ORIGINAL ARTICLE

Patient Perspectives on Artificial Intelligence in Radiology: Knowledge, Attitudes, and Concerns in Harare's Public Hospitals, Zimbabwe

Wadzanayi Chitsva[1], Leon-say Mudadi[2], Bornface Chinene[1]

[1]*Department of Radiography, Harare Institute of Technology, Belvedere, Zimbabwe.*
[2]*Royal Papworth Hospital NHS Foundation Trust, Cambridge, United Kingdom.*

ABSTRACT

Introduction: Artificial Intelligence (AI) adoption in Zimbabwean radiology could improve diagnostics and efficiency but risks worsening health inequities without addressing infrastructure gaps, workforce impacts, and patient education. The stakeholders who bear the greatest risks from new technologies like AI are patients. Achieving an adequate understanding of the attitudes and concerns of patients is crucial to ensure their interests are represented in determining how the technology is used to deliver clinical care. This study assessed patient knowledge, attitudes, and concerns regarding AI-assisted radiology in Harare Metropolitan Province's (HMP) public hospitals.

Methods: A quantitative cross-sectional survey was conducted from March to April 2024, utilizing a validated structured questionnaire as the primary data collection tool. Participants were enrolled consecutively until reaching the target sample size. Data analysis was done in Stata 13. Descriptive statistics summarized key features of the dataset, including means, medians, standard deviations, and frequencies, offering an overview of survey responses.

Results: A total of 300 participants took part in the study, only 37% reported a high level of knowledge about AI, and attitudes were predominantly negative, with 35% expressing unfavourable views and 38.33% unwilling to undergo AI-assisted examinations; however, 38.33% acknowledged AI's potential positive impact on diagnostic accuracy. Concerns about job loss were prevalent among 29% of participants, with a significant expectation for AI to reduce waiting times (30.33%).

Conclusion: The findings reveal a low level of knowledge about AI among patients, predominantly negative attitudes, and low trust in AI technologies, indicating significant barriers to acceptance. Although patients recognize potential benefits like shorter wait times, their persistent concerns highlight the need for better education, transparent healthcare provider communication, and ethical guidelines for AI implementation.

Corresponding Author:
Bornface Chinene
Harare Institute of Technology, Belvedere, Harare
Email: bchinene@hit.ac.zw

Keywords: Artificial Intelligence (AI), Patients, Attitudes, Knowledge, Radiology

This article is available online at: http://www.mjz.co.zm, http://ajol.info/index.php/mjz, doi: https://doi.org/10.55320/mjz.52.3.639
The Medical Journal of Zambia, ISSN 0047-651X, is published by the Zambia Medical Association

INTRODUCTION

Artificial intelligence (AI) is transforming radiology by enhancing diagnostic accuracy and patient outcomes, yet its global adoption reveals significant disparities. High-income countries primarily utilize AI for workflow optimization and advanced imaging analysis[1, 2], while resource-limited settings like Zimbabwe focus on targeted applications such as tuberculosis detection.[3, 4] This technological shift comes at a critical time, as rising imaging volumes demand solutions that improve both efficiency and accuracy.[1] However, successful implementation requires patient-centred approaches that are currently lacking. Despite AI's growing presence in radiology, patient perspectives remain overlooked, potentially compromising trust and acceptance. Such oversight risks misalignment between AI integration and patient expectations, ultimately undermining healthcare experiences and the technology's transformative potential.[3]

Previous research on the global stage has primarily focused on the perspectives of radiographers regarding AI integration. The studies have generally shown that while radiographers were enthusiastic about incorporating AI into radiology, viewing it as essential, they also expressed concerns about the technology's cost, workforce impact, potential errors, and ethical issues related to data security and technical expertise.[4, 5, 6] Despite these insights, a significant research gap remains regarding how patients interpret AI-assisted examinations and how these interpretations influence their trust and communication with healthcare providers, especially in low-resource settings like Zimbabwe.

