



ORIGINAL ARTICLE

Assessment of Knowledge, Awareness, Attitude and Interest of Radiotherapy as a Career Choice Among Final Year Radiography Students in Northern Nigeria

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Abstract

Background: Radiographers play a crucial role in radiotherapy treatment but their numeric strength is grossly inadequate globally. Till date, despite the obvious need for such professionals in healthcare settings, there is no single institution offering Bachelor's degree in radiotherapy in Nigeria.

Aim: This study assessed the knowledge, awareness, attitude, and interest of final-year Radiography students toward a career in radiotherapy

Methods: A descriptive cross-sectional study was conducted among final-year radiography students in northern Nigeria, where a self-administered questionnaire designed using Google form (Google, Mountain View, CA) was shared using online platforms. The questionnaire was face-validated, and the reliability was tested using Cronbach's alpha. A coefficient of 0.7 was obtained which is considered adequate. Descriptive statistics were generated for this study using Statistical Package for Social Sciences (SPSS) version 23.0.

Results: Out of 222 potential participants, 191 responded to the questionnaire giving a response rate of 86%. The result showed that 96% (n=185) are knowledgeable and aware of radiotherapy demonstrating widespread familiarity with the concept. Also, 52.9% (n=101) of the respondents have positive attitudes towards the importance of radiotherapy in cancer treatment. The simple majority, 59.7% (n=114) of the respondents, showed interest in becoming therapy radiographer though an alarming 81.2% (n=155) had not been exposed to radiotherapy practice during their clinical postings, indicating a potential gap in practical training.

Conclusion: This study revealed that large number of the respondents are knowledgeable and have positive attitude towards radiotherapy with great interest of becoming therapy radiographers despite inadequate practical exposure during their training.

Keywords: Radiotherapy awareness, career, student radiographers, northern Nigeria

Introduction

Radiotherapy involves the use of high energy radiation to destroy cancer cells and halt further growth. It is an essential component of cancer management and plays a crucial role in the fight against cancer. Cancer is a public health problem affecting all categories of people worldwide, and radiation therapy is often the mainstay of management. According to the World Health Organization (WHO), cancer is one of the leading causes of death worldwide, the second most common cause of death in developed countries, and the third leading cause of death in developing countries¹. The World Health Organization estimated that there would

be 20 million new cancer cases diagnosed each year by the year 2020, and 12 million will die of cancer unless there are significant advances in cancer care. Much of the cancer burden is expected to come from the developing countries^{2,3}. In Nigeria, a total of 24815 patients were diagnosed with cancer in 2020⁴.

It is estimated that about 55% of these cancer patients would receive radiation therapy during the course of their treatment^{5,6,7}. A successful radiotherapy treatment requires well-skilled professionals such as radiation oncologists, radiotherapists, and medical physicists⁸. Radiotherapy is a highly cost-effective

treatment modality, accounting for only 5% of the total cost of cancer care. It can be used either alone or in combination with other treatment modalities, such as chemotherapy and hormonal therapy, in a variety of tumour sites⁹. The intent of radiotherapy treatments may be cancer cure, prevention of relapse, or relief from cancer symptoms, and radiotherapy may be the only treatment or used in conjunction with surgery/ or chemotherapy. It uses high-energy radiation in the form of x-rays or gamma rays delivered by the machine outside the body (Teletherapy) or may come from radioactive material placed inside the body near cancer cells (Brachytherapy)¹⁰.

Radiotherapy is a cornerstone in the comprehensive treatment of cancer, and it is contingent not only on technological advancements but also on the awareness and preparedness of the next generation of healthcare professionals. Currently, there is no institution in Nigeria that has Bachelor of Radiotherapy program. Only the Institute of Radiographers of Nigeria runs a postgraduate diploma in Radiotherapy which allows diagnostic radiographers to be qualified and licensed to practice as radiation therapist. However, the undergraduate radiography student is only taught about radiotherapy in their final year. Final-year students on the edge of transitioning from their educational practice represent a pivotal group in shaping the future of cancer care. Understanding their awareness of radiotherapy is paramount, as it directly influences the quality of care they will provide in their future roles as health care practitioners, which is the aim of this study. This study therefore aims to evaluate the knowledge and practices of radiotherapy among this potential radiation worker across northern Nigeria.

