI is demonstrated by the integration of AI and the completion of required training, as long as the technology is employed to supplement rather than to replace the knowledge of healthcare professionals.

Kew words: Artificial intelligence (AI), Cancer diagnosis, Doctors, Pakistan

Introduction:

One of the pioneers of AI and contemporary computers was Alan Turing (1950). His conceptualized "Turing test" was designed to demonstrate a computer's intelligent behaviour by having it complete cognitively linked activities at a level comparable to that of a human[1]. Furthermore, in several clinical contexts in the medical field, artificial intelligence approaches such hybrid intelligent systems, artificial neural networks, fuzzy expert systems, and Bayesian networks were employed. When compared to other industries, the healthcare industry received the largest share of investments in AI research in 2016[2]. It has been documented that there are two categories of AI in medicine i.e. virtual and physical. The virtual component includes anything from neural network-based treatment decision guidance to electronic health record systems and the physical portion covers with aged care, intelligent prosthetics for the disabled, and robots helping with surgery[3, 4].

The majority of cancer patients receive their diagnosis after their symptoms start, and many of them arrive at emergency rooms with potentially fatal symptoms that they were unaware of when their illness went undetected. Additionally, compared to patients whose cancer is discovered after a non-emergency presentation or through a screening program, those who receive a cancer diagnosis subsequent to an emergency presentation are linked to worse clinical and patient-reported outcomes. It is acknowledged that preventing medical misdiagnosis is a national public health goal[5, 6]. The National Academy of Medicine (NAM) said that "most people will experience at least one diagnostic error in their lifetime, sometimes with devastating consequences" in its seminal 2015 study Improving Diagnosis in Healthcare[7].

Computer engineers and health scientists are now able to work closely together to improve prognoses through the use of Cox analyses, multi-factor analysis, and traditional logistic regression because to technological breakthroughs in computer software and statistics. It was discovered that these forecasts had a far greater accuracy rate than empirical predictions[8]. Since AI has been used, researchers have recently focused on developing models that use AI algorithms to forecast and diagnose cancer. At the moment, these techniques significantly increase the precision of cancer susceptibility, recurrence, and survival estimates[9, 10]. Considering the development of the advanced approaches the current study was designed to assess the Perception Of Pakistani Doctors Towards Facilitation Of Artificial Intelligence In Diagnosis Of Cancer.

Methodology:

It was a cross sectional study conducted at tertiary care hospital of Karachi. The calculated sample size at 50% proportion of total doctors, confidence interval 95% and, level of beta 80 was n=50. The participants were recruited through convenient sampling technique. The set inclusion criteria was all the doctors with post-graduation (MS, MD or FCPS) in field of medicine or surgery. A preform proforma with questions related to application of AI in cancer diagnosis was administered in the doctors who gave consent to participate in the study. The responses were evaluated by SPSS version 24, frequency and percentages were calculated for reporting the responses and chi square was applied to generate the associations.

Results:

The total calculated sample size was 50 however, a total of 75 participants were included in the study. The mean age of the study participants was 39.3 ± 7.4 years. Among them 41 were male, 46 were from department of surgery and 52 were FCPS consultants. Figure 1. Shows the distribution of participants according to their gender, department and degree of postgraduation in percentages (%).

