

ORIGINAL ARTICLE

EVALUATING ACCESS TO RADIATION ONCOLOGISTS BY NON-ONCOLOGY DOCTORS IN NIGERIA

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ABSTRACT

Background: Radiotherapy plays a pivotal role in the multidisciplinary management of cancer, yet access to Radiation Oncologists (ROs) in low- and middle-income countries, including Nigeria, remains a challenge. While much attention has been paid to infrastructure and equipment deficits, the ease with which non-oncology physicians can access ROs is underexplored.

Objective: The objectives of this study were to evaluate the ease of access to Radiation Oncologists by non-oncology physicians in Nigeria and to identify the key factors - such as prior oncology training, frequency of cancer patient encounters, and years of clinical practice - that influence this access.

Methods: A cross-sectional survey was conducted between January and July 2024 among 1,300 non-oncology doctors across Nigeria. Data were collected using a structured, self-administered questionnaire disseminated both physically and online. The survey assessed ease of access to ROs, frequency of cancer patient encounters, oncology training, and years of clinical experience. Data were analyzed using SPSS v26, with chi-square tests employed to determine associations.

Results: Over one-third (37%) of respondents reported difficulty accessing ROs, while 20% had never attempted to reach one. Doctors who had seen more than 10 cancer patients in the previous month were more likely to access ROs easily ($p < 0.001$). Prior oncology training was significantly associated with improved access; respondents without such training were more than twice as likely to have never contacted an RO. No significant association was found between years of clinical practice and ease of access.

Conclusion: A considerable proportion of non-oncology physicians in Nigeria experience difficulty accessing ROs, particularly those without oncology training or limited exposure to cancer patients. To bridge this gap, oncology education should be integrated into medical curricula and continuous medical education (CME) programs, alongside the development of structured referral pathways to foster multidisciplinary cancer care.

Keywords: Access to radiotherapy, barriers to cancer care in LMICs, global health, Radiotherapy services.

INTRODUCTION

Radiotherapy is a crucial part of comprehensive cancer control, used in the treatment or palliation of over 50% of cancer patients, offering potential for cure, control, and symptom management.¹⁻³ There are three (3) main specialties involved in the practice of radiotherapy. These are Radiation Oncologists (RO), Medical Physicists (MP) and Therapy Radiographers (RTT). The Radiation Oncologists are medical doctors who prescribe each patient's treatment plan. The Medical Physicists take precise measurement of radiation beam characteristics and ensure that treatment planning is properly tailored for the patient. They are also responsible for developing and directing quality control programs for radiation equipment and clinical procedures. The Therapy Radiographers administer the daily radiation dose to the

patient, as prescribed by the RO and planned by the MP.

Access to radiotherapy (RT) is a significant challenge globally, but many studies have documented much worse deficits in low-and middle-income countries (LMICs), including Nigeria, affecting both radiotherapy equipment and human resources.^{4,5} Up to 31% of LMICs still lack Radiotherapy facilities as at 2023.⁵ African countries are even worse off; with 61% of African countries (34/56) having no RT facilities in 1999, improving slightly to 54% (29/52) by 2013 and 52% (28/54) in 2021.⁵ Studies done in Nigeria, also clearly show how the country suffers a significant shortage of healthcare specialists, including in Oncology.^{6,7,8} According to a recent study, Nigeria has about seventy (70) Radiation Oncologists - as at October 2023.⁹ The distribution of Radiation Oncologists across Nigeria is as follows:

Table 1. Distribution of Radiation Oncologists across Nigeria.

