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KNOWLEDGE, USAGE, AND PERCEPTION OF GENERATIVE AI TOOLS AMONG ONCOLOGY RESIDENTS IN NIGERIA- A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Artificial Intelligence (AI) has increasingly demonstrated benefits across multiple sectors, including healthcare. Despite its expanding applications, adoption of generative AI in Oncology residency training in Africa remains limited.
Objective: This study assessed the knowledge, usage patterns, perceptions, and challenges associated with generative AI tools among Oncology residents in Nigeria, an under-researched area.

Methods: A cross-sectional online survey was conducted among 26 Radiation and Clinical Oncology residents across eight residency-training institutions in Nigeria between June and July 2025. The questionnaire collected information on sociodemographic characteristics, patterns of AI use, perceptions, and challenges encountered. Data analysis was performed using Statistical Package for Social Sciences (SPSS) version 27.

Results: Respondents had a mean age of 34 ± 4.6 years and had spent an average of 2.8 ± 1.8 years in residency training. Most participants were male (53.8%) and junior residents (53.8%). Nearly all respondents (92.3%) had used generative AI during training, with ChatGPT being the most commonly used tool (96.2%). AI was primarily used for study assistance by 76.9% of respondents, while limited training was identified as the major challenge by 61.5%. Most residents agreed that AI enhanced learning (96.2%) and could improve patient care (84.6%).

Conclusion: Most Oncology residents in Nigeria had used generative AI and showed readiness for its adoption in healthcare delivery. However, limited training remains a major barrier. Broader studies involving doctors in rural and non-training settings are recommended to guide equitable and ethical AI implementation across African healthcare systems.

Keywords: Generative Artificial Intelligence Tools, Oncology, Barriers, Nigeria

INTRODUCTION

Artificial Intelligence (AI) is a general term that implies the use of a computer to model intelligent behavior with minimal human intervention.[1] Over the years, AI has attracted significant interest from various fields. In

healthcare, the rapid development of computer hardware and software applications over recent years has resulted in the facilitation of the digitization of health data, providing new opportunities[2] for the use of AI systems to draw out insights from already existing data and in the development of computational models.[3] With an influence on healthcare that can be particularly profound, AI has propelled revolutionary advancements in various disciplines.[4]

In recent years, some AI tools have moved past testing to implementation in healthcare. The US Food Drug Administration was found to be approving AI products, particularly Machine Learning at an accelerating rate.[5] Machine Learning is a type of AI that encompasses several different algorithmic models and statistical methods to solve problems without specialized programming, having learnt patterns from data.[6] A study showed that the two main medical specialties with AI/ML-based medical innovations were Radiology and Cardiology. The remaining medical devices and algorithms were shown to focus on endocrinology (internal medicine), neurology, ophthalmology, emergency medicine, and oncology subspecialties.[7]

Besides traditional AI-ML platforms (i.e., nongenerative AI), new generative AI capabilities applied to health care are also starting to enhance diagnostic reporting, education, searching through large data sets and various other operational needs.[8] Generative AI models, such as the Generative Pre-trained Transformer (GPT) models developed by OpenAI, with the popular ChatGPT model receiving the most attention, have emerged as powerful tools with the potential to reshape the landscape of healthcare due to their remarkable capacity for natural language processing (NLP).[4]

In Oncology, the applications of AI are expanding to include new approaches for cancer detection, screening, diagnosis and classification, the characterisation of cancer genomics, the analysis of tumor microenvironment, the assessment of biomarkers with prognostic and predictive purposes and of strategies for follow-up and drug discovery.[9] In Africa however, where the chance of survival from cancer is significantly worse than it is in high-income nations, its adoption has been slower, albeit steadily progressing,[10] with a majority of AI innovations revolving around the field of diagnostics.[11] In Nigeria, a study showed that while some healthcare practitioners are aware of AI, they were yet to be trained on it.[12]

This paper focuses specifically on the use of AI Generative tools among Oncology residents in Nigeria: the current knowledge, usage patterns, perspectives and challenges. It also seeks to highlight challenges limiting its use, provide recommendations for the integration of Generative AI into Oncology training and practice, while adding to the currently existing body of knowledge.

MATERIALS AND METHODS

Study Design

This was a cross-sectional survey conducted among Radiation and Clinical Oncology Residents in Nigeria between June and July 2025 from the following institutions: Ahmadu Bello University Teaching Hospital, Zaria (ABUTH); Jos University Teaching Hospital

(JUTH); Lagos State University Teaching Hospital (LASUTH); Lagos University Teaching Hospital (LUTH); Marcell Ruth Cancer Center (MRCC); Medserve LUTH Cancer Center (MLCC); National Hospital Abuja (NHA); University College Hospital, Ibadan (UCH); University of Benin Teaching Hospital (UBTH); and University of Nigeria Teaching Hospital (UNTH).

