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Perceptions of artificial intelligence among radiology department professionals in African hospitals: A scoping review

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Background: The Fourth Industrial Revolution (4IR) is driving the integration of artificial intelligence (AI) into healthcare, with radiology emerging as a key area of transformation. Artificial intelligence offers the potential to enhance diagnostic accuracy, workflow efficiency, and clinical decision-making. However, implementation in Africa is challenged by limited infrastructure, digital capacity, and training. Understanding radiology professionals' perceptions is vital for guiding effective and ethical adoption.

Aim: This scoping review aimed to identify and map existing literature on the perceptions of radiology professionals regarding the use and adoption of AI in African healthcare settings.

Method: Following the Joanna Briggs Institute (JBI) methodology, a systematic search across Web of Science, ScienceDirect, and Scopus identified eight studies (2021–2025) involving 2467 radiology professionals. Data were thematically analysed to map perceptions, opportunities, and barriers to AI adoption.

Results: Radiology professionals generally viewed AI positively, recognising its benefits for diagnosis and efficiency. However, concerns included limited AI knowledge and training, infrastructural and technological constraints, high implementation costs, and weak governance frameworks. Most professionals saw AI as a supportive rather than a replacement tool.

Conclusion: Radiology professionals across Africa are receptive to AI but face educational, infrastructural, and regulatory challenges. Targeted training, stronger digital infrastructure, and robust governance are needed for sustainable adoption.

Contribution: This review consolidates current evidence on African radiology professionals' perceptions of AI, highlighting critical gaps in knowledge, readiness, and governance that can inform future policy and research.

Keywords: artificial intelligence; radiology; healthcare professionals; perceptions; Africa.

Introduction

The Fourth Industrial Revolution (4IR) is characterised by the rapid integration of digital technologies reshaping society and the global economy. A pivotal force behind this transformation is artificial intelligence (AI), defined as the ability of computer systems to perform tasks requiring human intelligence, such as learning and problem-solving (Pesapane et al. 2018). Its growing influence within healthcare highlights a transformation in diagnostics, medical interventions, and overall system performance (Mahesh et al. 2024).

In healthcare, AI shows strong potential to improve patient outcomes by enhancing the accuracy, speed, and efficiency of medical processes, particularly in radiology, where it supports early and precise disease detection (Mahesh et al. 2024). While ethical and governance concerns persist, AI remains a cornerstone of precision medicine, complementing rather than replacing radiologists and reinforcing clinical decision-making (Mahesh et al. 2024).

Radiology, at the forefront of AI adoption, shows both promise and challenges (Rowe, Soyer & Fishman 2022). Artificial intelligence systems can highlight suspicious areas, suggest diagnoses, and prioritise urgent cases (Alowais et al. 2023). Yet radiologists' perceptions remain divided: Some view AI as a valuable partner improving patient care, while others fear loss of autonomy,

job displacement, and issues of reliability (Aldhafeeri 2024). Understanding these perceptions is critical, as they shape the technology's successful integration (Huisman et al. 2021).

Across Africa, AI adoption faces constraints including fragmented health structures, persistent underfunding, weak digital infrastructure, and shortages of skilled professionals (Botwe et al. 2021b; Ibeneme et al. 2020; Sherr et al. 2017). Nevertheless, academic and referral hospitals, with better infrastructure and expertise, serve as key hubs for piloting and scaling AI innovations (Botwe et al. 2021b). Globally, radiologists recognise AI's benefits for accuracy and efficiency (Cè et al. 2024), but concerns persist over transparency, data privacy, and accountability (Abufadda et al. 2024; Cè et al. 2024). Successful implementation depends on strong infrastructure, secure data systems, and adequate training conditions, which are not consistently available in many African hospitals (Botwe et al. 2021a; Edzie et al. 2023; Etori, Temesgen & Gini 2023; Kamau Mwaniki, Onyambu & Chris Rodrigues 2024; Maphumulo & Bhengu 2019; Nciki & Hlabangana 2025).

Despite expanding international research, studies exploring radiologists' perceptions of AI in African healthcare remain limited and fragmented (Akinmoladun, Smart & Atalabi 2022; Antwi, Akudjedu & Botwe 2021; Botwe et al. 2021a; Etori et al. 2023; Kamau Mwaniki et al. 2024; Nciki & Hlabangana 2025). Few studies address how local infrastructural and socioeconomic factors shape readiness for adoption (Akinmoladun et al. 2022; Antwi et al. 2021; Ayanore et al. 2019). This highlights a need for a scoping review to consolidate existing evidence, map current research, and identify the barriers and facilitators influencing AI adoption among radiologists in Africa.

Aim

The aim of this review was to identify and map existing literature on the perceptions of radiology department professionals regarding the use of AI in healthcare settings or hospitals across Africa.

Research methods and design

This scoping review was conducted in accordance with the methodological framework for scoping reviews developed by Arksey and O'Malley (2005), as enhanced by the subsequent JBI guidance (Peters et al. 2020). This review is reported in accordance with the PRISMA Extension for Scoping Reviews (PRISMA-ScR), and all applicable items were addressed using the PRISMA-ScR checklist. The protocol was developed *a priori* using the PCC (Population, Concept, Context) framework to define the review question and eligibility criteria, consistent with the Arksey and O'Malley approach. The search strategy, study selection, data extraction, and presentation of results were performed in line with this established framework.

