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NIGERIAN RADIOGRAPHERS' PERCEPTION OF THE IMPACT OF ARTIFICIAL INTELLIGENCE (AI) ON RADIOGRAPHY PRACTICE IN SOUTHWEST NIGERIA

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ABSTRACT

The integration of artificial intelligence (AI) in radiography offers opportunities to enhance diagnostic accuracy, image processing and workflow efficiency. However, there is a paucity of literature on radiographers' perceptions and attitudes towards AI adoption in Southwest Nigeria. This study explored radiographers' perspectives on integrating AI into radiography practice in Southwest Nigeria, focusing on their perceptions, concerns, readiness for adoption and expectations regarding clinical implications. A descriptive cross-sectional design was employed using a self-administered questionnaire administered to 174 radiographers practising in Southwest Nigeria. The findings revealed a heterogeneous workforce with balanced representation of novice and experienced radiographers. Although respondents were optimistic about the benefits of AI, concerns remained regarding training, job security and ethical issues. The study concludes that radiographers must be equipped with the requisite skills and knowledge to leverage advances in AI while addressing concerns related to training, employment and ethics.

Keywords: artificial intelligence, radiography, perceptions, attitudes, education, training, Southwest Nigeria

Introduction

Radiography is a critical component of diagnostic, interventional medicinal and healthcare practices, with Artificial Intelligence (AI) technologies increasingly being integrated into radiography practices to enhance diagnostic accuracy and efficiency. Globally, AI has demonstrated potential in outperforming human radiologists in specific tasks, such as detecting fractures or identifying malignancies in imaging studies [1]

The integration of Artificial Intelligence (AI) in radiography has transformed the medical and healthcare landscape, offering opportunities to enhance diagnostic accuracy, optimize image analysis, and streamline workflow processes. Radiography practices involve the production and interpretation of images for diagnostic purposes. Artificial Intelligence (AI) algorithms have the potential to augment this practice by providing enhanced accuracy, increased efficiency, and the capacity to process substantial volumes of data

[2]. On the other hand, widespread integration of Artificial Intelligence has elicited workforce apprehension regarding professional displacement, competency obsolescence, and the critical demand for additional training by radiographers [3].

The integration of Artificial Intelligence (AI) in radiography is a rapidly evolving area. Evidence shows that radiographers in the United Kingdom, Europe, and Australia hold generally positive attitudes toward AI. They view it as a transformative asset for improving clinical workflows [4, 6]. However, this optimism is counterbalanced by well-documented industry concerns regarding potential job displacement, the risk of clinical de-skilling, and professional accountability [7, 9]. Consequently, these contrasting viewpoints emphasized the need for a comprehensive understanding of AI impact in radiography practices. Balancing these potential benefits with the associated challenges is essential to ensure AI is effectively integrated into clinical environments.

Recent literature highlights that radiographers in Low- and Middle-Income Countries (LMICs) exhibit a predominantly positive and optimistic attitude toward Artificial Intelligence. They perceive AI as an essential tool to optimize workflow efficiency, improve diagnostic accuracy, and elevate overall patient care [10, 12]. However, this positive reception is balanced by operational anxieties regarding the lack of formal educational training, risks of job displacement, and underlying infrastructural limitations [10, 12]

Previous studies have highlighted a disconnect between awareness and adoption of Artificial Intelligence (AI) in medical practice. Akinmoladun et al. found that only 12% of Nigerian radiologists demonstrated a strong understanding of AI, yet 58% expressed a willingness to integrate AI applications in their hospitals [10]. Similarly, Soreta et al. emphasized the need for tailored educational initiatives, extensive training programs, and infrastructure enhancements to support AI adoption in radiographic practices [11].Comparable trends have been observed in other contexts. Dang et al. reported that 5.9% of healthcare students in Vietnam exhibited a significant level of awareness and interest in AI, despite lacking formal training [12]. Furthermore, Oduoye et al. underscored the importance of capacity-building initiatives and training programs for laboratory professionals, clinicians, researchers, and policymakers to facilitate successful AI integration in laboratory medicine [13].These findings collectively highlight the need for targeted educational interventions and infrastructure development to bridge the knowledge gap and facilitate AI adoption in medical practice.