Materials and Methods

Study design and sampling technique

The study was a non-experimental, descriptive, cross-sectional study using a prospective research design. A non-probability convenient sampling method was used for data collection. All the final-year radiography students from accredited institutions across northern Nigeria were included in the study. Non-final year radiography students, those from unaccredited institutions, and those not from the radiography training were excluded from this study.

Ethical consideration

This research does not carry any potential risk to the respondents. An informed consent note was included at the beginning of the questionnaire. Consent from each respondent was granted before participation. All respondents were informed that the responses would be strictly used for this research and treated with the utmost confidentiality. The study participants' identities were anonymous, and participation was exclusively voluntary. The participants have the right to decline, discontinue, or withdraw their response before the publication. The respondents were asked to

click the "next" button to access the questionnaire only when they consented to participate in the study.

Data collection

The study used a self-administered and validated questionnaire to retrieve data from the final-year radiography students in northern Nigeria. The questionnaire was closed-ended in six sections, including demographics, radiotherapy knowledge, awareness, practice, attitude, and interest. The questionnaire was designed using Google forms (Google, Mountain View, CA) and shared using online platforms. An electronic link to fill out the online questionnaire was created and sent to the head of radiography departments (HoD) in Northern Nigeria via email for distribution to the eligible participants. The HoDs subsequently distributed the electronic link via their WhatsApp platforms. The class representatives of the final-year students from each recruited institution were contacted periodically and encouraged to remind their classmates to voluntarily complete the questionnaire before the deadline. The link was only valid for accepting responses over three months. The questionnaire was piloted on a few random respondents, and the analysis was face-validated. Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 23.0 and summarized using frequency and percentage descriptive statistics.

Results

Socio-demographic data

A total of 191 respondents who were final-year radiography students from accredited Universities in northern Nigeria submitted their responses successfully during the data collection period. Table 1 shows the socio-demographic information of the respondents. The majority (n = 116, 60.7%) of the respondents fall within 20-25 years of age. It was also observed that most respondents were males, accounting for 69.6% (n = 133) of the sample population. Concerning the tribe, majority of them were Hausa, 24.1% (n = 46) by tribe, followed by the Kanuri tribe, 23% (n = 44). University of Maiduguri (UNIMAID) students were the majority, 67% (n = 128) among the respondents.

Respondents Knowledge on Radiotherapy

The respondents' level of knowledge on radiotherapy is shown in Table 2. It was observed that 96.9% (n = 185) of the respondents knew about radiotherapy. The use of radiation in treating mainly malignant tumors was believed by most of the respondents (80.6%) to be the best definition of radiotherapy. Also, 83.2% (n = 159) of the respondents felt that linear accelerator was the most commonly used equipment in radiotherapy, followed by 77% (n = 147) who also believed that cobalt-60 is used in radiotherapy. However, only about 15.7% (n = 30) of the respondents believed that conventional X-ray units are used in radiotherapy. As

regards the personnel, 88% (n = 168) of the respondents agree that oncologists are specialists involved in radiotherapy, 85% (n = 162) believed that a therapy radiographer is involved in radiotherapy, and about 61.3% (n = 117) and 50.8% (n = 97) of the respondents agree that medical physicist and nurses are also part of the specialists involved in radiotherapy, respectively.