Inclusion criteria

This review included studies focusing on professionals within the radiology department, defined as: Radiologists, diagnostic radiographers, radiation therapists, and sonographers. The review focused on mapping shared perceptions and attitudes across this professional ecosystem, identifying common themes affecting AI adoption at the departmental level within African healthcare settings. Consequently, the central concept was the collective professional perspective towards the use and adoption of AI in radiology practice. These included studies exploring perceived benefits, barriers, challenges, and the impact of AI on roles, workflows, and patient care. Studies were included if conducted within African hospitals, encompassing tertiary, secondary, public, and/or private facilities. Only articles published in the English language were included.

Exclusion criteria

Exclusion criteria comprised articles that focused solely on the technical aspects of AI development without addressing human or user perspectives. Non-research publications such as editorials, opinion pieces, and commentaries were also excluded, along with conference abstracts lacking full texts and duplicate publications.

Search strategy

Upon receiving the University of Witwatersrand Human Research Ethics Committee (HREC) waiver for the review (REC-250208-004), a systematic search was conducted across three databases: Web of Science, ScienceDirect, and Scopus. These databases were used to ensure comprehensive coverage of biomedical, technological, and interdisciplinary literature relevant to AI in healthcare and radiology. Engineering-focused databases were excluded as their predominantly technical literature did not address the human, professional, and organisational perspectives central to this review. The search strategy was developed in consultation with a specialist health sciences librarian to ensure its comprehensiveness. Publications between 01 January 2015 and the end of September 2025 were included to capture contemporary and clinically relevant literature on the use of AI in radiology, while excluding earlier work from periods when AI applications in this field were largely theoretical. Studies from 2025 were included if they were available in the databases as Early Access, Online First, or in-press articles at the time the search was conducted (15 September 2025). Specific search strings, tailored to the syntax of each database, were used and are detailed in Table 1. The database searches were supplemented by a manual review of the reference lists from all included articles to identify any additional relevant studies.

Study selection

All search results from the three databases were imported into the Rayyan software (Ouzzani et al. 2016) for screening. After import, duplicate records were automatically detected

TABLE 1: Search strategy and execution.

Database	Search string	Date
Web of Science	('artificial intelligence' OR 'machine learning') AND ('radiology' OR 'radiologist') AND ('perception' OR 'attitude' OR 'acceptance' OR 'adoption')	15 September 2025
ScienceDirect	(perceptions) AND (radiologist) AND (artificial intelligence use) AND (hospitals) AND (Africa)	15 September 2025
Scopus	('perceptions') AND ('AI use' OR 'Artificial intelligence') AND ('Radiologist') AND ('Africa')	15 September 2025

AI, artificial intelligence.

and manually verified before removal. The study selection process was conducted independently by two reviewers in two phases to ensure consistency and reduce bias. In accordance with the JBI methodology for scoping reviews (Peters et al. 2020), titles and abstracts were first screened in a blinded manner against the predefined inclusion and exclusion criteria. In the second phase, the full texts of all potentially eligible articles were retrieved and assessed for final inclusion. Any disagreements between reviewers at either stage were resolved through discussion until consensus was achieved. To enhance methodological rigour, the final list of included studies was reviewed and verified by both reviewers before data extraction.

Data extraction

Two reviewers (the Principal Investigator [PI] and a second reviewer) independently screened articles for inclusion and exclusion. In cases of uncertainty, the reviewers met to reach an agreement on inclusion or exclusion. Data were extracted from the included articles by the principal investigator (Principal Investigator) using a structured data extraction form developed in Microsoft Excel. The form was designed to capture information directly relevant to the review's aim, including author(s), year, country, study aim, population, setting, methodology, sample size, AI application context, and most critically, key findings related to perceptions, identified barriers, facilitators, and contextual challenges.

Following extraction, the data were organised and thematically synthesised. This process involved Lfamiliarisation with the data, generating initial codes, collating codes into potential themes, and reviewing and refining themes to ensure they accurately represented the dataset.

To ensure methodological rigour and minimise bias, the thematic synthesis and study selection were independently reviewed by a third reviewer (the supervisor), who examined a random sample of the included articles, the extracted findings, and the derived coding framework. In situations where uncertainty arose regarding study inclusion or thematic categorisation, issues were resolved through discussion in consensus meetings. This was done to minimise potential bias and strengthen the trustworthiness of the findings.

Data mapping

The extracted data were collated, charted, and summarised in accordance with the JBI scoping review methodology (Peters et al. 2020). The results are presented to map the existing evidence and address the review objective. As recommended by the JBI framework (Peters et al. 2020), a descriptive analytical approach was used, and the findings are presented in a combination of tables and graphical formats. A narrative summary accompanies the data to contextualise the findings and discuss the implications for research and practice.