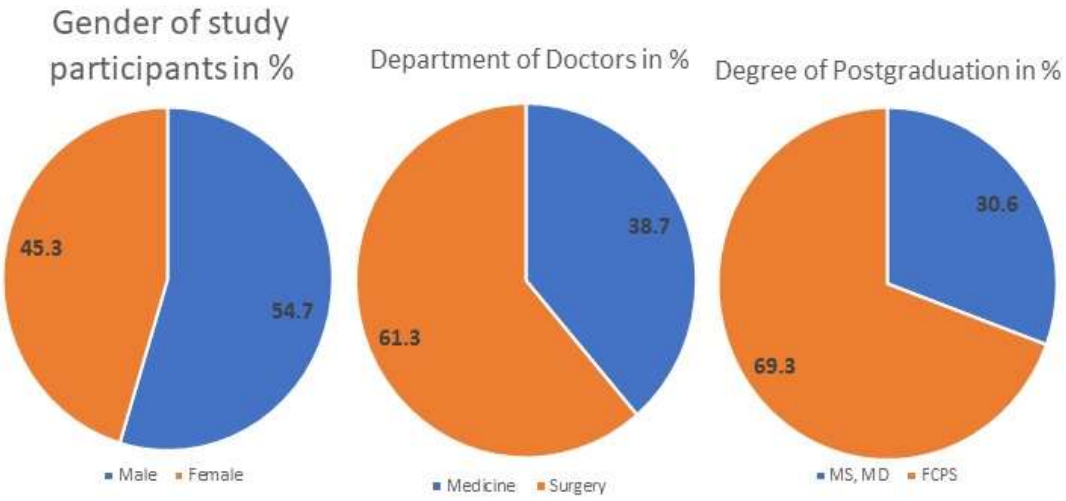

Figure 1. Showing the distribution of participants according to their gender, department and degree of postgraduation.

The participants were asked to fill a preformed proforma consisting of various questions regarding the application of AI in cancer diagnosis its benefits and challenges. Among the 64 (85.3%) were aware of concept of AI in healthcare, 53 (70.6%) AI can assist in the early detection and diagnosis of cancer, 67 (89.33%) would like to integrate the idea of AI into their diagnostic processes, 71 (94.6%) think AI can improve the accuracy of cancer diagnoses, 75 (100%) would be willing to undergo training to effectively use AI tools, 68 (90.6%) do not think that AI can replace human judgment in cancer diagnosis. Table 1. Shows the responses of study participants regarding applications of AI in cancer diagnosis

S.no	**Questions**	Yes		No		p-value
		(F)	**(P)**	**(F)**	**(P)**	
1	Do you know the concept of Artificial Intelligence (AI) in healthcare?	64	85.33	11	14.67	0.001
2	Have you ever used AI-based tools or software in your practice?	4	5.33	71	94.67	0.001
3	Do you believe AI can assist in the early detection and diagnosis of cancer?	53	70.67	22	29.33	0.034
4	Will you integrate the idea of AI into your diagnostic process?	67	89.33	8	10.67	0.022
5	Do you think AI can improve the accuracy of cancer diagnoses?	71	94.67	4	5.33	0.001
6	Would you be willing to undergo training to effectively use AI tools in your practice?	75	100.00	0	0.00	
7	Do you think that AI can reduce the time taken to diagnose cancer?	61	81.33	14	18.67	0.041

8	Do you think that AI can replace human judgment in cancer diagnosis?	7	9.33	68	90.67	0.003
9	Do you believe that AI might lead to over-reliance on technology, potentially undermining clinical skills?	46	61.33	29	38.67	0.033
10	Do you think that AI can transform the overall potential of cancer diagnosis in Pakistan?	41	54.67	34	45.33	0.142
11	Would you recommend the use of AI in cancer diagnosis to your colleagues?	52	69.33	23	30.67	0.011
12	Do you think that integrated diagnostic approach will benefit in early and accurate diagnosis of cancer?	73	97.33	2	2.67	0.001

Table 1. Responses of study participants regarding applications of AI in cancer diagnosis

Figure 2 depicts the responses of participants regarding the benefits that they feel they can achieve using AI. Among them 93.3% believe that it can yield improved accuracy and 94.7% said faster diagnosis, 70.7% mentioned reduced work load, 92% said enhanced patients' outcome and 65.3% believe that it may be cost effective. Following this the perceived challenges regarding use of AI in cancer diagnoses marked by the participants were lack of training, high cost of AI tools, reliability of AI logarithms, ethical concerns and resistance to change among the colleagues (Figure 3).