Western studies reveal that while patients recognize AI's benefits in radiology, they demand transparency about its clinical role and robust regulatory oversight.[1, 7, 8, 8, 9, 10] In contrast, low-income countries like Zimbabwe face both a research gap and unique implementation challenges. Here, limited technology access, affordability concerns, and infrastructure limitations shape different patient perceptions - with a greater focus on immediate practical benefits like reduced wait times.[11, 12] These needs are particularly acute given Zimbabwe's radiologist shortages, where AI could significantly improve service delivery by decreasing unreported exams and diagnostic delays.

This study, therefore, aimed to assess the views of patients on AI in radiology within public hospitals in the Harare Metropolitan Province (HMP). Specifically, it sought to determine patients' knowledge of AI technologies, evaluate their attitudes toward these technologies, and explore their perceptions of AI's role in radiology. Addressing these objectives is crucial for informing healthcare providers and policymakers on effectively integrating AI in a manner that meets patient expectations.

METHODS

Study design

A quantitative cross-sectional survey was conducted from March to April 2024, utilizing a structured questionnaire as the primary data collection tool. This approach was instrumental in addressing targeted research questions about patient knowledge and attitudes regarding the application of AI in radiology.

Research site

The study was conducted at three public hospitals in HMP, referred to as hospitals A, B, and C to maintain confidentiality. These hospitals serve as the primary government referral centres where most residents seek healthcare services. Located in a metropolitan area, they cater to diverse populations with varying ages, socioeconomic statuses, cultural backgrounds, and education levels. This diversity allows for a comprehensive exploration of patient perspectives. Additionally, the hospitals offer a broad range of medical specialties, making them ideal for studying how AI is perceived across different disciplines.

Population and Sampling

The study was carried out in HMP in north-eastern Zimbabwe. It is the nation's capital and largest city, which has 2 487 209 people according to the 2022

census.[13] There are three central hospitals all with fully-fledged radiology departments. The target population was patients receiving radiological services at central hospitals within the HMP. Consecutive sampling was used to recruit participants for the study. This method involved selecting individuals who met the inclusion criteria as they presented themselves, one after the other, until the desired sample size was achieved, or a predetermined time frame was reached. To ensure balanced gender representation, both male and female patients were consecutively sampled until equal numbers of each were obtained. Consecutive sampling was chosen to enhance representativeness of the patient population routinely accessing radiology services, as it minimizes selection bias by including all eligible participants in the order they present.[14]

The sample size was calculated using the Dobson formula[15], resulting in a total sample size of 300. The inclusion criteria for the study included all patients visiting the radiology department in the three hospitals who agreed to participate and provided consent. For participants under 18, informed consent was obtained from parents or guardians, ensuring they understood the study's purpose and risks. Only those who could comprehend the meaning of AI were included. Exclusion criteria included patients unwilling to participate and other healthcare professionals.

Research instrument and data collection procedure

The Zimbabwe Ministry of Health and Child Care and WHO guidelines on infection control were adhered to. Patients were given an information letter that briefly described the research and its goal, as well as a consent letter to sign if they understood and agreed to participate in the study. Questionnaires allowed for the efficient collection of data from a large number of participants simultaneously.[16] The questionnaire was organized into four sections, each designed to gather specific information from participants regarding their demographics, knowledge of AI, attitudes towards its integration in radiology, and perceptions of its impact.

Section A: Demographics collected basic information, including age, gender, educational background, occupation, health condition, residential area (rural or urban), and sources of knowledge about AI.

Section B: Knowledge Levels of AI by Patients assessed participants' understanding of AI in radiology. Respondents rated their knowledge (from very low to very high) and indicated their level of trust in AI (high, medium, or low).

Section C: Attitudes Towards AI explored how participants felt about the integration of AI in radiology. Questions included feelings about AI's role, beliefs about its accuracy in diagnoses, and comfort levels with undergoing AI-assisted procedures.

Section D: Perceptions Towards AI invited open-ended responses regarding the benefits and concerns of AI integration, impacts on the patient experience, and preferences for receiving information about AI from healthcare providers.