Ethical considerations

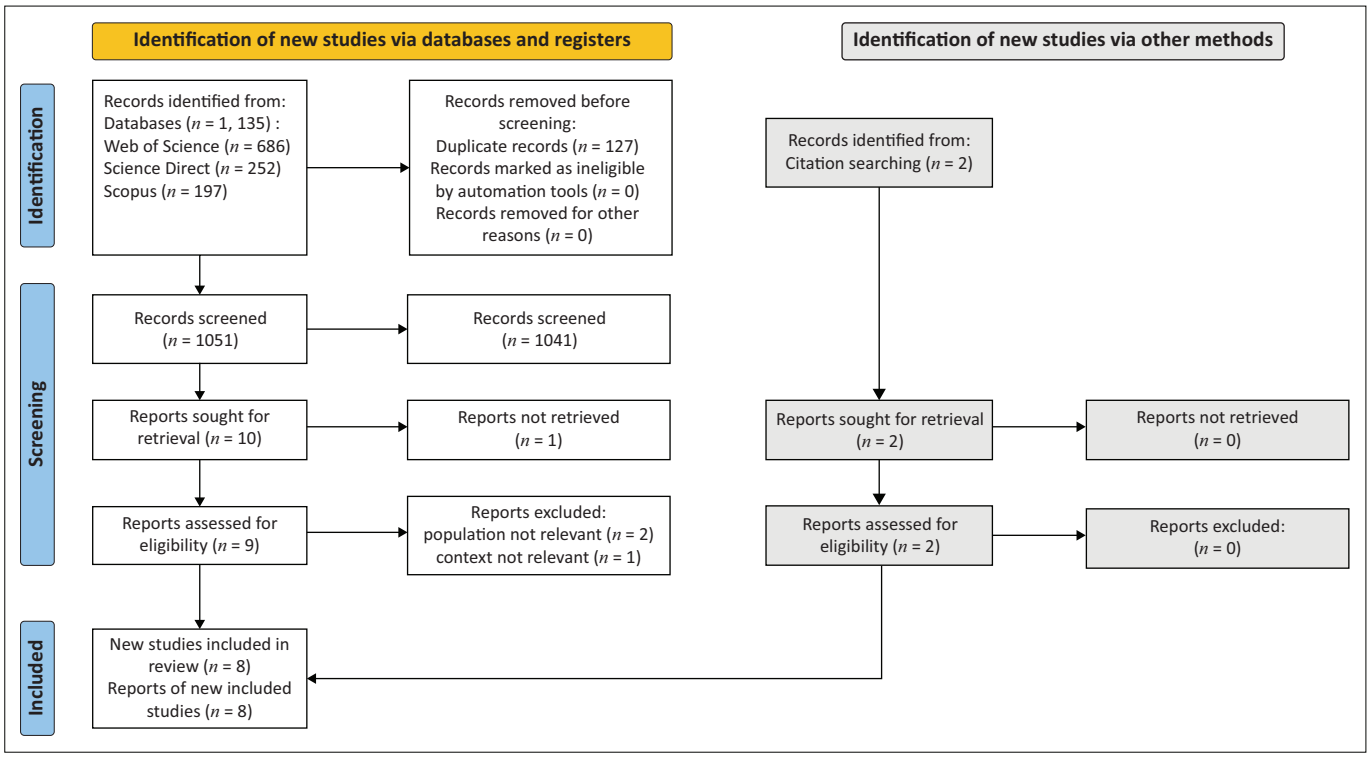
An application for full ethical approval was made to the University of the Witwatersrand Human Resource Ethics Committee and ethics consent was received on 28 August 2025. The ethics waiver number is Ref: W25/07/16. The Human Resource Ethics Committee issued an ethics waiver for the study because this review relied only on previously published literature and did not involve human participants or identifiable data, no additional ethical clearance was required.

Results

The search of three databases (Web of Science, ScienceDirect, and Scopus) was conducted on 15 September 2025, and search findings were downloaded into the author's and the second reviewer's reference manager software. The search strategy was broad to capture all potentially relevant studies, yielding a total of 1135 records. Of these, 127 duplicate records were identified, and 1051 records were screened by title and abstract. Following this screening, 1041 records were excluded for not meeting the inclusion criteria, leaving 10 articles for full-text screening; four more articles were excluded for not meeting the inclusion criteria. Two further studies were identified through reference list checking of the included articles. The flow diagram shown in Figure 1 illustrates the complete study selection process.

A total of eight (Akinmoladun et al. 2022; Antwi et al. 2021; Botwe et al. 2021a, 2021b; Donkor et al. 2025; Edzie et al. 2023; Kamau Mwaniki et al. 2024; Nciki & Hlabangana 2025) studies were included in this review (Table 2). The studies were published between 2021 and 2025, with the highest proportion of studies published in 2021 (38%, $n = 3$) (Antwi et al. 2021; Botwe et al. 2021a, 2021b). The years 2022 (Akinmoladun et al. 2022), 2023 (Edzie et al. 2023), and 2024 (Kamau Mwaniki et al. 2024) each contributed one study (12.5%, $n = 1/8$), while 2025 contributed two studies (25%, $n = 2/8$) (Donkor et al. 2025; Nciki & Hlabangana 2025) (see Figure 2).

Geographically, most of the studies were conducted in Ghana (38%, $n = 3/8$) (Botwe et al. 2021b; Donkor et al. 2025; Edzie et al. 2023). Single studies were conducted in South Africa (Nciki & Hlabangana 2025), Kenya (Kamau Mwaniki et al. 2024), and Nigeria (Akinmoladun et al. 2022) (12.5%, $n = 1/8$), while two studies (25%, $n = 2/8$) were multicountry (Antwi et al. 2021; Botwe et al. 2021a).



Source: Haddaway, N.R., Page, M.J., Pritchard, C.C. & McGuinness, L.A., 2022, 'PRISMA2020: An R package and Shiny app for producing PRISMA 2020-compliant flow diagrams, with interactivity for optimised digital transparency and Open Synthesis', *Campbell Systematic Reviews* 18. https://doi.org/10.1002/cl2.1230

PRISMA, preferred reporting items for systematic reviews and meta-analyses.

FIGURE 1: PRISMA reflecting this scoping review.