The synthesis of extant literature suggests that radiographers in low-income countries generally harbour a favourable disposition towards the integration of Artificial Intelligence in radiography practice. Notwithstanding this positive outlook, it is crucial to acknowledge and address several salient factors that may influence this process. Specifically, there is an imperative need for comprehensive formal training programs, infrastructure development, and proactive strategies to mitigate concerns related to job displacement. Addressing these areas is paramount to ensuring the successful implementation and sustainable integration of AI technologies in radiographic practices, thereby harnessing the potential benefits of AI while minimizing its attendant risks and challenges. Khine study emphasizes the need for concomitant training of end-users to facilitate the effective integration of Artificial Intelligence (AI) technologies in radiography practice [14]. The findings suggest that AI-enabled radiography workflows offer tangible benefits, including enhanced workflow efficiency and diagnostic support. However, the study also highlights potential disruptions to established professional roles and patient-centred care practices, which can be mitigated by a well-informed and educated workforce. Similarly, Doe research raises pertinent questions regarding the impact of AI integration on practitioners, patients, and the broader healthcare system, emphasizing the need for careful consideration of these implications [15]. Collectively, these studies emphasize the importance of addressing workforce education and training needs to ensure the successful adoption of AI technologies in radiography practice.

In the context of Southwest Nigeria, Ogunleye et al. observed that the adoption of artificial intelligence in

radiography practice is constrained by several operational challenges. These include limited access to advanced imaging technologies, a shortage of skilled personnel, and inadequate infrastructure. The study suggests that addressing these factors would be a necessary step toward facilitating effective artificial intelligence implementation in the region [14, 15, 16]. Despite these challenges, artificial intelligence has the potential to mitigate these issues by improving operational efficiency and reducing human error in radiographic practice [17].

Conclusively, this study comprehensively investigates the perspectives of radiographers in Southwest Nigeria regarding the integration of Artificial Intelligence (AI) into clinical practice. Specifically, it examines their current awareness, professional concerns, and educational preparedness. Evaluation of the perception of Radiographers in the southwestern Nigeria is tailored toward bridging the knowledge gap by identifying targeted training requirements, and outline effective strategies to mitigate barriers to adoption.

Methods

This descriptive cross-sectional study investigated the perceptions of radiographers in Southwest Nigeria regarding the impact of artificial intelligence (AI) on radiography practice. The study was conducted in Southwest Nigeria, a densely populated region comprising six states (Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo), with a mix of urban and peri-urban settlements, and hosting various healthcare facilities, including teaching hospitals, general hospitals, and private diagnostic centers. Participants were licensed and registered radiographers with the Radiographers Registration Board of Nigeria (RRBN), practicing in one of the six Southwest states. A self-administered questionnaire was used to collect data from 174 radiographers who met the inclusion criteria and voluntarily participated in the study. Data analysis was conducted using SPSS Version 26, employing descriptive statistics (frequencies and percentages) to summarize demographic characteristics and responses.

Table 1. Socio-Demographic Characteristics of the study population (n=174)

Characteristics of radiographers	Category	Frequency	Percentage(%)
Age Group	20–30 years	56	32.2
	31–40 years	33	19.0
	41–50 years	41	23.6
	51 years and above	44	25.3
Gender	Male	123	70.7
	Female	51	29.3
Highest Level of Education	Bachelor's degree	114	65.5
	Master's degree	52	29.9
	Doctorate	8	4.6
Years of Experience in Radiography Practice	Less than 5 years	56	32.2
	5–10 years	32	18.4
	11–20 years	30	17.2
	More than 20 years	56	32.2
State of Practice (Southwest Nigeria)	Ekiti	4	2.3
	Lagos	101	58.0
	Ogun	15	8.6
	Ondo	10	5.7
	Osun	30	17.2
	Oyo	14	8.0
Type of Healthcare Facility	Government hospital	83	47.7
	Private hospital	35	20.1
	Diagnostic center	45	25.9