Respondents Awareness of Radiotherapy

Table 3 shows the extent of radiotherapy awareness among the respondents. About 96.3% (n = 184) of the respondents affirmed they had heard of radiotherapy before. The majority, 90.5% (n = 173) of the respondents, admit to learning about radiotherapy in the classroom, while only 39.5% (n = 75) acquired knowledge of it through social media, and only 25.8% (n = 54) knew about it at seminars and workshops. From the table, it was observed that 90.1% (n = 172) of the respondents were familiar with the common indications for radiotherapy, whereas 43.5% (n = 83) of the respondents were moderately confident in explaining the basic principles and techniques of radiotherapy

Table 1: Socio-demographic information of the respondents

Sociodemographics	n (%)
Age (years)	
20-25	116 (60.7)
25-30	63 (33.0)
30-35	10 (33.0)
35-40	2 (1.0)
Total	191 (100)
Gender	
Female	58 (30.4)
Male	133 (69.6)
Total	191 (100)
Ethnicity	
Fulani	26 (13.6)
Hausa	46 (24.1)
Kanuri	44 (23.0)
Others	75 (39.3)
Total	191 (100)
Institution	
BUK	28 (14.7)
UDUS	35 (18.3)
UNIMAID	128 (67.0)
Total	191 (100)

Table 2: Respondents Knowledge of radiotherapy

Variable	Category	Frequency	Percentage
Do you know what radiotherapy is?	No	6	3.1
	Yes	185	96.9
Which of these bests define radiotherapy?	Use of ionizing radiation in the treatment of mainly malignant tumors	154	80.6
	Use of ionizing and non-ionizing radiation for treatment of patients and industrial purpose	29	15.2
	Use of magnetic resonance imaging in the treatment of malignancy	8	4.2
Which of this equipment is used in the radiotherapy department?	Linear accelerator	159	83.2
	Cobalt 60	147	77
	Computed tomography	93	48.7
	Simulator	104	54.5
	Mold room equipment	48	25.1
	Conventional X-ray unit	30	15.7
	Immobilizing devices	99	51.8
Which of the following specialists are involved in radiotherapy	Oncologists	168	88
	Diagnostic radiographer	54	28.3
	Medical physicist	117	61.3
	Nurses	97	50.8
	Therapy radiographer	163	85.3

Table 3: Radiotherapy Awareness

Variable	Category	Frequency	Percentage
Have you heard of radiotherapy before?	No	7	3.7
	Yes	184	96.3
If yes, please rate your level of awareness regarding radiotherapy on a scale.	1	9	4.7
	2	20	10.5
	3	65	34
	4	58	30.4
	5	36	18.8
How did you acquire knowledge about radiotherapy?	Classroom lectures	172	90.5
	Electronic media	51	26.8
	Social media	75	39.5
	Research articles/journals	71	37.4
	Seminars/workshops	49	25.8
	Online resources/websites	64	33.7
What sources do you consider reliable for obtaining accurate information?	Textbooks	155	81.2
	Peer-reviewed research articles	68	35.6
	Professional conferences	108	56.5
	Accredited websites	83	43.5
	Experts' opinions	85	44.5
	Social media	40	20.9
Are you familiar with the common indications for radiotherapy?	No	19	9.9
	Yes	172	90.1
How confident are you in explaining the basic principles and techniques of radiotherapy?	Extremely confident	4	2.1
	Moderately confident	83	43.5
	Not confident at all	18	9.4
	Somewhat confident	44	23
	Very confident	42	22

Radiotherapy practice

The majority of the respondents, 81.2% (n = 155), have never been exposed to radiotherapy practice during their clinical postings/rotation, with 45.5% (n = 40) having been poorly exposed (Table 4). Over an average of the respondents, 55.5% (n = 106), believed that the current curriculum adequately prepares them

for radiotherapy to some extent. 70.2% (n = 134) of the respondents anticipated a lack of specialized training as part of the challenges they might face in practicing radiotherapy after graduation. Over half, 62.8% (n = 120), anticipated limited resources, while 47.6% (n = 91) anticipated inadequate infrastructures as challenges in practicing radiotherapy after graduation.

