





Challenges and Recommendations for Improving Cancer Research and Practice in Nigeria: A Qualitative Study With Multi-Stakeholders in Oncology Research and Practice

Cancer Control
Volume 31: 1–10
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DOI: 10.1177/10732748241298331
journals.sagepub.com/home/ccx



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Abstract

Background: Cancers, with increasing incidence and mortality rates, constitute a leading public health problem in Nigeria. As the burden of cancer in Nigeria increases, research and quality service delivery remain critical strategies for improved cancer control across the continuum of care. This study contextualizes the challenges and gaps in oncology research and practice in Nigeria, and presents recommendations to address the gaps.

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Data Availability Statement included at the end of the article



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Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

Methods: This qualitative study was conducted among interprofessional and interdisciplinary stakeholders in oncology healthcare practice and research in academic settings, between July and September 2021. Key-informant interviews were held with six stakeholders and leaders in nursing, pharmacy, and medicine across the six geopolitical zones of Nigeria, and twenty-four in-depth interviews with early- or mid-career researchers or healthcare professionals involved in cancer prevention and treatment were conducted. The data were analyzed using a deductive thematic analysis approach and coded using the NVIVO 12 software.

Results: Five sub-themes were identified as major challenges to oncology research, including poor funding, excessive workload, interprofessional rivalry, weak collaboration, and denial of cancer diagnosis by patients. Challenges identified for oncology practice were poor governance and financing, high costs of oncology treatments, poor public awareness of cancer, workforce shortage, and interprofessional conflicts. Recommended strategies for addressing these challenges were improved financing of oncology research and practice by government and relevant stakeholders, increasing interest of medical, nursing, and pharmaceutical students in oncology research through curricula-based approach and mentorship, increased oncology workforce, and improved intra- and inter-professional collaboration.

Conclusion: These data highlight the challenges and barriers in oncology practice and research in Nigeria, and underscore the urgent need for increased investments in infrastructure to provide interdisciplinary and interprofessional research training for high-quality care. Only then can Nigeria effectively tackle the current and impending cancer burden in the country.

Keywords

cancer, health systems, cancer service delivery, cancer research, healthcare workforce

Received January 24, 2024. Received revised September 16, 2024. Accepted for publication October 21, 2024.

Introduction

As lifespans increase and the fatality due to infectious diseases continues to fall, Africa faces a new burgeoning health problem – Cancer.¹ From 2020 to 2040, cancer cases in Africa are expected to nearly double from 1.1 million to 2.1 million and cancer deaths are expected to increase from 711,429 to 1.4 million.² There is paucity of data on carcinogenesis in African countries, making it challenging to plan effective cancer control programs.³ The increasing incidence and mortality have been attributed to an increasingly westernized lifestyle.³ Other major contributory factors are poor health literacy in the general population, low clinician-to-population density, and weak government action.² Cancer patients in Africa often suffer from delayed diagnoses because of weak health systems that are poorly equipped to diagnose and treat cancer effectively.²

Cancers constitute a leading public health problem in Nigeria.^{4,5,6} In 2020, breast, prostate, and cervical cancers represented 18.1%, 10.8%, and 10.1%, respectively of all cancer-related deaths.⁴ In Nigeria, the chance of dying from cancer in 2020, before the age of 75 for men was 7.9%, and that for women was 8.5%.⁴ In Nigeria, late-stage diagnoses account for 98% of cases, making treatment increasingly difficult.^{7,8} Compared with high-income countries (HICs), the relatively higher presentation rate of advanced-stage cancer coupled with the limited surgery and radiotherapy options contribute to high cancer mortality rates and increase the burden of the disease on patients.^{7,8,9} Additionally, government policies for handling non-communicable diseases are weak, poorly funded, and implemented.¹⁰ In a review of

43 countries in Africa, it was found that only 37.2% had a cancer plan and 65.1% had a cancer registry.²

As the burden of cancer in Africa and Nigeria increases, research remains a critical strategy to guide prevention and treatment efforts. However, people of African ancestry, particularly those residing in Africa, are underrepresented in research globally,¹¹ and research findings from international studies may not always be as relevant when applied elsewhere.^{12,13} Although a systematic review of oncology research in Nigeria has shown a 63% growth in research publications from 1990 to 2019, the two researchers that dominated the field were both based in HICs.¹⁴ This is congruent with a global survey that found that those from HICs were more likely to publish, while oncologists from low- and middle- income countries (LMICs) cited overwhelming workload, lack of research opportunities and funding as barriers.¹⁵