The healthcare settings varied across the studies. Three studies (38%, n = 3/8) were conducted across both public and private facilities (Antwi et al. 2021; Botwe et al. 2021a; Donkor et al. 2025), two studies (25%, n = 2/8) were set exclusively in tertiary hospitals (Akinmoladun et al. 2022; Nciki & Hlabangana 2025), and one (12.5%, n = 1/8) involved both tertiary and secondary hospitals (Edzie et al. 2023), one study was conducted in a public hospital only (12.5%, n = 1/8) (Botwe et al. 2021b), and one (12.5%, n = 1/8) surveyed the Kenyan Association of Radiologists (Kamau Mwaniki et al. 2024), including retired members.

Most studies (87.5%, n = 7/8) (Akinmoladun et al. 2022; Botwe et al. 2021a, 2021b; Donkor et al. 2025; Edzie et al. 2023; Kamau Mwaniki et al. 2024; Nciki & Hlabangana 2025) used a cross-sectional observational design, while one study (12.5%, n = 1/8) used a qualitative content analysis approach (Antwi et al. 2021). Across all studies, the total sample size was 2467 participants, with individual study samples ranging from 77 to 1020 participants (Table 2).

Table 2 summarises the eight included studies, highlighting their methodological characteristics and key findings. It outlines each study's aim, design, sample size, study participants and the reported positive perceptions and barriers associated with AI adoption in radiology practice.

The analytical focus of the included studies was categorised to identify the primary research areas around AI in radiology. Six key research areas were identified, with a predominant emphasis on the technical and diagnostic capabilities of AI. As shown in Table 3, the most common area was Diagnostic Accuracy and Analysis, examined in seven of the eight studies (87.5%, n = 7/8) (Akinmoladun et al. 2022; Antwi et al. 2021; Botwe et al. 2021a, 2021b; Edzie et al. 2023; Kamau Mwaniki et al. 2024; Nciki & Hlabangana 2025). This shows a strong interest in understanding how AI can improve detection and interpretation. Operational Workflow and Efficiency was the second most studied research area, explored in six studies (75%, n = 6/8) (Antwi et al. 2021; Botwe et al. 2021a, 2021b; Donkor et al. 2025; Kamau Mwaniki et al. 2024; Nciki & Hlabangana 2025), often together with diagnostic analysis, indicating interest in how AI can make radiology work faster and more efficient. Education & Training was addressed in five studies (62.5%, n = 5/8) (Akinmoladun et al. 2022; Botwe et al. 2021b; Donkor et al. 2025; Edzie et al. 2023; Nciki & Hlabangana 2025), reflecting concern about preparing radiologists for an AI-supported practice.

Other research areas were studied less often. Decision Support and Quality Assurance (25%, n = 2/8) (Botwe et al. 2021a; Edzie et al. 2023) and Implementation and Professional Impact (12.5%, n = 1/8) (Antwi et al. 2021) received limited attention, while Trust and Governance was the least explored (Donkor et al. 2025), appearing in only one study (12.5%, n = 1/8). Collectively, these findings indicate that the current literature is predominantly focused on validating the core diagnostic utility of AI, while broader implementation areas, such as professional

TABLE 2: A summary of the characteristics of included studies ($N = 8$).