State	Number of Radiation Oncologists
Lagos	>15
Federal Capital Territory (FCT), Abuja	11-15
Oyo	6-10
Benue, Borno, Cross River, Edo, Enugu, Ebonyi, Gombe, Kaduna, Kano, Katsina, Ogun, Osun, Ondo, Plateau, Rivers, Sokoto, Zamfara	1-5
Abia, Adamawa, Akwa Ibom, Anambra, Bauchi, Bayelsa, Delta, Ekiti, Imo, Jigawa, Kogi, Kwara, Kebbi, Nasarawa, Niger, Taraba, Yobe	0

Source: Joseph A., et al (2024)⁹

There is no single RO in nearly half (17) of the 36 states of Nigeria, with a national population of over 200 million people. The International Atomic Energy Agency (IAEA) recommends at least 2 ROs per machine and an additional RO for every 200 – 250 new patients diagnosed with cancer.¹⁰ The International Agency for Research in Cancer (IARC)

through the Global Cancer Observatory (GLOBOCAN) estimates that there were over 120,000 new cases in Nigeria.^{11,12} Going by these recommendations vis-à-vis the current statistics of ROs in Nigeria, Nigeria needs at least 510 ROs. The current number of ROs in Nigeria is grossly inadequate.

A research which reviewed Oncologist Density (OD) against cancer survival rates, showed that

cancer patients' median survival in regions with the lowest OD was significantly lower compared to regions with the highest OD (8 vs 11 months, $p < 0.0001$).¹³ The study underscores the importance of oncologist availability and patient survival.

This study evaluates the ease of access to Radiation Oncologists for non-Oncology doctors in Nigeria.

MATERIALS AND METHODS

This survey was conducted between January 10 and July 17, 2024. The participants were medical doctors registered with the Nigerian Medical Association (NMA) and practicing in Nigeria at the time. The study included non-Oncology doctors from various regions of the country, while excluding medical students who were not yet qualified. Doctors were invited to complete a self-administered questionnaire.

The questionnaire was designed in English to meet the study objectives. It consisted of multiple-choice questions across four sections. The first section gathered background information on the respondent's encounter with cancer patients during recent clinical practice. The second section assessed the respondent's knowledge of radiotherapy. The third section collected data on the doctor's socio-demographic characteristics and medical

training. The fourth section explored the respondent's preferences for Continuing Medical Education (CME).

Eligible participants were asked to complete a structured questionnaire. The questionnaire was distributed both physically at various national medical (non-oncology) conferences and online through medical forums using a Google form. Informed consent was obtained from each respondent. The data analysis primarily aimed to present general trends in the knowledge of doctors. All data in this study were analyzed using the statistical software SPSS version 26.

RESULTS

One thousand three hundred (1300) non-Oncology doctors participated in this survey. Of this number, 288 (22%) were female while 1012 (78%) were male. There was a good spread of respondents across geopolitical regions of the country.

The ease of access was ranked on a Likert-scale as follows: Not made attempt to reach (0), Very difficult to reach (1), Somewhat difficult to reach (2), Somewhat easy to reach (3), Very easy to reach (4). The mean ease of access score was 2.15 (SD = 1.479), corresponding to 53.75%.