Compared to other global and WHO regions, Africa has the lowest physician, nurse, and radiotherapy units.² Delivering high-quality cancer services continues to be a challenge in LMICs.⁵ The lack of essential health system capacity, inefficient governance, and financial barriers hinder the centralization of available resources for cancer treatment and prevention in LMICs.^{5,6,8,9,16-18} Apart from the above-mentioned challenges, a majority of the population in Nigeria has limited access to systemic therapy due to inadequate infrastructure, a shortage of skilled oncology workforce, combined with high treatment costs.¹⁷⁻²⁰ Furthermore, poor public knowledge and awareness, which leads to delayed detection and diagnosis, is a persistent challenge to oncology practice in Nigeria.^{5,21-24}

Research studies have been conducted in Nigeria to document the challenges associated with oncology research and service delivery in Nigeria.^{12,25-29} This study, however, builds on the existing knowledge by providing an in-depth, qualitative, multi-stakeholder perspective on gaps in oncology research and practice. This study, therefore, contextualizes the challenges and gaps in oncology research and practice in Nigeria and proffers recommendations to address and mitigate the gaps.

Methods

Study Design and Setting

This descriptive, qualitative research is nested within a larger convergent parallel mixed methods study. Qualitative research is a “method of scientific inquiry that unveils the “what,” “why,” “when,” “where,” “who,” and “how” behind social behaviors and interactions, rather than merely quantifying occurrences”.³⁰ This research is appropriate for this study since the focus was on providing a rich in-depth perspective on gaps in oncology research and practice in Nigeria. The study was conducted between July and September 2021 and assessed the status of training and preparedness for oncology practice and research among healthcare professionals in all six geopolitical regions of Nigeria. For the primary study, 317 respondents completed an online questionnaire while key-informant interviews were held with six leaders in nursing, pharmacy, and medicine, and twenty-four in-depth interviews with early- or mid-career researchers. Findings of the qualitative component are reported in this article and details on participant recruitment, data collection, and analysis have been described in a published article.²⁷

Participant Recruitment

Participants for the qualitative data were purposefully selected and recruited across the six geopolitical zones of Nigeria. The participants comprise healthcare professionals -- medical doctors, nurses, and pharmacists involved in oncology research and/or service delivery. The study participants were identified primarily in two ways. First, members of the research team appointed six coordinators (one per geopolitical zone) to recruit professionals from their geopolitical zone. Second, some participants were identified through existing national databases of oncology researchers obtained from professional oncology associations. Head of academic, clinical departments or professional associations were identified as leaders.

Data Collection

Interview guides were developed after a review of the literature and had closed and open-ended questions on status, barriers, and challenges in oncology training, research, and

practice, and recommendations to address the gaps. Additional probes were used to elicit more details based on the responses of the interviewees. The interview guides ([Additional file 1](#)) were used to conduct six key informant interviews with leaders in these professions and twenty-four in-depth interviews with early- or mid-career pharmacists, nurses, and doctors (pediatric oncology, oncology, obstetrics, and gynecology, radiation oncology). Trained interviewers with academic backgrounds in public health and nursing conducted the interviews between May and July 2021 either by telephone or face-to-face using the English language. On average, the interviews took 25-40 minutes to complete. The interviews were conducted until data saturation was achieved.

Data Analysis

All interviews were voice recorded and transcribed verbatim to Word files. The data were analyzed using a deductive thematic analysis approach and coded using NVIVO 12 software. Deductive thematic analysis emphasizes “the analytic lens that a researcher brings to the data including the researchers’ knowledge in the field, theoretical model, research question, and predetermined theoretical constructs”.³¹ For this method, a researcher will develop initial codes from the literature to apply to the data and the subsequent line-by-line coding process may result in new additional codes.³²

For this study, the approach started with a predefined set of codes developed in line with the research questions and data from the literature. The codebook was jointly developed and refined by the research team, and it covered the health workforce, service delivery, research, governance and financing