Author	Year	Study's aim	Study's design	Sample size	Participants	Positive findings	Barriers or negative findings
Botwe et al. (2021a)	2021	To assess the perspectives of African radiographers on the integration of AI in medical imaging to offer recommendations for workforce training	Cross-sectional observational survey	1020	Radiographers	• High agreement that AI would improve practice, quality assurance, and patient care. • Most responders were excited and believed AI would optimise radiation doses.	• Significant concern about job replacement and salary reduction • Worries about potential errors and unethical use of patient data • A lack of funding/investment, dedicated courses, and mentorship • A lack of knowledge and clear regulatory policies
Antwi et al. (2021)	2021	To explore the perception of radiographers relating to the integration of AI in medical imaging practice through a qualitative approach in Africa	Cross-sectional qualitative content analysis	475	Radiographers	• Responders viewed AI as a tool that would improve practice quality, diagnostic accuracy, patient safety, and reduce radiation dose. • Artificial intelligence was seen as inevitable and beneficial for Africa's growth.	• Strong fears about job security and the profession becoming obsolete • Worries about high costs, poor equipment maintenance culture, data insecurity, and cyber threats • Significant knowledge gap and need for expanded AI awareness and training • Concerns about reduced human–patient interaction
Botwe et al. (2021b)	2021	To explore radiographers' perspectives on the integration of AI into diagnostic medical imaging	Cross-sectional observational survey	151	Radiographers	• See AI as the future (80.8%). • Believe it will have a positive impact (87.4%). • Viewed as an assistive tool to ease work (82.8%). • Can increase access to care, improve decision-making and quality assurance, and reduce radiation dose.	• Concerns about AI-related errors (83.4%) • Job displacement (23.2%) • Salary reduction (21.2%) • Lack of knowledge (82.8%) • High equipment cost (78.1%) • Cyber threats (72.2%)
Akinmoladun et al. (2022)	2022	To evaluate the knowledge level, attitude, and perception of radiologists in Nigeria towards the introduction of AI to radiology	Cross-sectional observational survey	163	Radiologists (Consultants, Senior Registrars, Junior Registrars)	• Had a positive attitude and were willing to embrace AI (58%). • Were willing to upgrade their knowledge (80.6%). • Had a positive perception of AI's opportunities (60%). • Believed AI would enhance image interpretation (72%). • Only 29.4% believed AI would take over radiologists' jobs.	• Only 12% of responders had good knowledge • A total of 50% had fair knowledge; 38% had poor knowledge • Knowledge appeared to increase with seniority
Edzie et al. (2023)	2023	To assess radiologists' perspectives on AI in Ghana, specifically their awareness, usage, perceived impact, and the challenges faced	Cross-sectional observational survey	77	Radiologist	• Responders believed that AI would have a significant life-changing impact on radiology. • They agree that AI can automatically detect lesions and recognise diseases. • Strong willingness to learn and incorporate AI. • Responders believed AI will not replace but complement radiologists.	• Average awareness and below-average expertise in radiological AI • Low current usage (54.5% do not use AI) • Concerns about potential adverse effects on practice and patient outcomes • A lack of knowledge or expertise (31.2%) • Low availability of AI equipment/infrastructure (20.8%) • High cost of rollout (18.2%) • Unsteady internet/IT challenges (15.6%)
Kamau Mwaniki et al. (2024)	2024	To assess the knowledge, attitudes, and practices (KAP) of radiologists and radiology residents towards AI/ML in Diagnostic Radiology	Cross-sectional observational survey	111	Consultant Radiologists and Radiology Residents	• A total of 67.6% of responders were reported to be willing to collaborate. • A total of 68.5% believe AI will change their job. • A total of 34.2% viewed AI as a tool making radiology exciting. • A total of 61.3% reported that with current knowledge of AI they would still choose the profession. • Potential to improve efficiency, free up time for cognitive tasks, revolutionise practice	• Low in-depth knowledge (e.g. only 21.6% knew Deep Learning) • Low utilisation (12.6%). Nearly half see AI as both good and bad (44.1%). Lack of infrastructure. • High workload • Absence from curriculum
Donkor et al. (2025)	2025	To determine the principles that enhance trust in AI systems from the perspective of medical imaging professionals in Ghana	Cross-sectional observational survey	370	Medical Imaging Professionals (Diagnostic Radiographers, Radiation Therapists, Sonographers)	• Strong agreement that four key principles are important for building trust: Transparency or Fairness or Accountability (highest rating), Human Agency or Oversight, Technical Robustness or Safety, and Data Privacy or Security or Governance.	• A total of 32.7% reported little to no understanding of how AI systems work. • Concerns about data bias, algorithmic fairness, and lack of regulatory frameworks • Lack of AI knowledge. • Inadequate regulatory/legal frameworks • Data privacy or security risks • Potential for biased AI systems because of unrepresentative training data
Nciki and Hlabangana (2025)	2025	To evaluate the perceptions and attitudes of qualified and trainee radiologists towards the adoption of AI in clinical practice	Cross-sectional observational survey	100	Radiologists (Trainees/ Registrars and Qualified)	• Overwhelmingly positive attitude; 89% in favour of AI in their practice. • Believed AI would improve daily work (95%) • High willingness to learn (98%) and contribute to AI development (97%) • Strong belief that AI will not replace radiologists (89%) and will positively change registrar training (97%)	• Significant knowledge gap: 78% unable to work with large data sets, 92% lacked understanding of AI computational principles. • No participants used AI in daily practice • Primary knowledge source was media (77%), with minimal formal training (95% never had AI training).

Note: Please see the full reference list of the article, Nekhudzhiga, T., Pretorius, D., 2026, 'Perceptions of artificial intelligence among radiology department professionals in African hospitals: A scoping review', *Health SA Gesondheid* 31(0), a3327. https://doi.org/10.3379/hsag.v31i0.3327, for more information.

AI, artificial intelligence; IT, information technology.

impact, training, and ethical governance, represent significant evidence gaps. For example, Botwe et al. (2021a, 2021b) covered multiple areas, including diagnostics, workflow, decision support, and education, illustrating a more comprehensive approach.

Table 3 provides an overview of the selected studies, outlining the primary focus of each included study. Following thematic coding, the resulting themes are presented in Table 4.

Themes that emerged after in-depth analysis

Table 4 represents key themes, sub-themes, and categories that emerged from the literature. The findings are organised into four overarching themes: Barriers to the Adoption of AI, Quality Care, Safety Risks, and Workforce Concerns and Opportunities. Each theme is further divided into sub-themes capturing specific dimensions, such as capacity and human capital, infrastructure and technology, policy and governance, and workforce engagement. The categories highlight the nuanced factors influencing AI integration in healthcare, including knowledge gaps, ethical and regulatory challenges, perceptions of safety risks, and evolving professional roles.

Theme 1: Quality care

Sub-theme 1.1: Enhanced clinical practice

The synthesis revealed that the most frequently cited benefits pertained to service delivery and clinical practice. Improvements in practice and workflow were reported in 4 of 8 studies (50%, $n = 4/8$) (Antwi et al. 2021; Botwe et al. 2021a; Kamau Mwaniki et al. 2024; Nciki & Hlabangana 2025), making it the most frequently reported benefit. Enhancements in patient care and safety were identified in two studies (25%, $n = 2/8$) (Antwi et al. 2021; Botwe et al. 2021a), while improvements in diagnostic accuracy were reported in four studies (50%, $n = 4/8$) (Akinmoladun et al. 2022; Antwi et al. 2021; Botwe et al. 2021b; Edzie et al. 2023). Optimisation or reduction of radiation exposure was reported in three studies (37.5%, $n = 3/8$).