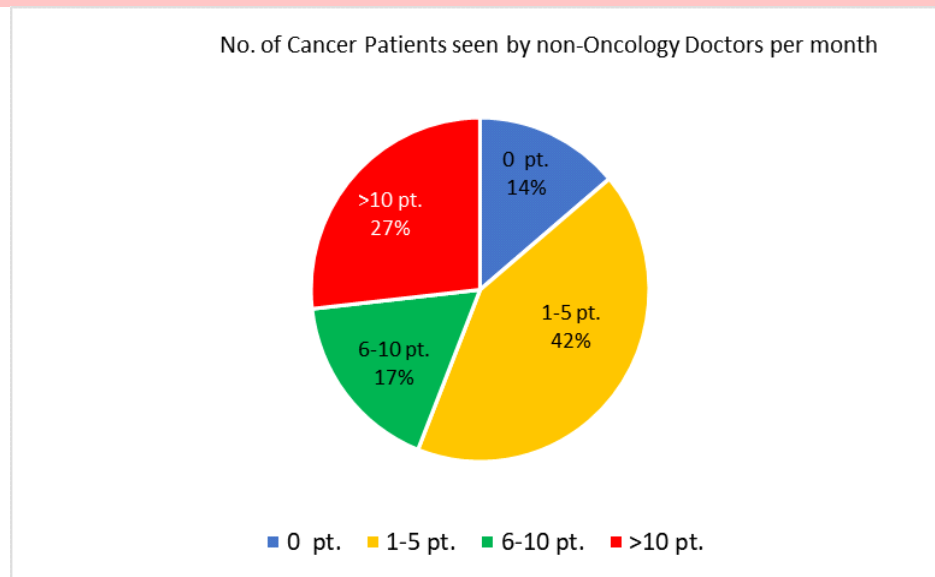


Figure 1. Number of patients with cancer seen by non-Oncology doctors per month

When asked about the number of cancer patients seen for medical consultations in the past month, 14% (n=180) of respondents said they had seen no cancer patients. Of those who had encountered a cancer patient in the previous month of practice, 42% (n=548) saw 1-5 patients, 17% (n=224) saw 6-10 patients, while 27% (n=348) had seen over 10 patients.

Participants were also asked “how often do you participate in the care of your patient with cancer?” This was rated as “Never”, “Rarely”, “Sometimes” and “Often”; and when matched against how many cancer patients each

respondent had seen in the past month, as shown in Fig. 2, only 6% (11 out of 180) of doctors who had seen 0 cancer patients in the past month said they “Often” saw cancer patients; 27% (149 out of 548) of doctors who had seen between 1-5 patients per month were often involved in the management of the patients, 58% (129 out of 224) of doctors who saw between 6-10 patients per month were often involved in the care of their patients and 78% (270 out of 348) of non-Oncology doctors who saw more than 10 cancer patients monthly were often involved in the management of their patients.

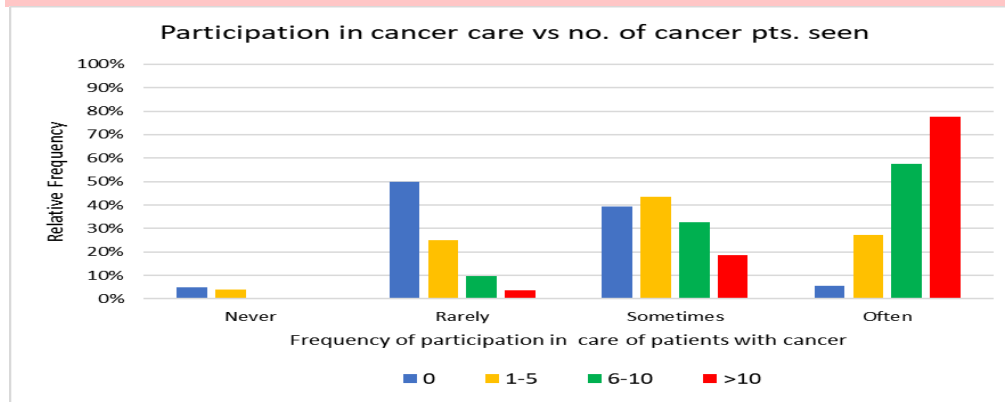


Figure 2. Frequency of participation in cancer care vs Number of cancer patients seen per month.

A chi-square test of independence showed a strong association between the number of patients seen and frequency of participation in cancer care ($p < 0.001$; 95% CI [3.70, 28.56]). This finding suggests that non-Oncology doctors who see more cancer patients each month are more likely to actively participate in their care.