Data analysis and presentation

Descriptive statistics summarized key features of the dataset, including means, medians, standard deviations, and frequencies, offering an initial overview of survey responses. For closed-ended questions with five options, were grouped the data into three categories for clearer analysis. Demographic variables from seven questionnaire items were used to create a table highlighting age distribution, gender representation, educational background, occupation, health condition, residence, and sources of knowledge about AI. Additionally, the study explored correlations between variables to determine if specific factors were associated with perspectives on AI in radiology.

Validity and reliability

In this study, data triangulation from three hospitals strengthened the credibility of the findings by ensuring consistency and dependability in measuring patients' perspectives. It helped identify

inconsistencies and provided a comprehensive understanding of subjective experiences. A pilot study involving 30 patients (10% of the target sample size) was conducted to refine the research methodology. This preliminary phase enabled identification and correction of issues in question clarity and grammatical structure, while minimizing resource expenditure before full-scale implementation. This approach minimized risks to participants and increased the overall rigor of the study, ensuring that the findings accurately reflected patients' perspectives on AI in radiology.

Ethical considerations

The study adhered to ethical standards according to the Declaration of Helsinki.[17] Data were anonymized using unique identifiers and stored following guidelines for research data management - physical copies in secured cabinets, digital files on encrypted servers with restricted access. Approval for the study was obtained from the Medical Research Council of Zimbabwe (MRCZ/B/2656) before its commencement.

RESULTS

Demographics

A total of 300 participants participated in the study, with a median (IQR) age of 48 (34; 63) years. Males and females were equally distributed within the surveyed sample (n = 150, [50%] each). More than a third of the participants (n = 111, [37%]) had a tertiary education. A quarter of the participants (n = 76, [25.33%]) were unemployed, and more than half of them (n = 156, [52%]) were resident in urban settings. These demographic findings are presented in Table 1.

Table 1: Demographics

Variable	Categories	Frequency n(%)
Gender	Male	150 (50)
	Female	150 (50)
Level of education	Primary	95 (31.67)
	Secondary	94 (31.33)
	Tertiary	111 (37)
Occupation status	Employed	70 (23.33)
	Retired	74 (24.67)
	Student	80 (26.67)
	Unemployed	76 (25.33)
Place of residence	Rural setting	144 (48)
	Urban setting	156 (52)

Knowledge of AI

The combined knowledge of AI use in radiology was high among participants (overall 68.33%) with 31.33% (n = 94) reporting a medium level of knowledge, and 37% (n = 111) reporting a high knowledge level. The internet (n = 78, [26%]) and media (n = 80, [26.67%]) were the two most common sources of AI knowledge for the participants. Attitudes towards AI amongst the participants were mostly negative (n = 105, [35%]). However, an almost equal proportion of participants (n = 102, [34%]) were neutral while 31% (n = 93) of the participants had a positive attitude towards AI.

Attitudes toward AI-assisted examinations

More participants (n = 104, [34.67%]) had higher trust in AI, while 32% (n = 96) had medium trust and 33.33% (n = 100) had low trust in AI. Despite this, a higher proportion of participants (n = 115, [38.33%]) were not willing to undergo an AI-assisted radiographic examination. In contrast, however, 38.33% (n = 115) of the participants

concurred that AI had a positive impact on the diagnostic accuracy of radiographic examinations.

Patient concerns

Most participants (n = 112, [37.33%]) were not convinced that the use of AI in radiology has an impact on the efficiency of the systems. Their main worry was that the use of AI in radiology would result in job losses (n = 87, [29%]). The main expectation from the use of AI in radiology was reduced waiting times (n = 91, [30.33%]). These findings are presented in Table 2.