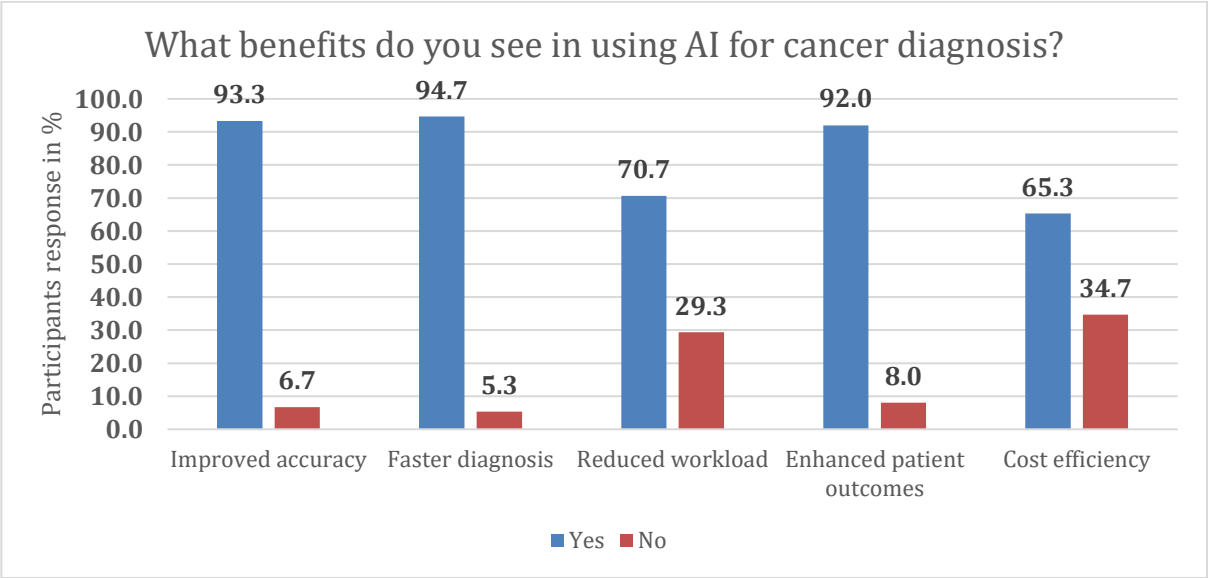

Figure 2. Responses of participants regarding the benefits of using AI for cancer diagnosis

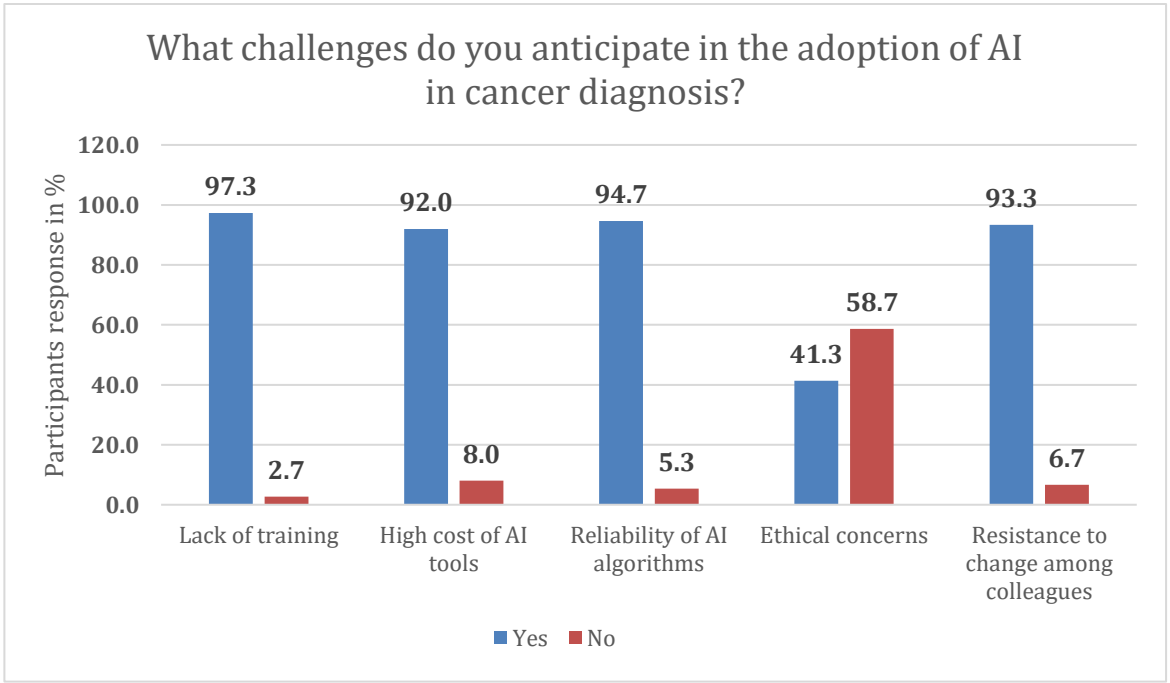

Figure 3. Perceived challenges regarding use of AI in cancer diagnoses

Discussion:

The findings that are displayed are based on a survey that was given to medical professionals to find out more about their knowledge, attitudes, and readiness to use artificial intelligence (AI) in diagnosis, especially for cancer patients. The results offer important new information on the present acceptance of AI and the belief that AI may improve healthcare procedures, especially in the delicate field of cancer diagnosis.