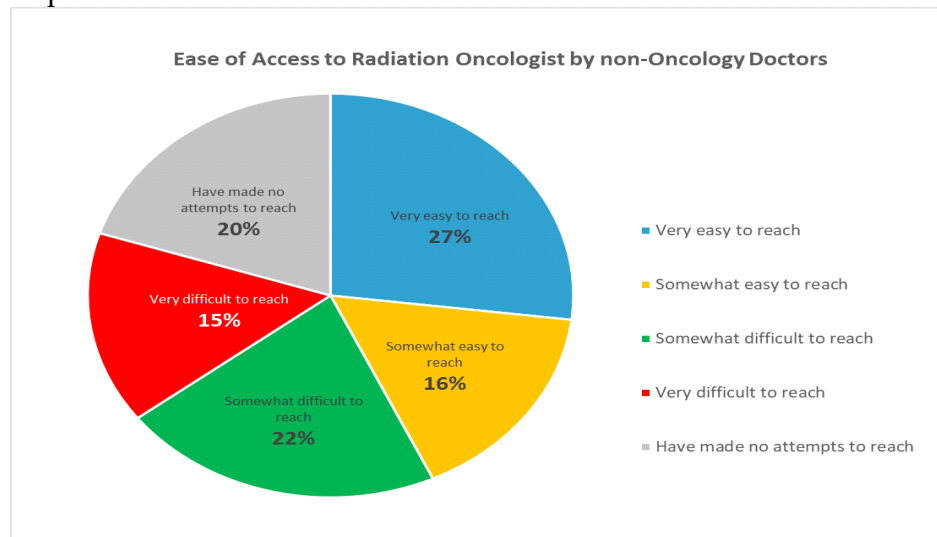


Figure 3. Ease of Access to Radiation Oncologist by non-Oncology Doctors

The chart in Fig. 3 reveals that 20% ($n=254$) of non-oncology doctors said that they made no attempts to reach radiation oncologist. 27% ($n=352$) found it “very easy”, 16% ($n=211$) found it “somewhat easy”, 22% ($n=283$) found it “difficult to reach”, 15% ($n=200$) said they found it “very difficult to reach an RO”.

Cumulatively, over one-third (37%) had some difficulty in accessing an RO, a notable 20% had not even attempted to contact an RO, and a total of 43% had some sort of ease in accessing ROs.

The ease of access to a Radiation Oncologist by the non-Oncology doctor was thereafter reviewed against the number of cancer patients

seen per month in his/her practice, number of years of clinical practice and prior Oncology training.