	Academic institution	11	6.3

Table 2. Current State of Radiography Practice in southwest Nigeria & Potential Role of AI in improving diagnosis and treatment (n=174)

Characteristics of radiographers	Category	Response	Percentage(%)
How would you assess the current state of radiography practice in Nigeria?	Very Poor	6	3.4
	Poor	17	9.8
	Average	97	55.7
	Good	50	28.7
	Very Good	4	2.3
Do you believe AI can improve diagnosis and treatment in radiography practice?	Yes	139	79.9
	No	4	2.3
	Uncertain	31	17.8
How familiar are you with artificial intelligence in radiography practice?	Not familiar	38	21.8
	Slightly familiar	47	27.0
	Moderately familiar	57	32.8
	Very familiar	32	18.4
Which radiography tasks do you believe AI can effectively assist with?	Image acquisition and optimization	122	70.1%
	Image interpretation and diagnosis	122	70.1%
	Patient positioning and workflow automation	32	18.4%
	Radiation dose regulation	78	44.8%
Do you believe AI can enhance the efficiency of radiographers in practice?	Yes	147	84.5
	No	7	4.0
	Not sure	20	11.5

Table 3. Evaluation of the Level of Awareness and Understanding of Artificial Intelligence (AI) Among Radiographers In Southwest Nigeria (n=174)

Characteristics	Categories	Frequency	Percent (%)
Have you received any formal training or education on AI applications in radiography practice?	Yes	70	40.2
	No	104	59.8
How would you rate your knowledge in AI in medical imaging and radiography?	Adequate	27	15.5
	Inadequate	93	53.4
	Good	47	27.0
	Excellent	7	4.0
How would you rate your understanding of how AI can be applied in radiography practice?	Poor	32	18.4
	Fair	60	34.5
	Good	64	36.8
	Excellent	18	10.3
How confident are you in your ability to use AI-based radiography tools?	Not confident	51	29.3
	Somewhat confident	44	25.3
	Confident	65	37.4
	Very confident	14	8.0
Do you think AI will significantly change radiography practice in the next 5–10 years?	Yes	42	24.1
	No	77	44.3

	Not sure	55	31.6

Table 4. The assessment of the perceptions of radiographers in Southwest Nigeria towards the integration of AI in radiography practice

Characteristics	Categories	Frequency	Percent (%)
Perceptions towards AI Integration in Radiography Practice	Strongly Disagree	18	10.3
	Disagree	6	3.4
	Not sure	2	1.1
	Neutral	42	24.1
	Agree	68	39.1
	Strongly Agree	38	21.8
What concerns do you have regarding AI integration in your practice?	Training Requirements	111	63.8%
	Loss of Jobs	98	56.3%
	Ethical Concerns	98	56.3%
	Patient Privacy	37	21.3%
What benefits do you think AI could bring to radiography practice?	Improved diagnostic accuracy	47	27.0%
	Faster image processing	26	14.9%
	Enhanced workflow efficiency	19	10.9%

Table 5. The perceived benefits and challenges associated with the integration of AI in radiography practice

Question	**Categories**	**Frequency**	**Percent (%)**
What challenges do you foresee in the integration of AI into radiography?	Cost of Implementation	139	79.9%
	Technological Barriers	105	60.3%
	Lack of Training	100	57.5%
	Staff Resistance	66	37.9%
What are the main challenges hindering AI adoption in radiography practice?	Lack of awareness and education	51	29.3
	High cost of implementation	52	29.9
	Ethical and legal concerns	11	6.3
	Limited technological infrastructure	56	32.2
	Resistance from radiographers	4	2.3
Do you believe AI will replace radiographers in the future?	Yes	29	16.7
	No	128	73.6
	Not sure	17	9.8
What challenges or threats do you perceive AI might introduce to radiography practice?	High cost(s)	89	51.1%
	Job displacement	88	50.6%
	Ethical concerns	71	40.8%
	Resistance	55	31.6%
	Accuracy/reliability issues	52	29.9%

Discussion:

The socio-demographic characteristics of radiographers in Southwest Nigeria provide insight into the current structure of the radiography workforce and its implications for service delivery. When interpreted alongside existing literature, several patterns emerge

that warrant consideration for workforce planning and professional development.

