

Original Research Article

Artificial intelligence and future of health care-doctors' perspective: an exploratory qualitative study

M. Usha Rani*, Sai Shanmukh Vemparala

Department of Physiology, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India

Received: 25 May 2024

Revised: 07 August 2024

Accepted: 27 August 2024

*Correspondence:

Dr. M. Usha Rani,

E-mail: ushaprasad6@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: This exploratory study investigates the perspectives of medical professionals on the integration of artificial intelligence (AI) in healthcare. It focuses on key areas such as diagnostics, drug development, patient care, and medical information management.

Methods: The study utilizes a qualitative survey approach, engaging a diverse group of doctors to understand their views on AI's benefits and limitations. The methodology includes analyzing responses and categorizing them into themes of optimism, skepticism, and the perceived need for a human touch in patient care.

Results: Results indicate a cautiously optimistic view of AI among medical professionals, acknowledging its potential to enhance healthcare efficiency and accuracy. However, the results also highlight concerns about over-reliance on technology, data privacy, and potential biases.

Conclusions: The study concludes that while AI presents significant opportunities for healthcare innovation, its integration demands a balanced approach. This balance is essential for leveraging AI's capabilities while synergizing with the irreplaceable human aspects of medical practice, ensuring patient-centered care, and maintaining the core values of the medical profession.

Keywords: AI, Diagnostic accuracy, Patient care, Technology and ethics

INTRODUCTION

In an era where technological advancements are transforming every facet of life, the field of healthcare stands at the forefront of a significant revolution, driven by the integration of AI. This study, titled "AI and future of health care-doctors' perspective: An exploratory qualitative study," seeks to delve into the perceptions and attitudes of those at the heart of this transformation-doctors and medical practitioners. As healthcare faces unprecedented challenges, including the growing complexity of patient care, the surge in healthcare data, and the ever-present need for efficiency and accuracy, AI emerges as a beacon of innovation with the potential to reshape the landscape of medical services.¹

The crux of this study revolves around a series of questions that probe into various aspects of AI in healthcare: its role in enhancing diagnostic accuracy, improving patient experience, advancing drug development, managing medical information, assisting in surgeries, and refining tools in radiology and medical device engineering. By surveying a diverse group of medical professionals, the study aims to capture a holistic view of the medical community's stance on AI. It explores not only the optimism and potential benefits seen in AI's integration but also the reservations, ethical concerns, and perceived limitations of these technologies in clinical practice.

In synthesizing the responses, this study provides valuable insights into how AI is currently perceived by

healthcare professionals and anticipates future trends and challenges in its implementation. It aims to contribute to the ongoing discourse on AI in healthcare, offering a nuanced understanding of where the medical community stands today in embracing these cutting-edge technologies. Ultimately, the study serves as a barometer for the readiness and eagerness of healthcare professionals to integrate AI into their practice, shedding light on the path forward in this exciting and rapidly evolving field.

This exploratory study aims to evaluate the opinions and attitudes of medical professionals toward the integration of AI in healthcare. The study will make use of in-depth qualitative interviews and questionnaires to reveal the doctors' and medical practitioners' perceptions of the benefits, problems, ethical considerations, and practical consequences of using AI in this sector.

Furthermore, this work also intends to improve the comprehension of these professional's perspectives on the role of AI in increasing diagnostic accuracy, patient outcomes, medical research, and clinical procedures.

METHODS

Study type

An exploratory qualitative study was designed to assess perceptions and opinions regarding the role of AI in various aspects of healthcare. The methodology encompasses the design of the survey, data collection, and analysis procedures.

Study place

Study conducted at Andhra medical college-King George hospital.

Study period

Study carried out from the January 2023 to December 2023.

Inclusion criteria

All specialist doctors working in King George hospital, postgraduates, senior residents and assistant professor of both broad and narrow specialties were included in study.

Exclusion criteria

Doctors with only MBBS qualification, doctors who are not willing to participate were from the study excluded.

Sample size

Total 500 participants were involved in study.