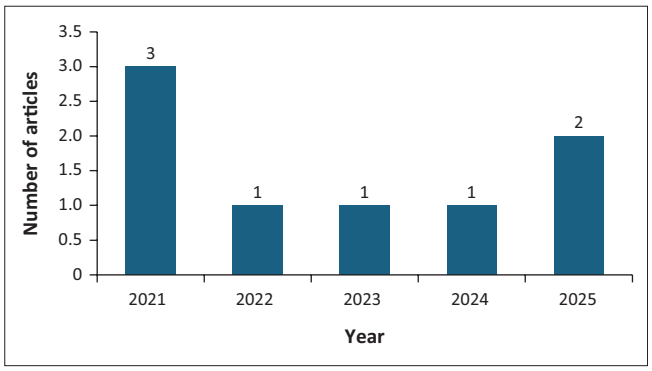


FIGURE 2: Number of articles published per year.

Artificial Intelligence's contribution to quality assurance was reported in two studies (25%, $n = 2/8$) (Botwe et al. 2021a, 2021b), indicating that it can strengthen existing safety and quality frameworks. Trustworthy AI principles were reported in one study (12.5%, $n = 1/8$) (Donkor et al. 2025), reflecting emerging attention to ethical and reliable AI implementation.

Theme 2: Workforce concerns and opportunities

Sub-theme 2.1: Workforce engagement and collaboration

Artificial intelligence was associated with positive workforce engagement. Excitement and willingness to learn or

TABLE 4: Themes, sub-themes and categories related to artificial intelligence adoption in radiology.

Theme	Sub-theme	Categories
1. Quality care	1.1 Enhanced Clinical Practice	• Enhanced Diagnostic Accuracy and Efficiency • Service Delivery • Improved Patient Care and Safety
2. Workforce concerns and opportunities	2.1 Professional Protectionism	• Job Security and Salary Reduction Fears
	2.2 Workforce Engagement and Collaboration	• Artificial Intelligence as a Complementary Tool and Future of Radiology • Workforce Excitement and Willingness to Collaborate • Professional Role Evolution and Extension
3. Safety risks	3.1 Risks to Patient Safety	• Perceived Risk of AI Errors and Adverse Effects
4. Barriers to the adoption of AI	4.1 Capacity and Human Capital	• Knowledge Gap and Need for Training
	4.2 Infrastructure and Technology	• Infrastructure and Cost Constraints
	4.3 Policy and Governance	• Concerns over Data Security and Patient Privacy • Demand for Transparency and Ethical Governance • Lack of Regulatory Frameworks

AI, artificial intelligence.

TABLE 3: Areas of artificial intelligence application examined in included studies.

Article (author)	Diagnostic accuracy	Decision support and quality assurance	Operational workflow and efficiency	Implementation and professional impact	Education and training	Trust and governance
Botwe et al. (2021a)	✓	✓	✓	-	-	-
Edzie et al. (2023)	✓	✓	-	-	✓	-
Donkor et al. (2025)	-	-	✓	-	✓	✓
Akimnoladun et al. (2022)	✓	-	-	-	✓	-
Nciki and Hlabangana (2025)	✓	-	✓	-	✓	-
Antwi et al. (2021)	✓	-	✓	✓	-	-
Edward et al. (2024)	✓	-	✓	-	-	-
Botwe et al. (2021b)	✓	-	✓	-	✓	-
Total ($N = 8$)	**7**	**2**	**6**	**1**	**5**	**1**

Note: Please see the full reference list of the article, Nekhudzhiga, T., Pretorius, D., 2026, 'Perceptions of artificial intelligence among radiology department professionals in African hospitals: A scoping review', *Health SA Gesondheid* 31(0), a3327. https://doi.org/10.3379/hsag.v31i0.3327, for more information.

AI, artificial intelligence.

collaborate were reported in four studies (50%, n = 4/8) (Akinmoladun et al. 2022; Edzie et al. 2023; Kamau Mwaniki et al. 2024; Nciki & Hlabangana 2025). Six studies (75%, n = 6/8) emphasised AI as a complementary tool or part of the future of radiology (Akinmoladun et al. 2022; Antwi et al. 2021; Botwe et al. 2021b; Edzie et al. 2023; Kamau Mwaniki et al. 2024; Nciki & Hlabangana 2025), this was the most reported positive perception, and four studies (50%, n = 4/8) highlighted its role in enhancing diagnosis and accuracy (Akinmoladun et al. 2022; Antwi et al. 2021; Botwe et al. 2021b; Edzie et al. 2023). Life-changing impacts and benefits, such as detecting lesions and disease detection, were reported in three studies (37.5%, n = 3/8) (Antwi et al. 2021; Edzie et al. 2023; Kamau Mwaniki et al. 2024). Overall, AI was perceived not only as a technical tool but also as a driver for professional growth and collaborative practice.

Sub-theme 2.2: Professional protectionism

The most prominent concern identified was a pervasive knowledge gap among the radiology workforce, identified in five studies (62.5%, n = 5/8) (Akinmoladun et al. 2022; Donkor et al. 2025; Edzie et al. 2023; Kamau Mwaniki et al. 2024; Nciki & Hlabangana 2025). Concerns about job security followed, reported in four studies (50%, n = 4/8) (Akinmoladun et al. 2022; Antwi et al. 2021; Botwe et al. 2021a, 2021b), while salary reduction concerns were reported in two studies (25%, n = 2/8) (Botwe et al. 2021a, 2021b). Low AI usage was reported in three studies (37.5%, n = 3/8) (Edzie et al. 2023; Kamau Mwaniki et al. 2024; Nciki & Hlabangana 2025). These findings indicate that workforce readiness and professional insecurity are major factors shaping negative perceptions of AI.