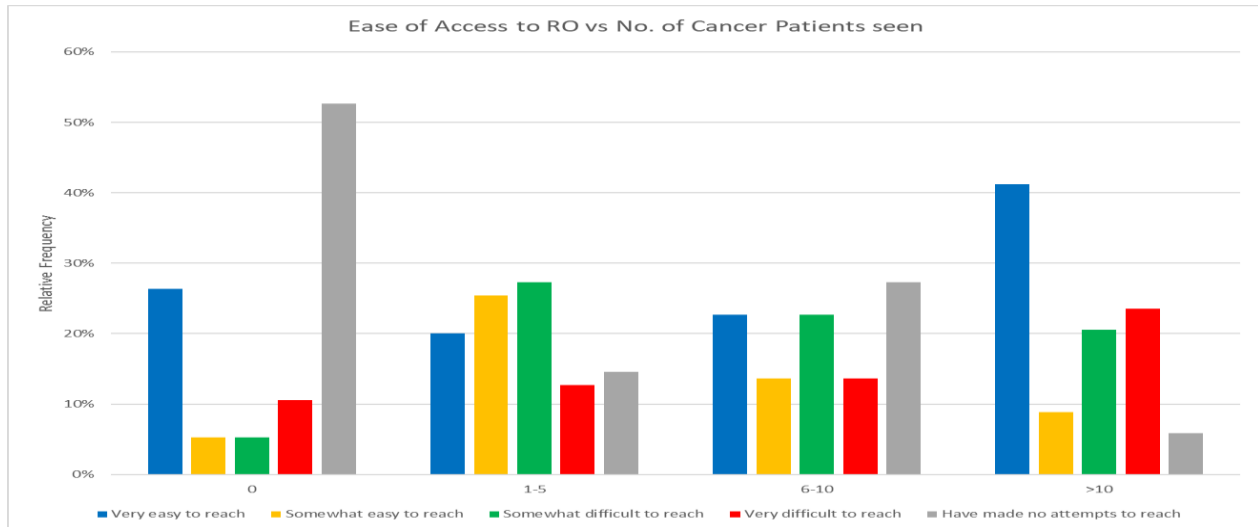


Figure 4. Ease of Access to RO vs No. of Cancer Patients seen per month

The ease of access to a RO was compared with the number of patients with cancer a doctor saw in the previous month, as shown in Figure 4. From the figure, it is clearly seen that doctors who saw more than 10 cancer patients per month had the highest ease of accessing a Radiation Oncologist at 50% (41.18% - very easy; 8.82% - somewhat easy). They also had a 44.1% difficulty in accessing an RO (23.53% - very difficult, 20.59% - somewhat difficult). 5.9% of them had made no attempt to reach an RO.

Difficulty to access an RO increased with fewer cancer patients seen per month with

36.4% difficulty (13.64%, 22.73%) for 6-10 patients, and 40.0% difficulty (12.73%, 27.27%) for 1-5 patients. 52.6% of doctors who had seen no cancer patient in the past month had never made an attempt to contact an RO, compared to 14.6% (1-5 pts.), 27.3% (6-10 pts.) and 5.9% (10+ pts.).

When analyzed with chi-square test, it showed there was a statistically significant association ($p < 0.001$; 95% CI [0.230, 0.402]) between the ease of access to Radiation Oncologists and the number of cancer patients seen monthly.

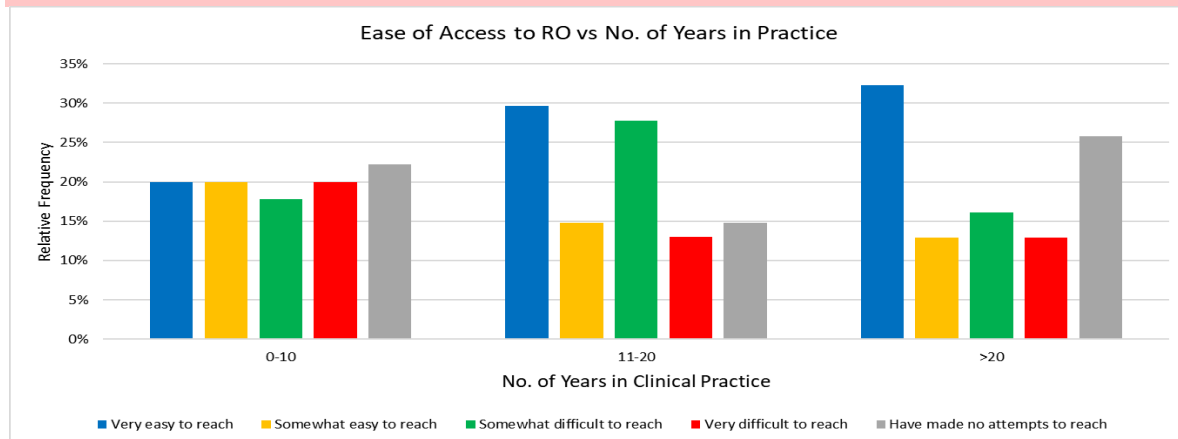


Figure 5. Ease of Access to RO vs Number of Years in Clinical Practice

The ease of access to a RO was compared with the number of years in clinical practice by the medical doctor, as shown in Figure 5. This comparison aimed to assess the relationship between years of practice and ease of access to ROs. The respondents were made of 35% early-career doctors (0-10 years), 42% mid-career doctors (11-20 years) and 24% late-career doctors (>20 years). The median number of years in practice was 14 years with the median year of graduation from Medical School being 2010.

The chart in Fig. 5 reveals that for doctors with over 20 years in clinical practice, 32% found it very easy to reach an RO and about 26% made no attempts to reach an RO. However, when combining “very easy” and “somewhat easy” to reach, there was little difference between the groups [(45%, >20 years), (45%, 11-20 years), (40%, 0-10 years)].