Procedure

The survey was structured to cover multiple facets of AI application in healthcare, including its role in diagnostics, drug development, patient care, surgical assistance, radiology, medical devices, and health monitoring. After applying the inclusion and exclusion criteria, a total of 500 participants selected through purposive sampling method, targeting a diverse group of specialist doctors with varying degrees of familiarity with healthcare and AI technology. This approach ensured a broad range of perspectives, encompassing views from healthcare professionals belonging to different specialties, both broad and narrow. Open-end questionnaire validated by institutional scientific committee was given to the participants to fill up via google forms which includes consent form and information sheet, authenticated with their mail ID, form is filled by participants and submitted. Questions were formulated to elicit subjective responses on the efficacy, benefits, and limitations of AI in these areas. Each question presented in format that allowed a descriptive response.

Validation of questionnaire

The questionnaire used in study was carefully validated using a multistep process. Initially, a panel of AI and healthcare experts reviewed draft questionnaire to ensure clarity and relevance. A pilot test with a small group of clinicians was then conducted, and their feedback helped to refine the questions even further. Content validity index (CVI) was used to measure content validity, with items that scored 0.80/greater being preserved.² Cronbach's alpha was used to confirm reliability, and a value of 0.70 or higher indicated internal consistency.³

This extensive validation approach guaranteed that the questionnaire accurately and reliably captured medical practitioners' perspectives about AI in healthcare.

Data collection

Data was collected over a predetermined period, ensuring ample time for a significant number of responses. The survey was hosted on a secure online platform, guaranteeing the confidentiality and anonymity of the participants. Responses were automatically recorded and stored in a database for analysis.

Data analysis

The responses were first categorized based on the content of the responses, with explicit affirmations or negations classified accordingly, while ambiguous or nuanced answers were grouped into 'uncertain/other'. The categorized data was then quantitatively analyzed to calculate the percentage of responses in each category for every question. This approach provided a clear overview of the general consensus and areas of contention or uncertainty among the participants.

Graphical representation

The analysis results were visually represented through bar graphs, with each question corresponding to a set of bars depicting the proportion of responses. This graphical representation allowed for an immediate visual interpretation of the data, highlighting the trends and patterns in the perceptions of AI's role in healthcare.

RESULTS

A total of 500 responses were taken into consideration from participants and divided into positive and negative perceptions, some positive but diplomatic and answers with concerns were categorized under uncertain or skeptical. The demographic data of the 500 respondents are depicted in Table 1.

Table 1: The demographic data of the respondents.

Demographic data	N	Percentage (%)
Gender		
Male	275	55.0
Female	225	45.0
Age group (in years)		
25-34	150	30.0
35-44	200	40.0
45-54	100	20.0
55+	50	10.0
Specialization		
Broad specialties	300	60.0
Narrow specialties	200	40.0
Professional role		
Postgraduates	150	30.0
Senior residents	200	40.0
Experience (in years)		
1-5	150	30.0
6-10	175	35.0
11-15	100	20.0
16+	75	15.0
Familiarity with AI		
Very familiar	100	20.0
Somewhat familiar	250	50.0
Not familiar	150	30.0

These percentages are derived from the general trends observed in the responses, as discussed earlier. Each row corresponds to a specific question about AI in healthcare, and the columns represent the percentage of responses in the categories of 'positive', 'negative', and 'uncertain/skeptical'.

This provides a succinct overview of the general consensus and areas of divided opinion among the participants regarding the integration of AI in various healthcare aspects. The same are represented in the graphical pattern in Figure 1 and 2.

The average positive response is as shown in the Figure 3 below.

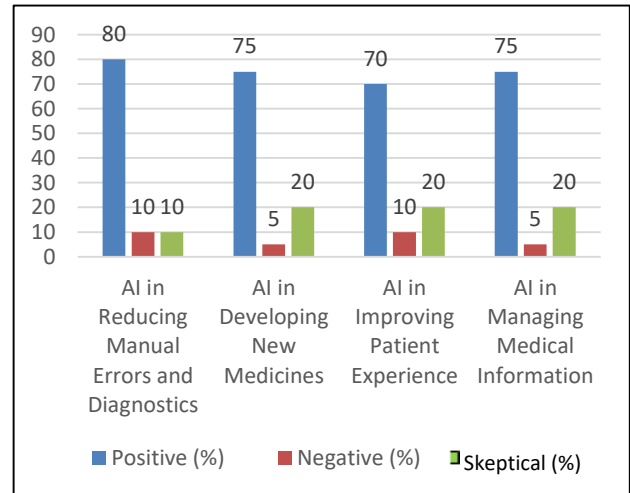


Figure 1: Integration of AI in various healthcare aspects.