The codebook was used to code the transcripts. Related themes were grouped and some identified sub-themes were pooled together. A pre-reporting meeting was held to scrutinize the themes and sub-themes to ascertain their contextual agreements with the research questions. The coded data was cross-checked to identify wrongly assigned codes; non-conforming codes were expunged and redefined appropriately. Two researchers independently check coded 10% of the transcripts (N = 3) and the inter-coder reliability for each code ranged between 85% to 100% which was sufficient.³³ Final approved themes were finally used to summarize the study findings and reporting in line with the Consolidated criteria for reporting qualitative research (COREQ).³⁴

Ethical approval for the conduct of the study was granted by the University of Ibadan/University College Hospital Ethics Committee, Ibadan, Nigeria (UI/EC/21/0114). The approval period spanned a one-year period: 21st May, 2021 to 20th May, 2022. The study was conducted based on ethical guidelines and written informed consent was obtained from all the interviewees after information was provided on the objectives and nature of the study.

Results

Socio-Demographic Characteristics of the Participants

Thirty oncology researchers and/or clinicians from the six geopolitical zones in Nigeria were interviewed. This comprised 24 in-depth interviews (four in each of the six geopolitical zones, with 12 nurses, six doctors, and six pharmacists) and six key informant interviews (one leader in nursing, medicine, or pharmacy in each of the six geopolitical zones). Almost two-thirds (60%) were female, and almost half of the participants, 46.7% (n = 14) were nurses. Over two-fifths, 43.3% (n = 13) were in the 35 to 39 years age range and 33.3% (n = 10) were within one to five years post highest qualification. Over one-third (36.6%) had spent 0-5 years in oncology practice; 30% between 6-10 years, 26.6% between 11-20 years, and 3.3% had over 20 years (Table 1).

Challenges and Gaps in Cancer Research

This theme refers to the participants' views on the current status of oncology research in Nigeria, with particular emphasis on the necessary skills for and barriers to conducting research. It encompasses four prominent sub-themes that will be subsequently discussed: poor funding, workload, inter-professional rivalry and weak collaboration and denial by patients.

Poor Funding

This was the most prominent sub-theme. Participants expressed that financial constraint was a major barrier at every level; grants were rare, and few had the funds to bear the costs themselves. At tertiary education and hospital entities, participants also mentioned that the equipment available are obsolete compared with the rest of the world and are often faulty due to the cost of maintenance. This notion is particularly well-reflected in the quote from a key informant in North Central Nigeria who delved into the limitations of having to fund research out of pocket in the following quote *"If you look at it currently in Nigeria, even if you've developed the best science model for research or anything, where do you get funding to be able to design and be able to answer your research questions? So, most of the people who are trying to gather data and do research in oncology in Nigeria, they are doing it ah... out of pocket and out of pocket is sooo limited. So, that is the major challenge I see in Nigeria."* (KII_Male Doctor_NC). Similar views were expressed by a female doctor in South East Nigeria *"I'm conducting research on patients' reported outcomes... to chemotherapy and radiotherapy, and I've not even been able to get so much, why? Because these patients I'm following up with, the treatment keeps being broken [truncated] because of machine breakdown"* (IDI_Female Doct_SE)

Table 1. Socio-Demographics Characteristics of Participants (N = 30).

Demographics	Frequency	%
Sex		
Male	12	40.0
Female	18	60.0
Age (in years)		
30-34	3	10.0
35-39	13	43.3
40-44	4	13.3
45-49	4	13.3
50-54	3	10.0
55-59	0	0.0
60-64	2	6.6
65-69	1	3.3
Specialization		
Gynae oncology	2	6.6
Surgical oncology	1	3.3
Radiation oncology	3	10.0
Hematology	1	3.3
Oncology pharmacy	5	16.6
Oncology nursing	11	36.6
Clinical oncology	1	3.3
Natural product chemistry	1	3.3
Oncology research	1	3.3
Drug formulation technology	1	3.3
Clinical pharmacy	1	3.3
General nursing	1	3.3
Maternal & child health nursing	1	3.3
Total number of years post- highest qualification		
<1yr	4	13.3
1-5	10	33.3
6-10	8	26.7
11-20	7	23.3
20 & above	1	3.3
Total number of years in oncology practice		
<1-5	12	36.6
6-10	9	30.0
11-20	8	26.6
20 & above	1	3.3