A Chi-Square test performed showed that there is no statistically significant association between the number of years a doctor has been

in practice and their perceived ease of accessing Radiation Oncologists.

Ease of Access to RO vs Prior Oncology Training

Upon asking the respondents, “did you receive any form of training (e.g., lectures, mentorship, training) in Oncology care?” it was found out that 75% of non-Oncology Doctors had received training of some form in Oncology care during their medical training. Among those with some form of training, it ranged from mentorship, observership, lectures and online training courses. It ranged from a few hours of training to weeks of training.

85% of respondents had less than 12 weeks of training of any sort in Oncology. The median number of weeks of Oncology training received by the doctor was 3.5 weeks.

The ease of access to a Radiation Oncologist, depending on whether the non-Oncology Doctor has previously received oncology training of any sort, is stated in Table 2.

Table 2. Ease of Access to RO vs Training of any form in Oncology care

Medical Training	Relative Frequency					
	Very easy to reach	Somewhat easy to reach	Somewhat difficult to reach	Very difficult to reach	Have made no attempts to reach	Total
No	15%	9%	24%	19%	33%	100%
Yes	31%	19%	21%	14%	15%	100%

DISCUSSION

This study reveals that more than one-third (37%) of non-Oncology doctors in Nigeria face considerable challenges in accessing Radiation Oncologists (ROs), a gap that may hinder timely and optimal cancer care. The findings illuminate a complex interplay of factors that influence this access, with exposure to cancer cases and prior oncology-specific training emerging as significant determinants.

Non-Oncology doctors with regular exposure to cancer patients reported a greater ease of access to ROs. This suggests that familiarity with oncology cases may facilitate awareness of referral pathways, enhance professional networks, and promote interdisciplinary collaboration.

Conversely, those with limited exposure to cancer patients reported more difficulty in accessing ROs - likely due to a lack of established communication channels and inadequate understanding of oncology referral systems. These findings reinforce the need to deliberately integrate oncology into general medical training and practice, particularly at the primary and secondary care levels, to promote early detection, timely referral, and effective co-management of cancer patients.

Interestingly, the length of clinical experience, as measured by years in practice, was not significantly associated with ease of access to ROs. This indicates that practical exposure and targeted oncology training are more influential than seniority or clinical tenure in facilitating inter-specialist engagement.

One of the most salient findings of this study is the significant association between prior oncology training and improved access to ROs. Non-oncology doctors who had received any form of oncology training - whether through lectures, mentorship, or observerships - were markedly more likely to report ease of access. In contrast, those without such training were more than twice as likely to have "never attempted" to contact an RO. This highlights an urgent need to embed oncology education within undergraduate curricula, internship orientation programs, and continuing medical education (CME) initiatives across all levels of healthcare delivery.

To the best of our knowledge, this is the first study in Nigeria - and possibly sub-Saharan Africa - that specifically explores non-Oncology doctors' access to Radiation Oncologists. The lack of directly comparable literature limited the possibility of contextual benchmarking; however, the findings echo broader regional studies that have documented limited interdisciplinary collaboration and

referral delays in cancer care pathways across African healthcare systems. For example, prior studies have reported significant gaps in cancer diagnosis, referral, and management, often attributed to insufficient training, resource constraints, and systemic fragmentation of care.^{14,15} These systemic barriers likely compound the access challenges reported in this study and further justify the need for policy-level interventions to improve multidisciplinary cancer care integration in Nigeria.

Overall, the study underscores the necessity for improved structural linkages between non-Oncology doctors and oncology specialists, alongside robust education, mentorship, and capacity-building programs aimed at reducing referral gaps. As Nigeria continues to scale up cancer care infrastructure, addressing the human and communication components of access - particularly between non-Oncology doctors and ROs - will be critical to delivering equitable and timely oncologic care.