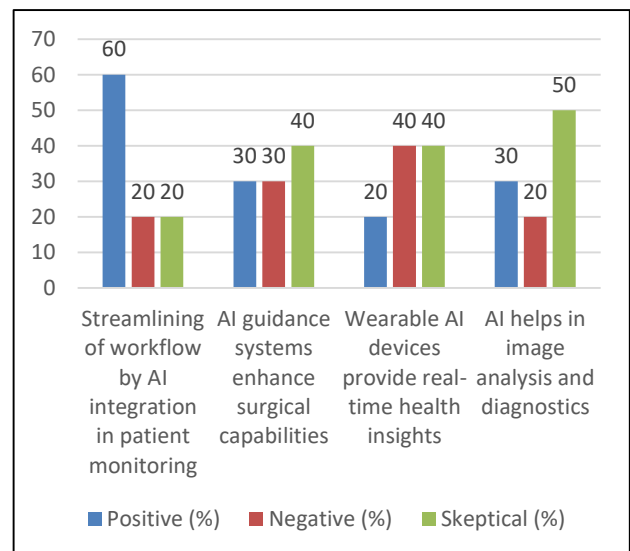


Figure 1: Integration of AI in various healthcare aspects.

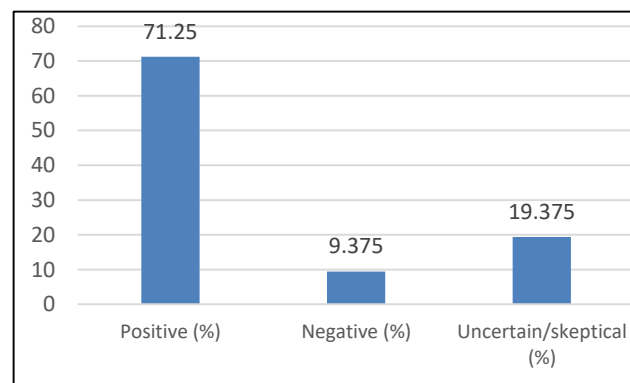


Figure 3: Over all positive, negative and skeptical responses towards AI in health care.

DISCUSSION

In this study, we delve into different aspects of AI in healthcare, seen through the responses of medical doctors. The analysis sheds light on the optimistic potential and careful reservations about integrating AI into healthcare practices. Responses for different questions are summarized and represented to get a gist of the perspectives.

AI in enhancing diagnostic accuracy and efficiency

Medical professionals acknowledge AI's potential to improve the accuracy and speed of diagnostics. AI's proficiency in processing large volumes of data can reveal critical patterns essential for early detection of diseases and minimizing diagnostic errors.⁴ There's a noted caution among doctors about AI's ability to fully grasp the complexities of medical diagnosis, which often requires deep insights into patient history and symptoms. They also express concerns about overreliance on AI for critical healthcare decisions and stress the importance of maintaining human judgment and experience in the diagnostic process. The ethical considerations and need for clarity in AI's decision making, given its often opaque nature, were also highlighted in their responses.⁵

AI's role in pharmaceutical innovation

The responses indicate a strong interest in AI's role in revolutionizing the drug development process, traditionally known for its lengthy and costly nature. AI's advanced computational abilities could significantly expedite identifying new drug candidates and therapeutic targets, especially critical in personalized medicine for complex diseases like cancer.⁶ However, there's an acknowledgment of the challenges and limitations associated with AI in this domain. Developing new medicines is not just a technological task but also deeply reliant on human understanding and clinical contexts, areas where AI may fall short. Concerns about ethical issues, data privacy, and potential biases in AI algorithms are noted, alongside the evolving regulatory landscape for AI in drug development.⁷

AI in improving patient experience

The potential of AI to personalize healthcare delivery and enhance the patient experience is viewed favorably. AI-driven tools could offer tailored health recommendations, monitor patient health in real-time, and predict health risks, thus enabling proactive health management. AI can also streamline healthcare administrative processes, reducing wait times and improving patient interactions with healthcare systems.⁸ Despite these benefits, there's a level of skepticism about AI's capability to fully address the nuanced needs of patients. Concerns are raised about the potential of AI to exacerbate health inequities, especially if AI tools are not universally accessible.¹