Excessive Workload

The workload was another prevalent issue that arose in the interviews, particularly among nurses. Participants highlighted a dearth of skilled oncologists and treatment centers, leading to oncology healthcare workers having an increasingly higher patient load. Many discussed that, as a result, they are burnt out and do not have time to do research when they have large numbers of patients to attend to. This is expressed in a quote from a Female Nurse in South East Nigeria who said, *"When there is no time, the interest will not be there and when the workload is much, by the time you are done, there will be burnout. So you will not be interested in doing any other thing asides from your primary job. But when you have more time,*

you can think of other things [i.e. research].” (IDI_Female Nurse_SE) This sentiment was similarly echoed by another nurse, a key informant in North East Nigeria who said, *“it’s [not] like we don’t have the interest, it’s because of the workload that is too much on most of us that we don’t even venture into research.... When we want to do it, the time will not even be there for us to start it [research].” (KII_Female Nurse_NE)*

Denial of cancer diagnosis. Participants also cited denial of cancer diagnosis as a deterrent to patient recruitment for studies. It was frequently mentioned that the patients they try to recruit are often in denial about their condition due to spiritual beliefs, and they prefer attempting traditional healing methods. One Female Nurse in South West Nigeria disclosed that *“when you want to recruit patients for oncology research... for patients that have been diagnosed with it, you see them constantly rejecting and denying that such a thing [cancer] is not in their body” (IDI_Female Nurse_SW)*. Additionally, many attribute this occurrence to an underestimation of the cancer burden in Nigeria and the need for the government to support more research. One female Pharmacist from North Central Nigeria remarked that *“the government ...may have a poor attitude towards oncology because not a lot of people are telling the government,.. Because if you don’t see any figures, any statistics, you may not believe that a lot of patients actually have cancer.” (IDI_Female Pharm_NC)*.

Interprofessional rivalry and weak collaboration. This was another challenge for many participants. They revealed that inter-professional conflict and rivalry often hindered research progression, due to different professional groups - nurses, pharmacists, and doctors - not wanting to share information or ideas, and even those within the same professions being unwilling to collaborate due to wanting more credit and acclaim for themselves. This was explicitly expressed by a female nurse from South East Nigeria who stated that *“the various experts in other fields such as nurses, physicians, etc. don’t collaborate with each other but prefer standing on their own with the ideas of them being more qualified than others in other fields.” (KII_Female Nurse_SE)*. Another Key informant, a male doctor from South-South Nigeria also conveyed a similar opinion noting that *“there’s no inter-professional trust as well as intra profession trust...And it makes it [oncology research] slower, more difficult, frustrating” (KII_Male Doct_SS)*

Challenges in Oncology Practice

This theme refers to challenges in oncology practice or service delivery in Nigeria. It contains four sub-themes: poor governance and financing for oncology practice, high costs of oncology treatments, poor public awareness of cancer, manpower shortage, and interprofessional conflicts.

Poor Governance and Funding

Majority of participants listed poor governance and inadequate funding as the most severe problems with cancer practice in Nigeria. The government does not attach enough importance to oncology practice due to poor awareness of the cancer burden. There are a few centers designated for oncology care. Most of the equipment in these centers are of low quality resulting in the inability to provide the necessary care and even worsening the conditions of patients. Some participants illustrated these problems based on their experience: *“In fact in the whole southeast, our center is the only one that is offering radiotherapy treatment” (IDI_Female Doct_SE)* and *“We don’t have enough centers. Even the centers that are available all don’t have the equipment or enough equipment” (KII_Male Doct_SS)*.

High costs of oncology treatments. Another factor that hinders patients’ access to oncology care is the high costs compared to the financial status of Nigerian households. Cancer patients may not access care due to financial challenges, even if they hope to receive oncology care. Many cancer patients who receive treatment are unable to pay for further care. One participant described the financial difficulties faced by cancer patients: *“The national health insurance is not covering most of the oncology drugs so they [patients] pay out of pocket; some of them will not have money even if you diagnose them early, sometimes to even get money for surgery will be an issue and later when they come back, it is too late” (IDI_Female Doct_NC)*. A participant highlighted how pharmacists in one teaching hospital tried to minimize patients’ costs by reconstituting drugs: *“For instance, cyclophosphamide comes as 500 mg. If we have a cancer patient that is a child and he needs just 300 mg, they pick just that 300 mg for that patient and then sell the remaining 200 mg to another patient who needs that same drug” (IDI_Female Pharm_NC)*. However, the financial challenges remain an obstacle to cancer care all over the country.