The notion of artificial intelligence in healthcare was known to a significant proportion of the respondents (85.3%). The high degree of knowledge indicates that artificial intelligence (AI) is not a new idea to healthcare professionals; rather, it has been receiving a lot of attention lately[11]. The increasing awareness of AI's potential in healthcare is demonstrated by the willingness of 89.33% of respondents to use AI into their diagnostic procedures. This willingness to embrace new technologies that may improve patient outcomes makes this openness to AI integration essential to the advancement of medical procedures[12]. The survey's findings indicate that a lot of people think AI will help in cancer diagnosis[13]. Notably, 70.6% of respondents think AI may help with cancer diagnosis and early detection. This discovery is consistent with the direction that artificial intelligence is now taking, since machine learning algorithms are being utilized more and more to spot patterns in medical imaging and pathology that might not be immediately obvious to human observers[13]. The capacity of AI to swiftly and effectively sort through massive datasets shows promise for increasing the rate of early diagnosis, which can have a substantial influence on patient survival rates. Early detection is a crucial component of cancer therapy[14].

The fact that 100% of respondents said they would be eager to get training in order to utilize AI technologies efficiently is encouraging since it shows that the healthcare industry is committed to keeping up with technological improvements. Professionals are not only receptive to the concept of artificial intelligence (AI), but they are also prepared to take proactive measures to guarantee they can make the most of these resources. This is demonstrated by their willingness to participate in training[15]. In order to guarantee that AI is applied appropriately and morally, training is necessary. It also shows a proactive approach to incorporating AI into clinical practice[16]. Even though AI is widely supported, 90.6% of respondents do not think AI can accurately diagnose cancer in place of human judgment. This opinion is important because it draws attention to the seeming limits of AI and the critical role that human expertise plays in the healthcare industry. Even though artificial intelligence (AI) can improve the diagnosis process and offer insightful information, human experience, intuition, and ethical concerns are still viewed as being crucial in making the ultimate decision, particularly in complicated instances like cancer[17, 18]. Surprisingly, ninety-three percent of participants think AI may increase medical diagnosis accuracy. This high degree of trust is a result of the development of AI technology, especially in areas like medical imaging, where AI has proven to be more accurate than humans in identifying patterns and abnormalities[18]. The creation of algorithms that can distinguish between identical symptoms, identify diseases at an earlier stage, and lower the risk of diagnostic mistakes is made possible by AI's capacity to handle massive volumes of data and learn from it. Increased accuracy is essential in the healthcare industry since even little errors may have a big impact on how patients fare[19]. What's even more noteworthy is that 94.7% of respondents think AI can speed up diagnosis. Rapid diagnosis is critical, especially for serious illnesses like cancer where survival chances can be greatly increased by early care. AI's speedy analysis of medical data, such as pictures, test results, and patient histories, can significantly shorten the time it takes to make a diagnosis, facilitating earlier decision-making and the start of therapy. This speed is especially useful in emergency situations or underdeveloped places where access to specialized knowledge may be limited[20, 21].

Remarkably, 65.3% of respondents think AI may be economical. This viewpoint is especially pertinent given the state of healthcare today, when growing prices are a big worry. Artificial Intelligence (AI) has the potential to save expenses in a variety of ways, including fewer diagnostic mistakes, fewer pointless testing, streamlined administrative procedures, and better resource allocation. Even though AI technology might need a large initial investment, over time savings and increased efficiency may more than make up for these expenses. It's crucial to remember that cost-effectiveness varies based on the particular use of AI and the healthcare system in which it's used[13, 22].