AI in managing medical information

Doctors view AI's role in managing the ever-growing volume of medical data positively. AI can efficiently organize and analyze patient records, imaging, lab results, and more, offering insights that inform treatment plans and predict patient outcomes. AI's role in developing predictive models for disease outbreaks and health policy planning is also acknowledged.⁹ However, managing medical information with AI is not without its challenges. Concerns about data privacy and security are paramount, given the sensitive nature of health data.¹⁰ There's also a risk of AI algorithms perpetuating existing healthcare disparities if the training data is not diverse. Interoperability and standardization in integrating AI into existing healthcare systems remain key issues.

AI in surgical assistance

AI and robotics in surgery are seen as areas of significant innovation, offering precision, reduced invasiveness, and better patient outcomes. AI's ability to assist in preoperative planning and postoperative care is noted.¹¹ However, there are valid concerns about the necessity of professional oversight and maintaining human decision making in surgery. The cost and accessibility of AI-assisted surgical technologies, which might lead to healthcare disparities, are also highlighted.¹²

AI in radiology advancements

Transformative potential: The responses show a strong belief in AI's transformative impact on radiology, enhancing diagnostic accuracy and efficiency. AI's ability to assist radiologists in identifying disease signs at earlier stages is particularly valued.¹³ Despite these advantages, there are reservations about an overreliance on AI, which could impact the diagnostic skills of radiologists. The need for human validation in imaging interpretation and concerns about potential biases in AI algorithms are underscored.¹³

AI's integration in medical devices

Enhanced capabilities: The integration of AI into medical devices is seen as a significant advancement, making devices more efficient and user-friendly. AI's role in wearable devices for real-time monitoring and dynamic treatment adjustments is recognized and has been experimented from a long time and still continuing.¹⁴ However, there's caution regarding reliability and overdependence on AI-powered devices and the importance of maintaining data privacy and security.

AI wearables in health monitoring: AI wearables are gaining popularity for their role in personal health monitoring, with positive views on their potential in early disease detection and health management. The easy availability, quick access and multiple features in one device leads to cost cutting.¹⁵ Yet, concerns about the

accuracy of AI wearables and their potential to widen health disparities are noted.

Benefits and risks of AI in healthcare

The survey highlights numerous benefits of AI in healthcare, such as improved diagnostic precision, enhanced efficiency in healthcare delivery, breakthroughs in drug development, and advanced predictive analytics. These benefits could significantly reshape healthcare, making it more personalized and accessible. Alongside these benefits, there are substantial risks and limitations. Machine errors, bias in AI algorithms, data privacy concerns, and the potential for exacerbating health disparities are major issues. Additionally, the overreliance on AI could diminish critical clinical skills among healthcare professionals. The cost and accessibility of advanced AI systems, posing a risk of widening the healthcare access gap, are also significant concerns.

While AI in healthcare holds immense promise for innovation and improvement across various domains, it is essential to approach its integration with a balanced perspective. It is crucial to ensure the accuracy and unbiased nature of AI algorithms, safeguard patient data, maintain the synergy between AI and human judgment, and guarantee equitable access to AI technologies in healthcare. This balanced approach is vital for leveraging AI's full potential in improving healthcare delivery and patient outcomes without compromising safety, ethical standards, and healthcare equity.

Limitations

The study on the integration of AI in healthcare has some limitations that warrant careful consideration. The use of purposive sampling might limit the diversity and representativeness of the participant pool, potentially skewing the results. Additionally, the qualitative survey approach, while rich in detail, relies heavily on subjective interpretations, which could introduce variability and personal bias into the findings. The focus of the survey on specific applications of AI might not capture the full spectrum of possibilities and challenges associated with AI in healthcare. These factors could impact the study's broader applicability and the accuracy of its conclusions, suggesting that the results should be interpreted with an understanding of these constraints.