Poor public awareness of cancer. Several participants expressed that most cancer patients present in the hospital relatively late due to low public knowledge of cancer. Treatment challenges are brought on by the public’s lack of health education. This statement is expressed by a participant: *“health education and the campaign are lacking” (...)* *“they hide everything by the time they are presenting to you here it is in the full stage of cancer” (IDI_Female Nurse_SS)*.

Manpower shortage and interprofessional conflicts. Majority of participants illustrated that a shortage of skilled oncology workforce constitutes one of the main challenges of oncology practice. According to the participants, the oncologists-patients ratio was very low. A participant expressed his views: *“the large population of patients is overwhelming us” (IDI_Male Pharm_SE)*. Oncology centers cannot provide

adequate oncology training for the health workforce due to facility and management issues. Misdiagnosis and mismanagement of cancer patients can happen when the oncology workforce does not receive systematic practical training. In addition, a large proportion of participants mentioned a lack of interprofessional collaboration, which hinders the holistic treatment for the patients, as expressed by a key informant: *“There is no collaboration between the doctors, nurses, and pharmacists. But maybe they have been collaborating among themselves on their own. But they haven’t been involving others”* (KII_Female Pharm_NW).

Recommendations to Improve Oncology Research and Practice

This theme refers to the participants’ recommendations for improving oncology practice, and how to achieve progress in research for the next generation.

Improved financing of oncology research and practice. Increased funding was the most-prevalent recommendation for improving oncology research. Participants believed more funding, especially from the Government, for grants and updating and expanding current insufficient infrastructure would lead to an increase in the quantity and quality of research. This was expressed by a nurse from North West Nigeria who said, *“The government should put finances for oncology research because when there is finance, it will encourage people to go into research”* (IDI_Female Nurse_NW). Another participant, a key informant from South-South Nigeria, also noted other possible effects of funding - increased exposure to research. *“If you’re trained, and you have funding, you will be motivated to do more, and people who are now being trained, who work under you will get the right kind of exposure.”* (KII_Male Doct_SS)

With regards to oncology practice, majority of participants recommended providing funds to procure well-functioning machines to guarantee the diagnosis and treatment process. Participants also advocated for the provision of PPE (Personal Protective Equipment), standard wards, and clean water to improve the working environment for the oncology workforce. In addition, several participants recommended the government offer subsidies for cancer patients so that they can afford medications and therapies. As a participant expressed: *“For the practice, equipment for diagnosis, radiotherapy equipment; more equipment for radiotherapy, they need to be provided. Then also drugs for cancer be made available to patients, and apart from being available, they should also be affordable to the patient, even if it means the government subsidizing for the patient because the drugs are usually very expensive”* (IDI_Male Pharm_NW)

Increasing interest in oncology research and practice. Many participants proposed that research training, especially data

analysis, needs to be emphasized earlier, when healthcare professionals are still students or just beginning to practice, through both the curriculum and mentorship approach to foster interest in research. A doctor from North West Nigeria reflected this opinion, arguing that *“It should be both formal and informal. Formal in the sense that the curriculum should be adjusted right from the undergraduate level, people should be made to know the importance of data documentation, and they would get knowledge that research is part of the practice and up to the postgraduate level... Informal in the sense that in day-to-day practice, senior practitioners should incorporate and teach the habit of research to the younger ones”* (IDI_Male Doct_NW). A doctor from South East Nigeria similarly emphasized the importance of teaching research, saying that *“A lot of mentoring has to be done...being more involved, being willing to teach, being willing to know, teach these upcoming ones what you know... if they are more involved in the teaching, in having more seminars...being more involved in the teaching I would say it will actually go a long way, yeah”* (IDI_Female Doct_SE)

Several participants suggested raising medical students’ awareness and interest in oncology study, which will encourage them to pursue careers in the oncology field. In addition, it was suggested that oncologists should educate the public about the importance of cancer prevention and early detection. The majority of participants favored more hands-on, practical training over theoretical instruction in the classroom.