CONCLUSION

This study provides valuable insight into the accessibility of Radiation Oncologists (ROs) by non-Oncology doctors in Nigeria, revealing that a significant proportion of non-Oncology doctors experience difficulty initiating contact with ROs - particularly those without prior oncology exposure or training. The findings underscore the importance of integrating oncology education into both undergraduate and postgraduate medical training, as well as embedding interdisciplinary collaboration into routine clinical workflows.

Given the growing cancer burden in Nigeria and the critical role that early detection and timely referral play in patient outcomes, strengthening professional linkages between

non-Oncology doctors and oncology specialists must be a national priority. Policy efforts should focus on structured oncology mentorship programs, continuing professional development opportunities, and the establishment of clear referral protocols to support collaborative cancer care.

Further research is warranted to explore the institutional and systemic barriers that may compound access limitations, and to assess whether similar patterns exist in other regions or among other medical specialties. Addressing these gaps will be vital to advancing Nigeria's progress toward comprehensive, equitable, and multidisciplinary cancer care.

RECOMMENDATIONS

1. **Integrate Oncology into General Medical Training:** Medical schools and residency programs in Nigeria should incorporate structured oncology modules - particularly focused on radiation oncology - into undergraduate and postgraduate curricula to increase awareness and build capacity for appropriate referrals.
2. **Strengthen Continuing Medical Education (CME):** Regulatory and professional bodies should mandate oncology-focused CME programs for non-oncology doctors (even if they are Specialists in other areas of medicine), with specific emphasis on the referral process, interdisciplinary communication, and the role of Radiation Oncologists.
3. **Develop Clear Referral Pathways and Guidelines:** Health institutions should establish standardized and widely disseminated referral protocols that facilitate timely and efficient

communication between non-Oncology doctors and Radiation Oncologists.

4. **Promote Interdisciplinary Collaboration:** Hospitals and healthcare systems should create opportunities for joint case reviews, tumor boards, and mentorship programs that foster routine engagement between non-Oncology doctors and oncology teams.
5. **Expand Access to Oncology Services at Regional Levels:** Policymakers should ensure equitable distribution of Radiation Oncology services across Nigeria by investing in human resource development, infrastructure, and specialist deployment, especially in underserved regions.

LIMITATIONS

1. **Self-Reported Data:** The study relied on self-reported perceptions from participants, which may be subject to recall bias or social desirability bias. Some respondents may have under- or over-estimated their level of access or training.
2. **Limited Geographic Representation:** Although efforts were made to reach doctors across Nigeria, some regions may have been underrepresented, which could affect the generalizability of the findings to the entire country.
3. **Cross-Sectional Design:** The study design captures responses at a single point in time and does not account for dynamic changes in access or referral behavior over time.
4. **Lack of Comparative Literature:** The paucity of similar studies limited the ability to conduct robust cross-national comparisons or to benchmark findings against established metrics of oncology access.
5. **Exclusion of Other Oncologic Disciplines:** While focused on Radiation Oncologists, the study did not explore access to other

oncology sub-specialists (e.g., medical or surgical oncologists), which may provide a more holistic picture of interdisciplinary cancer care challenges.

6. **Exclusion of Details on Respondents' Centres of Practice:** Because the respondents were not asked their Hospitals of Practice, details about availability of Radiotherapy Facilities in their Centres, or proximity to Radiotherapy Centres, were not obtained. This could create a bias, influencing ease of access to Radiation Oncologists.

DECLARATIONS

Ethics approval and consent to participate

This study was carried out in accordance with the World Health Assembly's Declaration of Helsinki. All participants were duly informed about the study and informed of their rights to withdraw participation at any point. They all provided written consent prior to participation, and measures were taken to protect participant confidentiality, including anonymizing data. No identifiable information was disclosed in the study results.

Supplementary Materials: The Research Questionnaire is attached at submission as Appendix A.

Consent for Publication

All the Participants were duly informed in the Consent Form that the findings would be Published and consented to this by Signing to indicate their approval.

Competing Interests:

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as potential conflicts of interest.

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Authors' Contributions:

All authors made significant contributions to the study and have approved the final version of the manuscript.

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