Table 2: Use of AI in radiology

Variable	Categories	Frequency n(%)
AI knowledge level	High Low Medium	111 (37) 95 (31.67) 94 (31.33)
AI knowledge source	Healthcare provider Internet Media Other	65 (21.67) 78 (26) 80 (26.67) 77 (25.67)
Attitude towards AI	Negative Neutral Positive	105 (35) 102 (34) 93 (31)
Trust in AI	High Low Medium	104 (34.67) 100 (33.33) 96 (32)
AI accuracy impact	Negative No impact Positive	80 (26.67) 105 (35) 115 (38.33)
AI efficiency impact	Negative No impact Positive	96 (32) 112 (37.33) 92 (30.67)
Willing to undergo an AI-assisted examination	Maybe No Yes	99 (33) 115 (38.33) 86 (28.67)
Concerns about AI in radiology	Job loss Other Privacy Quality of care	87 (29) 55 (18.33) 79 (26.33) 79 (26.33)
Expectations from the use of AI in radiology	Improved diagnosis Other Reduced healthcare costs Reduced waiting times	64 (21.33) 89(29.67) 56 (18.67) 91 (30.33)

DISCUSSION

The stakeholders who bear the greatest risks from new technologies are patients.[1] Achieving an adequate understanding of the attitudes and concerns of patients is crucial to ensure their interests are represented in determining how the technology is used to deliver clinical care. This study aimed to assess patients' views on the integration of AI in radiology at central hospitals in the HMP. The study seeks to align AI integration with patients' expectations and needs, fostering a patient-centred approach. The findings are valuable for radiological departments, as they provide insights into how AI interacts with patients unique cultural, socioeconomic, and medical contexts.

The results indicated a low level of knowledge regarding AI in radiology among participants, with 37% demonstrating high level of understanding of its applications. This is similar but lower than a study done in Malta that reported knowledge levels of 42.1 %[7], indicating a generally low level of knowledge about AI in radiology among patients. This underscores the need for enhanced education and outreach regarding AI technologies within healthcare settings. A significant portion of the population lacks critical knowledge, which could influence their engagement with and acceptance of these innovations. Previous studies have shown that factors such as digital literacy, previous experience with AI, and educational attainment are associated with greater acceptance of AI among patients.[8,9,10]

Notably, this study identified the internet and media as the primary sources of this knowledge, suggesting that public discourse and educational outreach are influencing patient awareness. This finding aligns with literature that highlights the role of accessible information in shaping public perceptions of emerging technologies in healthcare.[18]

In the current study, attitudes toward AI were predominantly negative, with 35% of participants expressing unfavourable views. This finding aligns with results reported by Xuereb et al.,[7] who found that when patients were asked about AI interpreting their scan images and issuing results without a

radiologist's involvement, only 24.7% indicated they would feel comfortable or very comfortable with this scenario. This ambivalence may stem from concerns over job security, as indicated by the significant proportion of participants (29%) fearing job losses due to AI integration. This sentiment reflects broader societal anxieties regarding automation and workforce displacement, a phenomenon documented in healthcare.[19] However, it is noteworthy that a substantial number of participants (34%) maintained a neutral stance, indicating a potential openness to further discourse and education about AI's role in radiology.

Trust levels in AI among participants in this study were low, with only 34.67% exhibiting high trust. These findings align with a study investigating the general population's views on the use of AI for the diagnostic interpretation of screening mammograms, where 77.8% of patients felt a human check was necessary.[10] Yet another study by Ongena et al., reported that patients were moderately negative when it comes to their trust in AI in taking over diagnostic interpretation tasks, concerning accuracy, communication, and confidentiality.[9] Furthermore, a study by York and colleagues[8], showed significantly higher confidence in clinicians rather than AI-assisted image interpretation with 95.4% of participants reporting favouring clinicians over AI in the event of disagreement.

This suggests that patients remain sceptical, likely due to concerns about the reliability and accuracy of AI systems. Trust is a critical factor in the adoption of AI technologies in healthcare, as it significantly influences patients' willingness to accept AI-assisted procedures.[20] The fact that a substantial proportion of participants (38.33%) in this work expressed reluctance to undergo AI-assisted examinations underscores the need for healthcare providers to address these trust issues through transparency and evidence-based communication. This echoes previous research findings stating that lay users often demand AI explanations to determine whether to trust or distrust the AI's outputs.[21] However, it is important to note that the level of trust in AI may not necessarily correlate positively with clinical or patient outcomes.