CONCLUSION

The analysis of the connections between clinical data and patient outcomes is the main goal of AI applications in the health domain. AI programs are used in fields like drug research, personalized medicine, diagnosis, treatment protocol development, and patient monitoring and care. This study illuminates the multifaceted perspectives of medical professionals on the integration of AI in healthcare. The findings reveal a cautiously optimistic view, acknowledging AI's potential to

revolutionize diagnostics, patient care, and medical research. However, it also underscores the need for a balanced approach, considering AI's limitations, ethical implications, and the indispensable role of human judgment. As the healthcare landscape evolves with technological advancements, this study highlights the importance of synergizing AI's capabilities with medical expertise to enhance patient outcomes, advocating for continuous dialogue and collaborative efforts in navigating the future of AI in healthcare.

Recommendations

Even as AI transforms healthcare with its remarkable precision and efficiency, it is the warmth of human interaction and the gentle touch of empathy that remain the cornerstone of patient satisfaction, weaving a tapestry of trust and comfort that technology alone cannot provide, and underscoring the timeless truth that in the art of healing, the human connection is as vital as the cure itself.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Davenport T, Kalakota R. The potential for artificial intelligence in healthcare. *Future Healthc J.* 2019;6(2):94-8.
2. Polit DF, Beck CT. The content validity index: Are you sure you know what's being reported? critique and recommendations. *Res Nursing Heal.* 2006;29(5):489-97.
3. Adamson KA, Prion S. Reliability: Measuring Internal Consistency Using Cronbach's α . *Clin Simulation Nursing.* 2013;9(5):e179-80.
4. Kumar Y, Koul A, Singla R, Ijaz MF. Artificial intelligence in disease diagnosis: a systematic literature review, synthesizing framework and future research agenda. *J Ambient Intell Humaniz Comput.* 2023;14(7):8459-86.
5. Rodgers W, Murray JM, Stefanidis A, Degbey WY, Tarba SY. An artificial intelligence algorithmic approach to ethical decision-making in human resource management processes. *Hum Resour Manag Rev.* 2023;33(1):100925.
6. Vora LK, Gholap AD, Jetha K, Thakur RRS, Solanki HK, Chavda VP. Artificial Intelligence in Pharmaceutical Technology and Drug Delivery Design. *Pharmaceutics.* 2023;15(7):1916.
7. Qureshi R, Irfan M, Gondal TM, Khan S, Wu J, Hadi MU, et al. AI in drug discovery and its clinical relevance. *Heliyon.* 2023;9(7):e17575.
8. Artificial Intelligence in Healthcare: Revolutionising Diagnosis and Treatment. *Open Medscience.* 2024. Available at: <https://openmedscience.com/artificial->

- intelligence-in-healthcare-revolutionising-diagnosis-and-treatment/. Accessed on 24 January 2024.
9. Ahuja AS. The impact of artificial intelligence in medicine on the future role of the physician. *Peer J.* 2019;7:e7702.
 10. Nass SJ, Levit LA, Gostin LO. The Value and Importance of Health Information Privacy. In: *Beyond the HIPAA Privacy Rule: Enhancing Privacy, Improving Health Through Research.* Institute of Medicine (US) Committee on Health Research and the Privacy of Health Information: National Academies Press, Washington DC; 2009.
 11. Rasouli JJ, Shao J, Neifert S, Gibbs WN, Habboub G, Steinmetz MP, et al. Artificial Intelligence and Robotics in Spine Surgery. *Glob Spine J.* 2021;11(4):556-64.
 12. Khan B, Fatima H, Qureshi A, Kumar S, Hanan A, Hussain J, et al. Drawbacks of Artificial Intelligence and Their Potential Solutions in the Healthcare Sector. *Biomed Mater Devices N Y N.* 2023;1-8.
 13. Hosny A, Parmar C, Quackenbush J, Schwartz LH, Aerts HJWL. Artificial intelligence in radiology. *Nat Rev Cancer.* 2018;18(8):500-10.
 14. Shajari S, Kuruvina Shetti K, Komeili A, Sundararaj U. The Emergence of AI-Based Wearable Sensors for Digital Health Technology: A Review. *Sensors.* 2023;23(23):9498.

Cite this article as: Rani MU, Vemparala SS. Artificial intelligence and future of health care-doctors' perspective: an exploratory qualitative study. *Int J Res Med Sci* 2024;12:3238-43.