Table 1: Showing Participating Institutions

Institution	Frequency	Proportion (%)
ABUTH	1	3.8
JUTH	2	7.7
LASUTH	2	7.7
LUTH	3	11.5
MLCC	2	7.7
MRCC	2	7.7
NHA	3	11.5
UBTH	3	11.5
UCH	4	15.4
UNTH	5	19.2
Total	26	100

Data collection

Data was collected using an online questionnaire, adapted from similar studies, and was distributed via Google Forms. Questions included participants' years and level in residency, reasons for the use and challenges with use of various artificial intelligence (AI) tools during residency, as well as perception towards the use of generative AI. Out of an estimated 63 eligible Residents, 26 responded, yielding a response rate of 41%.

Data analysis

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 27. Data was described with frequencies and proportions using appropriate tables and figures. Test of association was conducted using Fisher's Exact Test, with level of significance set at 0.05 level.

RESULTS

Respondents had a mean age of 34 years (SD = 4.6) and spent an average of 2.8 years (SD = 1.8) in residency training. Most respondents were male 14 (53.8%). The majority 14 (53.8%) were Junior Residents.

Table 2: Showing Demographic Characteristics of Participants

Variable		**Frequency (N = 26)**	**Percentage**
Age (at last birthday)	*Mean ± SD*	*33.9 ± 4.4*	
Gender	Female	12	**46.2**
	Male	14	**53.8**
Number of years in residency	*Mean ± SD*	*2.9 ± 1.7*	
Level in your program	Junior Resident	14	**53.8**
	Senior Resident	12	**46.2**

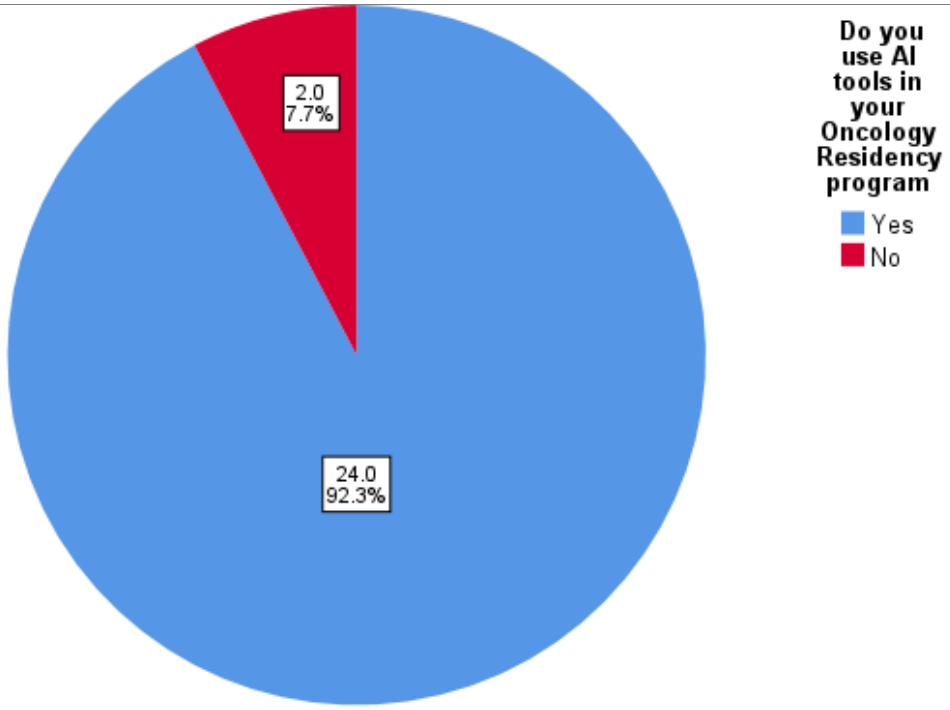


Figure 1: Use of AI tools by Oncology Residents

Nearly all participants 24 (92.3%) had used AI tools during residency. Nine (34.6%) participants used it at least once a week. ChatGPT was the most commonly used tool with 25 (96.2%) respondents.

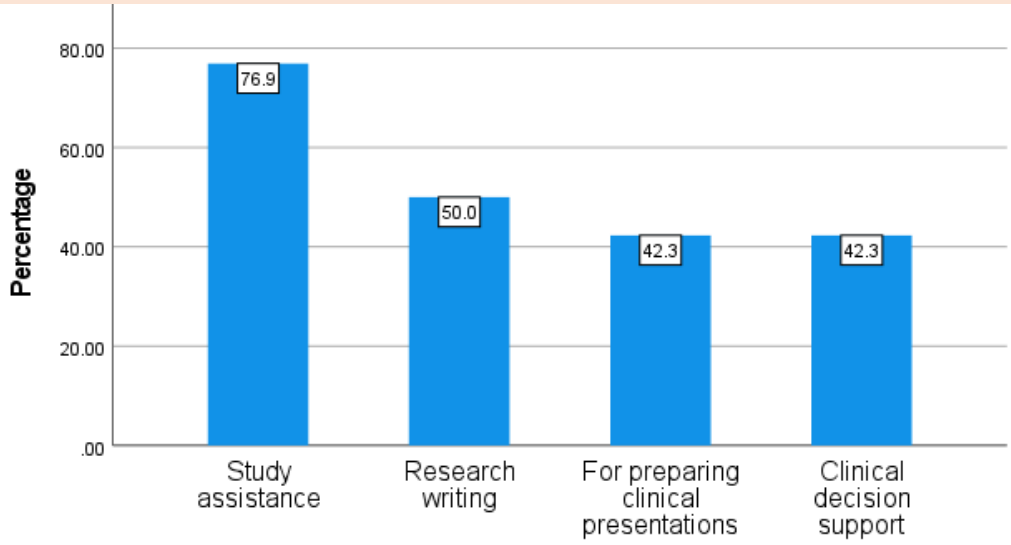


Figure 2: A simple bar chart showing the use of generative AI by Oncology Residents