Table 4: Radiotherapy Practice

Variable	Category	Frequency	Percentage
Have you had any exposure to radiotherapy practice during your clinical?	No	155	81.2
	Yes	36	18.8
If yes, please rate your level of practical exposure to radiotherapy techniques.	1	40	45.5
	2	15	17.9
	3	17	19.3
	4	14	15.9
	5	2	2.3
Do you think the current curriculum adequately prepares you for radiotherapy?	No, not at all	56	29.3
	Yes, completely	29	15.2
	Yes, to some extent	106	55.5
What challenges do you anticipate in practicing radiotherapy after graduation?	Lack of specialized training	134	70.2
	Limited resources and equipment	120	62.8
	Inadequate infrastructure	91	47.6
	Lack of awareness among healthcare professionals	71	37.2
	Insufficient support staff	70	36.6

Respondents Attitude toward Radiotherapy

Table 5 shows the attitude of the respondents towards radiotherapy. About 53% (n = 101) of the respondents believe radiotherapy is crucial in treating cancer (n = 56) with an interest in radiotherapy as a career admit to being motivated by the desire to make a difference in cancer treatment. About 76.4% (n = 146) of the respondents believed the role of radiographers is essential in delivering radiotherapy services.

patients. Most respondents (46.6%, n = 89) were interested in pursuing a career in radiotherapy, while 28.8% (n = 55) were yet to decide. The majority of respondents (29.3%,

Table 5 Attitude towards Radiotherapy

Variable	Category	Frequency	Percentage
How important do you think radiotherapy is in the overall treatment of cancer patients?	Extremely important	66	34.6
	Moderately important	14	7.3
	Not important	3	1.6
	Somewhat important	7	3.7
	Very important	101	52.9
Are you interested in pursuing a career in radiotherapy?	Neutral	55	28.8
	No	47	24.6
	Yes	89	46.6
If yes, what motivates you to choose a career in radiotherapy?	Desire to make a difference in cancer treatment	56	29.3
	Financial stability	6	3.1
	Job prospects	18	9.4
	Personal interest	35	18.3
How do you perceive the role of radiographers in the delivery of radiotherapy services?	Essential	146	76.4
	Not sure	9	4.7
	supportive	36	18.8

Respondents Interest in Radiotherapy

Table 6 reveals that 59.7% (n = 114) of the respondents want to become a therapy radiographer, while 40.3% (n = 77) showed no interest. For those willing to become therapy radiographers, 48.7% (n = 93) do so out of sheer interest/passion, while 16.2% (n = 31) do so due to its lucrative nature and good salary. On the other hand, the majority (31.9%, n = 61) of those who don't want to become therapy radiographers due to the

risk of high doses of radiation common to radiotherapy practice. But however, most of the respondents believed that there is a bright future for radiotherapy. Similarly, 73.3% (n = 140) of the respondents affirmed that there is an untoward risk to radiotherapy, among which 20.9% (n = 40), 30.4% (n = 58), and 25.7% (n = 49) of them considered cancer, exposure to radiation and radiation accident respectively as the untoward risk.

Table 6 Level of interest in radiotherapy

Variable	Category	Frequency	Percentage
Would you like to be a therapy radiographer?	No	77	40.3
	Yes	114	59.7
If yes, Why?	Good pay and lucrative	31	16.2
	Interest/like the discipline	93	48.7
If not, Why?	No knowledge	9	4.7
	No specific reason	39	20.4
	Risk for high-dose radiation	61	31.9
	Stressful	17	8.9
	They do not make money	3	1.6
Do you think there is a bright future for radiotherapy?	No	9	4.7
	Yes	182	95.3
Do you think there is an untoward risk to radiotherapy?	No	51	26.7
	Yes	140	73.3
If yes, what is the risk?	Cancer	40	20.9
	Exposure to radiation	58	30.4
	Radiation accident	49	25.7

Discussion

The study on final-year radiography students in northern Nigeria yielded significant insights into their knowledge, awareness, practice, interest, and attitude towards radiotherapy. The findings presented in Tables 1 to 6 provide a comprehensive overview of various aspects related to the respondents and their perspectives on radiotherapy knowledge and awareness.