The observed age distribution indicates a coexistence of early-career and experienced radiographers, a pattern consistent with findings reported by Akintomide et al. (18). This generational mix presents an opportunity to integrate innovative approaches introduced by younger practitioners with the clinical expertise of senior colleagues. However, the variation in experience levels suggests that training and continuing education programs should be designed to accommodate differing learning needs and technological familiarity across age cohorts.

A notable gender imbalance was identified, with 70.7% of respondents identifying as male and 29.3% as female. This disparity aligns with trends documented in prior studies, including Rehani, which indicate a historical predominance of males in radiography. Addressing this imbalance may require targeted strategies to promote gender diversity, such as outreach initiatives, mentorship opportunities, and institutional policies that support the recruitment and retention of female professionals (19).

The majority (65.5%) of participants held a Bachelor's degree in radiography and radiation sciences, with an additional 29.9% holding a Master's degree. This distribution reflects a workforce with a substantial academic foundation, consistent with recommendations by the American Society of Radiologic Technologists regarding the role of advanced education in maintaining standards of patient care and professional competence (20).

The data reveal a bimodal distribution in years of experience, with 32.2% of radiographers having fewer than five years and an equal proportion having over twenty years in practice. This dichotomy emphasize the potential value of structured mentorship programs to facilitate knowledge transfer, support skill development, and ease the integration of early-career professionals into clinical practice. The concentration of radiographers in Lagos (58.0%) and Osun (17.2%) states suggests an uneven distribution of the workforce across Southwest Nigeria. Such a pattern reflects broader disparities in healthcare workforce allocation reported by the World Health Organization (21). The findings highlight the need for policy interventions aimed at improving the equitable distribution of radiography services and personnel across underserved regions.

Employment patterns indicate that 47.7% of radiographers work in government hospitals, while 25.9% are employed in diagnostic centers and private facilities. The diversity of practice settings emphasizes the importance of adaptable training curricula that prepare radiographers for the varied operational demands and resource contexts encountered in public and private sectors.

Overall, the findings indicate that targeted workforce strategies are warranted to strengthen the radiography profession in Southwest Nigeria. Such strategies should encompass gender equity initiatives, age-appropriate training, structured mentorship programs, and policy interventions to address geographic maldistribution. Implementation of these measures has the potential to improve access to radiography services and enhance the quality of patient care within the region.

The integration of Artificial Intelligence (AI) into radiography practice presents substantial potential to enhance efficiency, diagnostic accuracy, and therapeutic outcomes. This study examines the current state of radiography practice in Southwest Nigeria and explores radiographers' perceptions regarding the prospective role of Artificial Intelligence in the field.

More than half of respondents (55.7%) rated the overall quality of radiography practice in Nigeria as average, while 28.7% rated it as good. This distribution suggests an existing operational foundation upon which improvements can be built. The findings align with prior research indicating that practice quality is influenced by multiple factors, including equipment standards, staff training, and adherence to established protocols (18). The results highlight opportunities for targeted quality enhancement initiatives.

A substantial majority (79.9%) of radiographers expressed confidence that Artificial Intelligence can improve practice efficiency, diagnostic accuracy, and therapeutic efficacy in radiographic procedures. This

perception is consistent with evidence from earlier studies demonstrating Artificial Intelligence capacity to enhance diagnostic precision in medical imaging (1, 23). The anticipated benefits stem primarily from Artificial Intelligence ability to support image analysis and assist in clinical decision-making, which may contribute to more consistent and timely patient outcomes.

Regarding familiarity with Artificial Intelligence, 32.8% of respondents reported moderate exposure, whereas 21.8% indicated limited or no familiarity. This gradient of awareness emphasize the need for structured educational and training programs to build radiographers competence in AI applications. As noted by McHugh et al., targeted training is essential for enabling healthcare professionals to integrate AI technologies effectively into clinical workflows (24).