Lastly, the current study found that 30.33% of patients expect AI to reduce waiting times, indicating their desire for tangible benefits from AI integration. Research shows that in low-resource settings, patients' views on AI in radiology often differ from those in Western countries, primarily due to a stronger focus on immediate, practical benefits.[11, 12] In places like Zimbabwe, where overcrowding leads to long waiting times, it is reasonable to expect that patients will look to AI technologies to help alleviate these delays.[22]

RECOMMENDATIONS

Based on the study findings, the following recommendations are proposed to enhance patient-centred AI integration in radiology:

1. Education & Awareness Campaigns: Develop targeted patient education programs to improve understanding of AI's role in radiology, addressing misconceptions and emphasizing benefits (e.g., faster diagnoses, reduced wait times). Secondly, leverage trusted information sources, including healthcare providers and community outreach, to supplement internet/media-based knowledge.
2. Transparency & Trust-Building: Implement clear communication strategies explaining how AI assists (rather than replaces) radiologists and radiographers, ensuring patients understand human oversight remains central.
3. Patient-Centred AI Deployment: Prioritize AI applications that align with patient priorities, such as reducing wait times and improving diagnostic efficiency, particularly in resource-limited settings.
4. Workforce & Ethical Safeguards: Strengthen regulatory frameworks to ensure AI systems meet local ethical, cultural, and clinical needs.
5. Research & Policy Development: Conduct longitudinal studies to monitor evolving patient attitudes as AI adoption expands. Additionally, involve patients in AI policy discussions to

ensure equitable and culturally sensitive implementation.

LIMITATIONS

The study focused on patients at central hospitals in the HMP, which may not represent the broader population. The perspectives of patients from rural or smaller healthcare facilities were not included, potentially limiting the generalizability of the findings. Furthermore, the study acknowledges the influence of cultural and socioeconomic contexts on patient perceptions. However, these factors were not extensively explored, which may limit the understanding of how they specifically shape attitudes toward AI in radiology. Future research should delve deeper into the cultural and socioeconomic contexts that influence patient perceptions of AI in radiology to better understand how these factors shape attitudes and acceptance of this technology.

CONCLUSION

This study reveals critical insights into patient perspectives on AI in radiology within Zimbabwe's Harare Metropolitan Province, highlighting a significant knowledge gap, prevalent scepticism, and concerns about trust and job displacement. While patients recognize AI's potential benefits—particularly in reducing waiting times—their acceptance remains hindered by limited understanding and apprehensions about accuracy and human oversight. The findings underscore the urgent need for targeted patient education, transparent communication, and ethical AI deployment strategies that prioritize tangible healthcare improvements while addressing cultural and socioeconomic contexts. To foster trust and equitable adoption, radiology departments must integrate patient voices into AI implementation, ensuring that technological advancements align with local needs and expectations. Future research should expand to rural populations and further examine how cultural factors shape AI acceptance, enabling more inclusive and effective integration of AI in radiology across diverse settings.