Furthermore, the absence of training has been noted as one of the major issues. In the quickly developing sector of healthcare, artificial intelligence (AI) demands a workforce well-versed in using these technologies for clinical practice to successfully integrate AI. Insufficient training may make it difficult for medical practitioners to comprehend data produced by artificial intelligence, incorporate AI-derived insights into clinical decision-making, or simply have confidence in the technology. Underutilization of AI tools or misinterpretations of AI outputs might result from this knowledge gap and lead to diagnostic mistakes[23]. To tackle this issue, extensive educational initiatives emphasizing AI literacy, practical instruction, and continual professional growth to stay up to date with AI technological breakthroughs are needed[24]. Another major obstacle to the use of AI techniques in cancer detection is their high cost. AI system development, deployment, and maintenance may be costly, and healthcare providers frequently bear the brunt of these expenses. Many organizations may find these financial obstacles to be insurmountable, especially those operating in environments with low resources. The cost of AI technology covers not just the hardware and software purchases, but also the costs associated with staff training, regulatory compliance, and integrating these systems into current processes. A concentrated effort to lower the cost and increase accessibility of AI technology is required to meet this issue. This might entail creating affordable AI solutions, looking for financing or subsidies, and investigating joint ventures between the public and private sectors to split the costs[25, 26].

One issue that should not be disregarded is the reluctance to change. The use of AI in healthcare signifies a dramatic change in the field's long-standing traditions and evidence-based procedures for making diagnoses and developing treatment plans. Certain professions can harbor doubts over AI's potential or perceive the concept of technology intruding into domains customarily devoted to human proficiency as a danger. It will take convincing people of AI's advantages, data proving its efficacy, and the fact that AI is meant to complement rather than replace the work of healthcare professionals to overcome this opposition. Adoption can also be facilitated by cultivating a culture that is receptive to innovation and offering assistance throughout the changeover. Furthermore, through the implementation of focused training programs, cost-cutting tactics,

meticulous testing of AI instruments, moral standards, and change management plans, the medical community may more effectively leverage artificial intelligence to enhance cancer detection and patient results[27-30].

Conclusion:

There is still a clear awareness of AI's limits and the indispensable necessity of human judgment. A readiness to accept AI is demonstrated by the integration of AI and the completion of required training, as long as the technology is employed to supplement rather than to replace the knowledge of healthcare professionals. The survey's findings show how positive the medical sector is about AI's potential advantages. Significant benefits of AI integration are thought to include increased patient outcomes, quicker diagnosis, less effort, improved accuracy, and possible cost-effectiveness. Significant obstacles include a lack of training, expensive expenses, worries about the accuracy of AI algorithms, moral issues, and reluctance to adapt among coworkers.

References:

1. Mintz Y, Brodie RJMIT, Technologies A. Introduction to artificial intelligence in medicine. 2019;28(2):73-81.
2. Malik P, Pathania M, Rathaur VKJJofm, care p. Overview of artificial intelligence in medicine. 2019;8(7):2328-31.
3. Hamet P, Tremblay JJm. Artificial intelligence in medicine. 2017;69:S36-S40.
4. Liu C, Tan Z, He M. Overview of artificial intelligence in medicine. Artificial Intelligence in Medicine: Applications, Limitations and Future Directions: Springer; 2022. p. 23-34.
5. Zhou Y, Abel GA, Hamilton W, Pritchard-Jones K, Gross CP, Walter FM, et al. Diagnosis of cancer as an emergency: a critical review of current evidence. 2017;14(1):45-56.
6. Wallace D, Walker K, Kuryba A, Finan P, Scott N, van Der Meulen JJBjoc. Identifying patients at risk of emergency admission for colorectal cancer. 2014;111(3):577-80.
7. Newman-Toker DE, Wang Z, Zhu Y, Nassery N, Tehrani ASS, Schaffer AC, et al. Rate of diagnostic errors and serious misdiagnosis-related harms for major vascular events, infections, and cancers: toward a national incidence estimate using the "Big Three". 2021;8(1):67-84.
8. Huang S, Yang J, Fong S, Zhao QJCl. Artificial intelligence in cancer diagnosis and prognosis: Opportunities and challenges. 2020;471:61-71.
9. Hunter B, Hindocha S, Lee RWJC. The role of artificial intelligence in early cancer diagnosis. 2022;14(6):1524.
10. Lisboa PJ, Taktak AF. The use of artificial neural networks in decision support in cancer: a systematic review. Neural networks. 2006;19(4):408-15.
11. Oh S, Kim JH, Choi S-W, Lee HJ, Hong J, Kwon SH. Physician confidence in artificial intelligence: an online mobile survey. Journal of medical Internet research. 2019;21(3):e12422.
12. Ogolodom MP, Mbaba AN, Johnson J, Chiegwu HU, Ordu KS, Okej MC, et al. Knowledge and perception of healthcare workers towards the adoption of artificial intelligence in healthcare service delivery in Nigeria. AG Salud. 2023;1:16-.
13. Khanna NN, Maindarkar MA, Viswanathan V, Fernandes JFE, Paul S, Bhagawati M, et al., editors. Economics of artificial intelligence in healthcare: diagnosis vs. treatment. Healthcare; 2022: MDPI.
14. Wittal CG, Hammer D, Klein F, Rittchen J. Perception and knowledge of artificial intelligence in healthcare, therapy and diagnostics: A population-representative survey. medRxiv. 2022:2022.12. 01.22282960.
15. Esmaeilzadeh P. Use of AI-based tools for healthcare purposes: a survey study from consumers' perspectives. BMC medical informatics and decision making. 2020;20:1-19.
16. Rainey C, O'Regan T, Matthew J, Skelton E, Woznitza N, Chu K-Y, et al. Beauty is in the AI of the beholder: are we ready for the clinical integration of artificial intelligence in radiography? An exploratory analysis of perceived AI knowledge, skills, confidence, and education perspectives of UK radiographers. Frontiers in digital health. 2021;3:739327.
17. Giavina-Bianchi M, Amaro Jr E, Machado BS. Medical expectations of physicians on AI solutions in daily practice: cross-sectional survey study. JMIRx Med. 2024;5(1):e50803.
18. Singh G, Kamalja A, Patil R, Karwa A, Tripathi A, Chavan P. A comprehensive assessment of artificial intelligence applications for cancer diagnosis. Artificial Intelligence Review. 2024;57(7):179.
19. Kaur S, Singla J, Nkenyereye L, Jha S, Prashar D, Joshi GP, et al. Medical diagnostic systems using artificial intelligence (ai) algorithms: Principles and perspectives. IEEE Access. 2020;8:228049-69.
20. Mei X, Lee H-C, Diao K-y, Huang M, Lin B, Liu C, et al. Artificial intelligence–enabled rapid diagnosis of patients with COVID-19. Nature medicine. 2020;26(8):1224-8.
21. Vinod DN, Prabaharan S. Data science and the role of Artificial Intelligence in achieving the fast diagnosis of Covid-19. Chaos, Solitons & Fractals. 2020;140:110182.
22. Chernina VY, Belyaev M, Silin AY, Avetisov I, Pyatnitskiy I, Petrash E, et al. A diagnostic and economic evaluation of the complex artificial intelligence algorithm aimed to detect 10 pathologies on the chest CT images. medRxiv. 2023:2023.04. 19.23288584.
23. Kumaraswamy E, editor Key challenges in the diagnosis of cancer using artificial intelligence methods. AIP Conference Proceedings; 2022: AIP Publishing.
24. Ahmad Z, Rahim S, Zubair M, Abdul-Ghafar J. Artificial intelligence (AI) in medicine, current applications and future role with special emphasis on its potential and promise in pathology: present and future impact, obstacles including costs and acceptance among pathologists, practical and philosophical considerations. A comprehensive review. Diagnostic pathology. 2021;16:1-16.

25. Patel D, Shah Y, Thakkar N, Shah K, Shah M. Implementation of artificial intelligence techniques for cancer detection. Augmented Human Research. 2020;5:1-10.
26. Dlamini Z, Francies FZ, Hull R, Marima R. Artificial intelligence (AI) and big data in cancer and precision oncology. Computational and structural biotechnology journal. 2020;18:2300-11.
27. Bi WL, Hosny A, Schabath MB, Giger ML, Birkbak NJ, Mehrtash A, et al. Artificial intelligence in cancer imaging: clinical challenges and applications. CA: a cancer journal for clinicians. 2019;69(2):127-57.
28. Khan M, Shiwlani A, Qayyum MU, Sherani AMK, Hussain HK. AI-powered healthcare revolution: an extensive examination of innovative methods in cancer treatment. BULLET: Jurnal Multidisiplin Ilmu. 2024;3(1):87-98.
29. Longoni C, Bonezzi A, Morewedge CK. Resistance to medical artificial intelligence. Journal of Consumer Research. 2019;46(4):629-50.
30. Pesapane F, Codari M, Sardanelli F. Artificial intelligence in medical imaging: threat or opportunity? Radiologists again at the forefront of innovation in medicine. European radiology experimental. 2018;2:1-10.