Most participants (70.1%) agreed that AI could support key aspects of radiography practice, including image acquisition, optimization, and interpretation. Additionally, 84.5% anticipated that Artificial Intelligence would improve workflow efficiency. These findings reflect a consensus on Artificial Intelligence potential to enhance both the technical quality of imaging and the productivity of radiography departments (25). Such perceptions suggest readiness among practitioners to engage with Artificial Intelligence, provided adequate training and institutional support are available.

These findings indicate that while radiographers in Southwest Nigeria recognize the value of Artificial Intelligence. However, gaps in familiarity and training may constrain its effective adoption. Addressing these gaps through curriculum development, continuing professional education, and institutional infrastructure investment is likely to facilitate the responsible integration of Artificial Intelligence into practice. Advancing in these areas may contribute to improved diagnostic consistency, operational efficiency, and overall quality of care in the region.

Furthermore, the study findings on radiographers' awareness and understanding of Artificial Intelligence within radiography practice in Southwest Nigeria revealed that only 40.2% of participants reported having received formal education or training in Artificial Intelligence applications. This limited exposure is consistent with existing literature that identifies a deficit in AI, focused training for healthcare professionals. The result indicates a need to integrate Artificial Intelligence related content systematically into undergraduate curricula and continuing professional development frameworks to ensure foundational competence (24).

Additionally, a substantial discrepancy was observed between perceived and actual knowledge levels. While 15.5% of radiographers rated their knowledge of Artificial Intelligence in radiography practies as adequate, 53.4% considered it inadequate. This disparity suggests an unmet educational need that may impede the effective adoption of Artificial Intelligence technologies. As emphasized by Lee et al., structured training is critical for enabling healthcare professionals to incorporate Artificial Intelligence into clinical practice in a safe and evidence-based manner (25).

Furthermore, confidence in employing Artificial Intelligence based radiography tools was heterogeneous, with 37.4% of respondents expressing confidence and 29.3% reporting a lack Artificial Intelligence based radiography tools. The variation highlights the importance of experiential learning and supervised practice in fostering self-efficacy. Prior research indicates that competency based training enhances practitioners ability to apply AI algorithms accurately in diagnostic imaging contexts (23).

Similarly, perceptions regarding AI prospective influence on radiography practice over the next 5–10 years were divergent. Approximately 44.3% of participants expressed skepticism about its significance, whereas 24.1% anticipated a substantial impact. Such ambivalence suggests that enhanced education and exposure to empirical evidence may facilitate a more nuanced understanding of Artificial Intelligence capabilities and limitations (22). Collectively, the results emphasize the necessity for targeted educational strategies and institutional support to bridge existing gaps in Artificial Intelligence knowledge and confidence. Addressing these deficiencies may promote informed adoption of

Artificial Intelligence technologies and contribute to improvements in diagnostic accuracy and workflow efficiency within the region.

The assessment of radiographers perceptions towards the integration of Artificial Intelligence in radiography practice in Southwest Nigeria reveals a complex landscape, characterized by both optimistic and pessimistic sentiments. A substantial proportion of radiographers (39.1%) recognize the potential advantages of AI integration, with 21.8% expressing strong agreement. However, a notable segment of skepticism and ambivalence exists, with 24.1% adopting a neutral position and 13.7% expressing outright disagreement or strong disagreement. The positive perceptions regarding Artificial Intelligence integration are corroborated by prior research, which underscores the prospective benefits of Artificial Intelligence in enhancing diagnostic accuracy and optimizing workflow efficiency (25, 23). However, the skepticism and uncertainty articulated by certain radiographers highlight the imperative for educational initiatives and awareness campaigns aimed at elucidating both the potential advantages and inherent challenges associated with Artificial Intelligence incorporation. Primary concerns related to Artificial Intelligence integration include Training Requirements (63.8%), Job Security (56.3%), and Ethical Considerations (56.3%). These apprehensions resonate with findings from earlier studies, documenting similar trepidations among healthcare professionals. This emphasizes the critical need for comprehensive training programs and supportive frameworks to facilitate a smooth technological transition. Radiographers identified several perceived advantages of Artificial Intelligence integration, including Enhanced Diagnostic Accuracy (27.0%), Accelerated Image Processing (14.9%), and Improved Workflow Efficiency (10.9%). These insights align with existing literature, highlighting the potential of Artificial Intelligence to enhance the quality and efficiency of radiographic practices (1).