AI tools were primarily used for study assistance 20 (76.9%), research writing 13 (50.0%), preparation of clinical presentations 11 (42.3%), and clinical decision-making 11 (42.3%) – Figure 2**Figure 3:** A simple bar chart showing concerns of Oncology Residents regarding use of Generative AI

The main challenges identified were limited training 16 (61.5%), ethical concerns 14 (53.8%), technical issues 12 (46.2%), and lack of access and expensive full packages 5 (19.2%) – Figure 3.

Table 3: Perception of Oncology Residents Towards Generative AI Tools

Variable	Agree n (%)	Disagree n (%)
AI tools enhance learning experience	25 (96.2%)	1 (3.8%)
AI tools will improve quality of patient care	22 (84.6%)	4 (15.4%)
The use of AI tools may diminish clinical skills	10 (38.5%)	16 (61.5%)
The Use of AI has ethical implications in medicine	21 (80.8%)	5 (19.2%)

Most Residents agreed that AI enhances learning 25 (96.2%) and will improve patient care 22 (84.6%). The majority disagreed that AI will diminish clinical skills 16 (61.5%). Four-fifths of the Residents expressed concern about the ethical implications of the use of AI in medicine 21 (80.8%). Table 2.

DISCUSSION

The study is aimed to determine the use of Generative AI tools among oncology residents in Nigeria with emphasis on its current knowledge, usage patterns, perspectives and challenges. The result of the study showed that only 26 respondents out of 63 eligible participants participated in the study with mean age of 34 years and an average of 2.8 years in residency training. Nearly all participants have used generative AI at one point or the other in their training with just a little lower than 10% reporting weekly use. More than a quarter (30%) used AI on a daily basis. Of all the studied generative AI tools, ChatGPT ranked highest (96.2%) as the most commonly used with DALL-E being the least used (7.7%). Majority of the reasons why oncology residents in Nigeria use AI was for assistance in their studies (>75%) whereas these tools were least employed in clinical decision making. Just a little above three-fifth of the concerns that oncology residents in Nigeria have with the use of generative AI tools is on limited training. Next to this concern are ethical concerns and technical issues in that order. Oncology residents in Nigeria have different perceptions on the use of AI tools. Greater than 95% of them reported enhanced learning experience whereas just under two-fifth of them are of the opinion that AI tools may diminish clinical skills.

A study carried out in Nigeria comprising about 15 tertiary oncology referral centres also majorly highlighted limited technical expertise as a major challenge encountered in the use of Generative AI.[12] This may even be more pronounced in non-tertiary healthcare facilities not represented in our sample. The implication of this is that Nigerian oncologists' optimism on the adoption of AI must be viewed in relation to the technological dependency and need for locally adapted and culturally appropriate generative AI. Our findings also align with other studies expressing ethical and medicolegal concerns regarding health data breaches and autonomy. This is in consonant with an analysis of ethical consideration for AI in African healthcare, emphasizing the universality of this concern despite different context.[13] This raises the question on how patients' privacy can be effectively managed in the use of AI in healthcare. Despite the recognized potential of AI in healthcare, several secondary concerns were highlighted such as over- reliance on these technologies undermining clinical skills and judgement which are essential for decision -making. Our study's findings align with the reports from recent studies, who highlighted the risks of both over-reliance and excessive skepticism toward AI in healthcare.[14] In addition, AI can foster cost-effective healthcare solutions and improve overall patient outcomes. Majority of the participants in this study (84.6%) believe generative AI improves the quality of patient care. This is similar to a study carried out in the UK, where the majority (79%) of the participants believe AI is essential in their clinical practice.[15] Also, similar to related studies in Australia and Asia,[16,17,18] most of the participants believe artificial intelligence can improve health service delivery.

A major limitation of this study is the small sample size as well the poor response rate of the participants. This may affect the generalisability of the findings. Although the study relied on self-reported data which may introduce response bias, it yielded rich insight

into participant's personal experiences that would be difficult to obtain otherwise.

CONCLUSION

Future research should explore the use of generative AI tools among medical doctors practicing in rural non-training settings. This will develop a realistic and comprehensive AI framework that can serve as a model for most African countries guiding their implementation strategies and ensuring the ethical and equitable deployment of AI powered health solutions.

Among the oncology residents surveyed, the use of generative AI was common, suggesting a readiness for its adoption in healthcare delivery. However, limited formal training remains a major barrier to its effective and responsible use.

Declarations

Consent to participate

All consenting participants were enrolled in the study.

Consent for publication

Not applicable. No personal information has been included in this manuscript.

Clinical trial number

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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