Theme 3: Safety risks

Sub-theme 3.1: Risks to patient safety

Potential risks to patient care and quality were reported less frequently. Artificial intelligence errors were reported in two studies (25%, n = 2/8) (Botwe et al. 2021a, 2021b), and adverse effects on practice were reported in one study (12.5%, n = 1/8) (Edzie et al. 2023). Data misuse or security concerns appeared in two studies (25%, n = 2/8) (Antwi et al. 2021; Botwe et al. 2021a), while data bias and fairness were raised in one study (12.5%, n = 1/8) (Donkor et al. 2025). Although less commonly mentioned, these risks highlight areas that require careful management during AI implementation.

Theme 4: Barriers to the adoption of artificial intelligence

Sub-theme 4.1: Capacity and human capital

The most frequently reported barrier was a lack of knowledge or training, observed in seven of the studies (87.5%, n = 7/8) (Akinmoladun et al. 2022; Antwi et al. 2021; Botwe et al. 2021a, 2021b; Donkor et al. 2025; Edzie et al. 2023; Nciki & Hlabangana 2025), followed by curriculum gaps in two studies (25%, n = 2/8) (Botwe et al. 2021a; Kamau Mwaniki et al. 2024). Workload issues were mentioned in one study (12.5%, n = 1/8) (Kamau Mwaniki et al. 2024), and reduced human interaction was identified in two studies (25%, n = 2/8) (Antwi et al. 2021; Botwe et al. 2021a). These findings indicate that workforce capacity and preparation are critical for successful AI adoption.

Sub-theme 4.2: Infrastructure and technology

Infrastructure and IT limitations were reported in three studies (37.5%, n = 3/8) (Botwe et al. 2021b; Edzie et al. 2023; Kamau Mwaniki et al. 2024), while risks of biased AI and data privacy/security concerns were reported in one study (12.5%, n = 1/8) (Donkor et al. 2025). These technological challenges underscore the importance of robust infrastructure and reliable AI systems for safe implementation.

Sub-theme 4.3: Policy and governance

Governance and system-level concerns were infrequently reported. Only one study (12.5%, n = 1/8) highlighted the lack of regulatory frameworks (Edzie et al. 2023), and one study reported high costs or infrastructure challenges (12.5%, n = 1/8) (Antwi et al. 2021). A mixed or ambivalent perception of AI was also reported in one study (12.5%, n = 1/8) (Kamau Mwaniki et al. 2024), suggesting that while these issues are less frequently cited, they remain important barriers to adoption.

Funding and cost issues were reported in three studies (37.5%, n = 3/8) (Botwe et al. 2021a, 2021b; Edzie et al. 2023), and a lack of regulatory frameworks was reported in two studies (25%, n = 2/8) (Botwe et al. 2021a; Donkor et al. 2025). These findings highlight the need for policy support, investment, and governance mechanisms to facilitate effective AI integration in radiology.

Implications and recommendations

This scoping review mapped the existing literature on the perceptions of radiology professionals towards AI within African healthcare settings. The synthesis of eight studies reviewed reveals a landscape defined by a duality of perspective: A widespread, forward-looking optimism about the transformative potential of AI is starkly contrasted by significant apprehensions regarding practical implementation and systemic readiness. This discussion interprets this duality not as a simple contradiction but as a symptomatic 'readiness-implementation gap', situating the core themes within the unique socio-technical challenges of the African radiological context.

The geographic and institutional diversity of the included studies necessitates a carefully contextualised interpretation of perceived barriers and readiness for AI adoption. Although studies were drawn from diverse African settings ranging from national professional association surveys to hospital-based studies in public, private, and mixed healthcare systems, the synthesis was intentionally conducted at a thematic level to identify overarching patterns in perceptions rather than to compare countries or institutions directly. The

number of research publications from Ghana, despite its classification as an low- and middle-income countries (LMICs), suggests proactive national-level engagement with AI readiness within its radiology workforce, contrasting with South Africa, an upper-middle-income countries (UMICs), where only a single study was identified despite comparatively advanced healthcare infrastructure. This disparity highlights that national research priorities and institutional focus may be as influential as economic capacity in shaping the available evidence base.

Importantly, perceptions captured across tertiary referral hospitals, professional bodies, and mixed practice environments reflect a convergence of shared concerns such as workforce preparedness, governance, and infrastructure, while the relative salience and expression of these concerns are likely shaped by local resource availability and institutional context. For instance, infrastructure limitations appeared more acute in public-sector and resource-constrained settings, whereas governance, regulation, and professional role adaptation were more prominent in tertiary or association-based contexts. Accordingly, the findings should be interpreted as delineating a common conceptual framework of challenges and opportunities that manifest in context-specific ways, rather than as uniform continent-wide trends.

Beyond geographic distribution, the findings show a nuanced narrative around workforce concerns. African radiologists and radiographers largely perceive AI as a complementary technology to enhance diagnostic accuracy and workflow efficiency. This aligns with global attitudes where AI is seen as a tool for augmenting complex cognitive work (Pesapane et al. 2018). Furthermore, the strong reported willingness to learn and collaborate indicates a workforce eager to engage proactively. However, this optimism must be interpreted as largely aspirational, reflecting engagement with an idealised future of AI rather than confidence born from practical experience. This positive attitude provides a crucial foundation, but it exists in a vacuum of practical application.