Improved Intra and Inter-professional Collaboration

Additionally, as lack of collaboration was mentioned as a problem, participants suggested that as practicing healthcare professionals, multi-disciplinary meetings should be promoted. A key informant pharmacist from South West Nigeria declared *“the optimal way to build the oncology research... for every research that we want to do, we must be able to have a team and collaboration with other professionals where medical doctors will be there, pharmacists too will be there, nurses will be there, dietitian, lab scientists, pathologists and surgeons for us to be able to come together and share ideas that is number one”* (KII_Male Pharm_SW). Similar views were expressed by a key informant *“We have to all come together, then look at it from different disciplinary perspective”* (KII_Male Doct_NC).

Participants also repeatedly recommended collaborating with foreign researchers. A key informant nurse from South East Nigeria reiterated this position saying that *“collaborating with experts and professionals from other countries who have the appropriate equipment would prove optimal therefore, many trainees should be sent to these countries where facilities are not lacking and partake in research with experts there as this would give them access to equipment they would not have had access to ordinarily”* (KII_Female Nurse_SE)

Discussion

This study identified challenges to oncology research and practice in Nigeria. These include poor governance and financing for oncology research and practice, and health systems challenges including poor public awareness of cancer, an inadequate workforce, high costs of oncology treatments, weak collaboration, and interprofessional rivalry and conflicts. Recommended strategies to mitigate the gaps were proffered.

Challenges and Recommended Strategies to Improve Oncology Research

Our findings indicate that poor funding, an overwhelming workload, and lack of public awareness and poor inter-professional collaboration are some of the major challenges to conducting oncology research in Nigeria. This is consistent with other studies on the state of oncology research in Nigeria and other African countries.^{14,15,18,26,35} Regarding funding, participants noted that they often had to pay out of pocket to do research, and the equipment available was usually faulty. These challenges were also documented in Ethiopia and other African countries; highlighting that at the current rate of growth of demand for oncology research, the deficit gap in these resources is still widening,³⁶ emphasizing an increasing need for intervention. In response, some participants recommended more government funding and collaboration with researchers in other countries with better facilities. Studies on Africa as a case study have shown that if these recommendations are enacted, they have the potential to help overcome these setbacks.³⁷

Additionally, our study revealed that current oncology healthcare workers are overwhelmed by the number of patients they must attend to. This hinders their interest and initiative to do research. This issue is not just unique to Nigeria; studies have shown that many low-income countries are understaffed,^{38,39} and that this is further exacerbated by the healthcare workforce emigrating to countries with better working conditions.^{38,40} This highlights the urgent need for increased efforts in recruiting and training qualified medical personnel. Also pertinent are interventions to retain them by providing more opportunities for career advancements.⁴⁰ The interview responses also cited a lack of interprofessional collaboration as a barrier to research. This sentiment is supported by multiple studies that emphasize the importance of collaboration to improve cancer research and treatment outcomes.⁴¹⁻⁴³ This result indicates that more work needs to be done on the current relationships between physicians, pharmacists, and nurses and how to mitigate communication breakdowns.

Participants also highlighted that it is difficult to obtain patient participation, government investments, and potential researchers due to lack of public awareness of cancer and denial of cancer diagnosis by patients. This issue has also been documented in other LMICs like India.^{44,45} With the late-stage

presentation patterns that oncologists in Nigeria deal with at a disproportionate level compared to the rest of the world^{7,8}, raising public awareness and getting patients screened earlier could have a large impact on the outcomes of the disease and increase the scope of research.⁴⁵

Challenges and Recommended Strategies to Improve Oncology Practice

Findings from our qualitative study revealed that low public awareness, poor governance, inadequate funding, shortage of manpower, limited access to therapies and poor health insurance coverage hinder oncology practice in Nigeria. An insufficient number of oncology centers, inadequate facilities, and a lack of well-functioning equipment were also identified as barriers. Studies in developing countries and LMICs also highlighted these problems and emphasized the need to take action to address them.^{32,46-53} This emphasizes the necessity of strengthening governance, providing financing, and establishing more oncology facilities. Building oncology research centers of excellence to train aspiring young health professionals should be of high priority.