Knowledge of Radiotherapy

The majority of respondents demonstrated a high level of knowledge regarding radiotherapy, with 96% indicating familiarity with the concept, contrary to the previous studies^{2,8,10,11} where they all stated that there are deficiencies in knowledge of radiotherapy among their students. These findings do not agree with our study. This could be due to variations in geographic location and slight differences in the target population, as most of the studies focussed on medical students and not radiography students. Only Habeeb et al. (2021) involved radiography students in a single center in Southern Nigeria. The understanding of radiotherapy's definition and the equipment used in our study reflected a commendable grasp of the subject matter. This may not be unconnected with the recent surge in radiotherapy centers in northern Nigeria. In 2001, there were only 6 therapy centers in Nigeria. The number increased to 8 in 2010¹². Today, about 13 radiotherapy centers are in Nigeria, with six located in Northern Nigeria.

Radiotherapy Awareness

The findings in the current study reveal a widespread awareness of radiotherapy among respondents, with 96.3% having heard of it before. This contradicts the studies conducted by Soko et al. (2019), where the average rate of correct responses from all awareness items was 35.6%, which is significantly low, and Habeebu et al. (2021), where it was stated in the study that the majority of the students were not aware nor knew radiotherapy. The disagreement could be due to the geographic location and background of the respondents. Additionally, the curricular content at most accredited radiography universities in Northern Nigeria typically leads to a B.Rad degree, whereas in other parts of the country it is a B.Sc. in Radiography. This distinction may explain the comprehensive professional training and extensive coverage of core aspects of radiography, including radiotherapy, in Northern Nigeria. Classroom lectures were identified as the primary source of knowledge, emphasizing the significance of formal education.

Radiotherapy Practice

As regards radiotherapy practice, a significant proportion of respondents (81.2%) had not been exposed to radiotherapy practice during their clinical postings, indicating a potential gap in practical training, which is in line with studies conducted by

Habeebu et al. (2021), where the majority of the respondents (91.7%) have not had a clinical posting on radiotherapy before. Also, Biswal et al. (2004) stated in their study that 29% of students rarely visited radiotherapy facilities at their hospital. Anticipation of challenges such as lack of specialized training, limited resources, and inadequate infrastructure underscores the need for targeted improvements in radiography students' educational and clinical preparation.

Attitude toward Radiotherapy

This study shows that there are positive attitudes towards the importance of radiotherapy in cancer treatment (52%) and the interest in pursuing a career in radiotherapy (46.6%) is encouraging, contradicting the study conducted by Biswal et al. (2004) where the attitude towards radiotherapy was negative. The motivations cited, such as desire to make a difference in cancer treatment, are quite commendable and reveal a sense of purpose among those interested in the field.

Level of interest in Radiotherapy

The data on respondent's interest in becoming radiotherapists (59.7%) sheds light on their career aspirations contrary to the survey conducted by Biswal et al. (2004) and Habeebu et al. (2021) where they stated that many of their students did not show interest in radiotherapy. In this study, the majority expressed their interest based on passion and intrinsic motivation (48.7%), which is promising. However, concerns about the risk of high radiation doses (31.9%) highlight the need for addressing misconceptions and ensuring that students are well-informed about safety measures in radiotherapy practice.

The study suggests a generally positive attitude and awareness of radiotherapy among final-year radiography students in northern Nigeria. However, identified gaps in practical exposure, potential misconceptions, and anticipated challenges emphasize enhancing the curriculum's practical training opportunities and addressing specific knowledge gaps across the entire region and country at large. This study has shown high awareness and knowledge among final-year radiography students, giving accurate definitions and equipment recognition. There is also limited practical exposure among the students. The study also showed a high interest and positive attitude toward radiotherapy among the students. We would recommend enriching the radiography curriculum by adding significant number of radiotherapy courses and perhaps awarding double major, Bachelor of Radiography and Radiotherapy as obtainable in some countries like Malaysia. Alternatively, the students can be allowed from 400 level, to specialize in either radiography or radiotherapy.

Conclusion

This study provides valuable insights into the awareness and practice of radiography students

towards radiotherapy in northern Nigeria. Addressing the identified areas for improvement can contribute to better-prepared professionals in the field, ultimately enhancing the quality of radiotherapy services in the region and Nigeria.

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Conflict of Interest

The authors declare there is no any iota of conflict of interest in the entire aspects of this work.

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