REFERENCES

1. Hemphill S, Jackson K, Bradley S, Bhartia B. The implementation of artificial intelligence in radiology: a narrative review of patient perspectives. *Futur Healthc J*. 2023;10(1):63–8.
2. Verma S, Maerkisch L, Paderno A, Gilberg L, Teodorescu B, Meyer M. One scan, multiple insights: A review of AI-Driven biomarker imaging and composite measure detection in lung cancer screening. *Meta-Radiology*. 2025;3(1):100124. Available from: https://doi.org/10.1016/j.metrad.2024.100124
3. Temple S, Rowbottom C, Simpson J. Patient views on the implementation of artificial intelligence in radiotherapy. *Radiography*. 2023;29:S112–6. Available from: https://doi.org/10.1016/j.radi.2023.03.006
4. Chivandire G, Mudadi L, Chinene B. Radiographers' Perspectives on the Impact of Artificial Intelligence use on their future roles: A Qualitative Study. *Med J Zambia*. 2023;49(3):263–72.
5. Hardy M, Harvey H. Artificial intelligence in diagnostic imaging: Impact on the radiography profession. *Br J Radiol*. 2020;93 (20190840):1–7.
6. Arkoh S, Akudjedu TN, Amedu C, Antwi WK, Elshami W, Ohene-Botwe B. Current Radiology workforce perspective on the integration of artificial intelligence in clinical practice: A systematic review. *J Med Imaging Radiat Sci.* 2025;56(1).
7. Xuereb F, Portelli DJL. The knowledge and perception of patients in Malta towards artificial intelligence in medical imaging. *J Med Imaging Radiat Sci.* 2024;55(4):101743.
8. York T, Jenney H, Jones G. Clinician and computer: a study on patient perceptions of artificial intelligence in skeletal radiography. *BMJ Heal Care Informatics*. 2020;27(e100233).
9. Ongena YP, Haan M, Yakar D, Kwee TC. Patients' views on the implementation of artificial intelligence in radiology: development

and validation of a standardized questionnaire. *Eur Radiol*. 2020;30(2):1033–40.

10. Ongena YP, Yakar D, Haan M, Kwee TC. Artificial Intelligence in Screening Mammography: A Population Survey of Women's Preferences. *J Am Coll Radiol*. 2021;18(1):79–86.
11. Wuni AR, Botwe BO, Akudjedu TN. Impact of artificial intelligence on clinical radiography practice: Futuristic prospects in a low resource setting. *Radiography*. 2021:27 Suppl 1:S69-S73.
12. Mollura DJ, Culp MP, Pollack E, Battino G, Scheel JR, Mango VL, et al. Artificial intelligence in low- And middle-income countries: Innovating global health radiology. *Radiology*. 2020;297(3):513–20.
13. ZimStat. 2022 Population and Housing Census. Census 2022. Harare; 2022.
14. Polit FD, Beck TC. Nursing Research. Principles and Methods. 7th ed. Philadelphia, Pennsylvania: Lippincott Williams and Wilkins; 2014. 746 p.
15. Dobson A., Gebski V. Sample Sizes for Comparing Two Independent Proportions Using the Continuity-Corrected Arc Sine Transformation. *Stat*. 1986;35:51–3.
16. Harrison C. Questionnaire Design Tip Sheet. Harvad Univ Progr Surv Res. 2007;http://psr.iq.harvard.edu/files/psr/files/PSRQuest.
17. WMA. WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects – WMA – The World Medical Association [Internet]. The World Medical Association, Inc. 2018 [cited 2020 Apr 1]. Available from: https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/
18. Kuwabara A, Su S, Krauss J. Utilizing Digital Health Technologies for Patient Education in Lifestyle Medicine. *Am J Lifestyle Med*. 2020;14(2):137–42.
19. Pham TB. Is AI Causing The Jobs Displacement In Medical Industry?? Is AI Causing The Jobs Displacement In Medical Industry?? 2024;(April).
20. Asan O, Bayrak AE, Choudhury A. Artificial Intelligence and Human Trust in Healthcare: Focus on Clinicians. *J Med Internet Res*. 2020;22(6):1–7.
21. Zhang Z, Citardi D, Wang D, Genc Y, Shan J, Fan X. Patients' perceptions of using artificial intelligence (AI)-based technology to comprehend radiology imaging data. *Health Informatics J*. 2021;27(2).
22. Chinene B, Bwanga O. Exploring the perceptions of radiographers pertaining to the provision of quality radiological services in Zimbabwe. *J Med Imaging Radiat Sci*. 2023;54(3):634–43. Available from: https://doi.org/10.1016/j.jmir.2023.07.013