The integration of Artificial Intelligence into radiography practice has garnered considerable attention, particularly in the context of its perceived benefits and challenges. This study findings indicate that the primary challenges faced by radiographers include high costs of implementation (79.9%), technological barriers (60.3%), and a lack of training (57.5%). These challenges resonate with existing literature, which has highlighted similar concerns among healthcare professionals regarding the financial constraints and technological limitations posed by the introduction of Artificial Intelligence (24). The data analysis identifies limited technological infrastructure (32.2%) and a lack of awareness and education (29.3%) as additional barriers that warrant attention. These obstacles emphasize the necessity for targeted strategies to address infrastructural deficiencies, financial implications, and educational gaps, thereby facilitating the successful integration of Artificial Intelligence in radiography practice.

Similarly, Rajpurkar et al. emphasize the importance of education and training for healthcare staff to effectively leverage Artificial Intelligence technologies (23). The majority of radiographers (73.6%) in this study do not perceive Artificial Intelligence as a threat to their professional roles, with only 16.7% expressing concerns about potential job displacement. This finding suggests a prevailing confidence among Southwest radiographers regarding their relevance and adaptability in an Artificial Intelligence enhanced environment. This perspective aligns with the work of Lakhani and Sundaram, who argue that Artificial Intelligence has the potential to augment the roles of healthcare professionals, rather than replace them. Despite the optimism regarding the role of Artificial Intelligence in enhancing professional practice, the results of this study reveal that radiographers hold significant concerns relating to high costs (51.1%), job displacement (50.6%), and ethical considerations (40.8%). These multifaceted concerns highlight the complex implications of Artificial Intelligence integration within the radiography profession. Financial implications, alongside fears of job loss and ethical dilemmas, necessitate a comprehensive understanding of Artificial Intelligence benefits and limitations in medical imaging (1)

McHugh et al. further highlight the role of education and training in assisting healthcare professionals in navigating these challenges, ensuring that they are equipped to engage with Artificial Intelligence technologies responsibly and effectively (24). Conclusively, the integration of Artificial Intelligence into radiography practice presents both notable opportunities and significant challenges. Addressing the prevailing barriers, including cost, technological infrastructure, and education, will be important in the successful adoption of Artificial Intelligence technologies. Furthermore, fostering a positive perception of Artificial Intelligence among radiographers is essential for mitigating concerns related to job displacement and ethical issues.

SUMMARY

The results of this study characterize the radiography workforce in Southwest Nigeria as diverse in age and experience, yet marked by a pronounced gender imbalance and an uneven geographic and institutional distribution of services. Radiographers generally rated the overall quality of radiography practice as average. A substantial proportion expressed positive disposition towards integrating Artificial Intelligence, citing anticipated improvements in diagnostic efficiency, diagnostic accuracy, image processing speed, and workflow optimization. Concurrently, respondents raised concerns about training requirements, job security, and the ethical implications of Artificial Intelligence adoption.

ETHICAL APPROVAL

This research was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and governed by the guidelines established by the Osun State University Health Research and Ethics Committee (UNIOSUN.HREC). Ethical approval was obtained from the Osun State University (UNIOSUN) Health Research Ethics Committee (UNIOSUNHREC 2025/RAD/007)

CONFLICT OF INTEREST: The authors declare that there are no conflicts of interest associated with this research study.

DATA AVAILABILITY

The datasets generated from this study are available from the corresponding author on reasonable request.

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DECLARATION OF AI USE: During the preparation of this manuscript, AI tool Grammar was used for language editing. After using this tool, the author reviewed and edited the content as needed to suit the purpose of this publication.

LIMITATIONS OF THE STUDY

This study encounters several limitations that should be taken into account when interpreting the findings, which include Geographic Scope, Sample Size, Self-Reported Data, Temporal Constraints, Financial Constraints and Limited Exploration of AI applications, which may affect the generalization of the outcome of this study. These limitations emphasized the necessity for further research to validate and expand upon the findings presented in this study.

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