However, this positive attitude must be interpreted cautiously alongside the review's most dominant and consistent finding: Systemic barriers to adoption. The pervasive knowledge gap, identified in 87.5% of included studies, represents a chasm between theoretical acceptance and practical competency. While high levels of conceptual awareness of AI were reported, this knowledge was often non-specialised and primarily acquired through informal sources such as conferences, the internet, or media exposure, limiting its translation into safe and confident clinical use. For instance, Nciki and Hlabangana (2025) demonstrated that media-driven exposure fostered superficial understanding rather than the critical literacy required for clinical implementation. This deficit is not merely informational but reflects under-resourced education systems and curricula that have yet to integrate AI and informatics training in a structured manner.

Consequently, favourable perceptions of AI appear to represent aspirational or conceptual acceptance rather than implementation readiness, explaining the coexistence of high positivity with minimal real-world use. This review reveals that higher knowledge levels are associated with more positive attitudes, further suggesting that education functions as a key enabling mechanism. However, without parallel investment in formal training pathways, regulatory clarity, governance frameworks, and institutional support, positive attitudes alone are insufficient to drive adoption.

In addition to individual-level gaps, substantial systemic barriers were prevalent, including high costs, unreliable connectivity, and a lack of AI-enabled equipment (Botwe et al. 2021b; Edzie et al. 2023). These are not isolated technical issues but interconnected manifestations of broader healthcare underfunding and digital divides. The fear that AI systems could malfunction because of a 'poor maintenance culture' adds a uniquely contextual layer, indicating that sustainable implementation requires robust support ecosystems (Antwi et al. 2021). Critically, these infrastructural and educational barriers are mutually reinforcing, creating a cycle where a lack of infrastructure makes training theoretical, and a lack of training leads to underutilisation of available technology. This interdependency explains why high enthusiasm has not translated into widespread use.

Beyond immediate barriers, a pivotal finding that captures the balance between optimism and apprehension relates to the evolving nature of professional roles. The consensus leaned towards AI transforming, not replacing, the radiologist's and radiographer's role (Edzie et al. 2023; Nciki & Hlabangana 2025). Professionals anticipate a shift where AI handles routine tasks, freeing them for complex reasoning and patient care. This anticipated role extension signifies a mature understanding of professional adaptation. However, this envisioned future is contingent upon precisely the educational and infrastructural foundations that are currently deficient. It simultaneously underscores the critical imperative for a parallel evolution in training curricula to equip the workforce for these advanced responsibilities.

While 'Safety Risks' captures individual-level concerns about potential patient harm and data security, the 'Policy and Governance' theme addresses the system-level frameworks and institutional roles required to mitigate those risks and build trust for adoption. Furthermore, this review underscores that the journey towards AI adoption in Africa is inextricably linked to system-level issues of governance and institutional capacity. The call for clear regulatory frameworks, data protection standards, and accountability mechanisms points beyond individual readiness to the critical roles of institutional actors in creating an enabling environment for AI. For instance, professional councils and regulatory bodies must develop guidelines for AI validation and clinical use, while universities and training institutions are pivotal for integrating AI literacy and ethics into curricula.

Healthcare employers and hospital administrators must establish clear protocols for implementation, maintenance,

and oversight, and national governments must develop overarching data governance and cybersecurity policies. These institutional roles are not ancillary but central to translating workforce optimism into tangible, trusted adoption. The emphasis on trustworthy AI principles reflects professionals' understanding that ethical and operational safeguards are prerequisites, not afterthoughts, for sustainable integration in contexts where trust in health systems may already be fragile.

Limitations

This review has inherent limitations. Studies published in languages other than English were not included, which may have resulted in the omission of relevant evidence. Most included studies relied on cross-sectional survey designs, offering useful but time-bound snapshots of perceptions while limiting deeper qualitative insights and longitudinal understanding. The inclusive definition of 'radiology professionals', while allowing for a holistic departmental perspective, limited the ability to examine differences in perceptions based on professional role, level of training, or scope of practice. Existing research remains largely focused on technical and diagnostic applications of AI, with comparatively limited attention to ethical governance, trust, and long-term workforce implications. Although the overall sample size appears substantial, it is heavily influenced by a small number of large, multicountry surveys, which may under-represent localised contexts and setting-specific nuances.

Recommendations

To advance sustainable AI integration in African radiology, a coordinated, multistakeholder approach is essential. Building human capital should be prioritised through the inclusion of AI literacy, ethics, and applications in radiology curricula and continuous professional development. Parallel investment is required to strengthen foundational digital infrastructure, including reliable power, connectivity, and maintenance systems to ensure operational readiness. Equally important is the establishment of context-sensitive governance frameworks addressing data protection, accountability, and algorithmic validation to foster trust and ethical use. By aligning workforce training, infrastructure development, and governance reform, African health systems can convert professional optimism into meaningful and equitable AI adoption.

Conclusion

This review highlights both the promises and challenges of AI adoption in African radiology. While radiology professionals generally express positive attitudes towards AI, real-world implementation is challenged by limited infrastructure, insufficient training, and weak governance frameworks. The current evidence base remains fragmented and concentrated in a few countries, revealing a need for broader, contextually grounded research. Overall, AI in radiology is still in its early stages across the continent, but with sustained investment in capacity building, infrastructure, and ethical oversight, African healthcare systems can gradually transition towards more efficient, data-driven, and patient-centred radiology services.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

CRediT authorship contribution

Tshifhiwa Nekhudzhiga: Conceptualisation, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Validation, Visualisation, Writing – original draft, Writing – review & editing. Deidre Pretorius: Conceptualisation, Project administration, Supervision, Validation. All authors reviewed the article, contributed to the discussion of results, approved the final version for submission and publication, and take responsibility for the integrity of its findings.

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Data availability

The authors confirm that the data supporting the findings of this study are available within the article.

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