Most of the cancer patients presenting themselves in hospitals in Nigeria are at an advanced stage, which hinders cancer treatments, not to mention cancer prevention. A lack of comprehensive knowledge regarding cancers was one of the main contributory factors. Similar findings were reported in a study from India.⁵³ To address this problem, education on cancer-related knowledge⁵⁴ and regular affordable screening services^{45,53} should be provided. Apart from hospitals, education can be provided in places where people conduct regular activities, such as religious centers, public transportation, market entrances, and social media. In addition, health professionals need to be trained to navigate patients promptly to reduce late detection and advanced-stage presentation in LMICs.^{43,49,50}

Shortage in the oncology workforce also creates obstacles to oncology practice in Africa.^{35,55-57} In Nigeria, according to our study, the current situation of limited skilled oncology staff cannot meet the needs of an increasing number of cancer patients. A study in Nigeria has identified the limited opportunities for oncology training and education. Most of the oncology professionals interviewed reported that they had no standard pre- or post-professional training but acquired competencies on the job.²⁷ Only a few had cancer-related training through workshops and online/virtual training programs which were largely self-funded.²⁷ There is therefore a need for the government, teaching hospitals, and relevant stakeholders to provide sustainable hands-on training, fellowship programs, and holistic manpower development strategies.

Findings from our study reveal that available cancer treatment is limited in Nigeria. A significant number of cancer patients have limited access to WHO essential medicine

including chemotherapies and targeted therapies,⁵⁸ most cannot afford these drugs even if they have access to them. Similar findings have been reported in LMICs^{54,59}

Nigeria has developed an agenda and policies for universal health coverage.¹⁸ However, poor implementation due to poor political will remains a challenge and less than 4% of the population has been enrolled since the establishment of the National Health Insurance program in 2005.¹⁸ To address this issue, the availability of opportune cancer therapies should be expanded, and medications should be provided in all regions the national health insurance program should also be improved to reduce out-of-pocket costs of treatment and the effects of catastrophic medical expenses on households.^{18,54}

This study had some limitations, a qualitative research methodology was used to document the challenges with oncology practice and research in Nigeria. However, the results cannot be quantified and this is characteristic of qualitative research. Some interviews could not be conducted in person due to the logistics, cost, and security risks of travelling in Nigeria. These interviews were conducted through telephone calls. In some instances, the telephone appointments had to be rescheduled due to poor networks. To ensure rich interactions, we adopted strategies such as active listening, supportive vocalization, and validation and clarification exchanges.⁶⁰ With these approaches, we were able to document the opinions of various cancer medical specialists and/or researchers from all the geographical zones of Nigeria. Furthermore, a detailed, accurate description of the difficulties facing oncology practice and research in Nigeria was done by the use of a qualitative methodology.

Conclusion

This study highlights the multifactorial challenges and barriers to oncology research and practice in Nigeria, emphasizing the timely and unified efforts required to address them. The government and other stakeholders need to invest more in human, technical, infrastructural, and financial resources for cancer care services. Additionally, there is a call to intensify investments in robust and rigorous research training and high-quality clinical care to effectively address the growing burden of cancer in Nigeria.

Appendix

Abbreviations

DOCT	Doctor
HIC	High income countries
IDI	In-depth interview
KII	Key informant interview
LMICs	Low and middle income countries
NC	North central
NE	North east
NW	North west

PHARM	Pharmacist
SE	South east
SS	South
SW	South west
UNESCO	United nations educational, scientific and cultural organization.

Acknowledgments

We are grateful to Samson Akande who helped with the analysis of the qualitative data.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

Supported by NCI P20CA233307, Susan G. Komen for the Cure (OIO) and Breast Cancer Research Foundation (OIO) and a Kiphart Global Health Equity Scholar award from the University of Chicago Center for Global Health (P.O.A. and M.M.O.).

Ethical Statement

Ethical Approval

Ethical approval for the conduct of the study was granted by the University of Ibadan/University College Hospital Ethics Committee, Ibadan, Nigeria (UI/EC/21/0114). The approval period spanned a one year period: 21st May, 2021 to 20th May, 2022.

Informed Consent

The study was conducted based on ethical guidelines and written informed consent was obtained from all the interviewees after information was provided on the objectives and nature of the study.

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Data Availability Statement

Transcripts can be provided upon request to the corresponding author. This can only be used for non-commercial purposes which ensures that participants' confidentiality is protected.

Supplemental Material

Supplemental material for this article is available online.

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