



ASSESSMENT OF KNOWLEDGE AND ACCEPTANCE OF TELERADIOLOGY

AMONG RADIOGRAPHERS IN BENIN CITY

A Project Submitted to the

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CERTIFICATION

This is to certify that the project titled “**Assessment of Knowledge and Acceptance of Teleradiology among Radiographers and Radiography Students in Benin**” was carried out by **DARLINGTON BRIDGET UCHECHUKWU** with Matriculation Number **BMS180666** in partial fulfilment of the requirements for the award of the degree of Bachelor of Science (B.Sc.) in Radiography, **Department of Radiography, School of Basic Medical Sciences, University of Benin.**

This work has been read and approved as meeting the requirements for the award of the aforementioned degree.

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DEDICATION

This project work is dedicated to myself for the hard work, perseverance and determination that kept me going despite the challenges faced along the way.

This research work stands as a reminder of my commitment and passion for the radiography profession. I am proud of how far I have come and motivated for the journey ahead.

ACKNOWLEDGEMENT

First and foremost, I give all glory to God Almighty for His grace and strength during the course of my academic journey and this project.

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God bless you all.

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ABSTRACT

Teleradiology represents a vital solution to Nigeria's healthcare challenges, particularly the shortage of radiologists and uneven distribution of healthcare services. Despite its potential benefits, adoption remains limited in Benin City. This study assessed the knowledge, perception, and acceptance of teleradiology among radiographers in Benin City. A descriptive cross-sectional survey was conducted among 46 radiographers from University of Benin Teaching Hospital (UBTH) and RayTouch Diagnostics Center. Data were collected using a structured questionnaire and analyzed using SPSS version 29. Descriptive statistics, including frequencies, percentages, and means, were computed. The majority of respondents were aged 20-29 years (84.8%), male (63.0%), and had 1-5 years of experience (69.6%). Knowledge of teleradiology was high, with 93.5% correctly defining teleradiology and 97.8% identifying image types that can be transmitted. Perception towards teleradiology was generally positive, with mean scores ranging from 3.30 to 3.43 for benefits, though concerns existed about internet connectivity (mean = 3.11). Acceptance was high across all dimensions, with mean scores between 2.98 and 3.39, indicating readiness to adopt teleradiology systems.

Radiographers in Benin City demonstrated good knowledge, positive perception, and high acceptance of teleradiology. However, infrastructure concerns, particularly internet connectivity, remain barriers to implementation. Stakeholders should invest in reliable internet infrastructure, provide comprehensive training programs, and develop clear implementation policies to facilitate successful teleradiology adoption in Benin City.

Keywords: Teleradiology, Knowledge, Perception, Acceptance, Radiographers, Benin City, Nigeria.

CHAPTER ONE

INTRODUCTION

1.1. BACKGROUND OF THE STUDY

Teleradiology refers to the transfer of medical images such as X-rays, CT scans and MRIs through telecommunication systems to radiologists located in another location, which allows for the interpretation, consultation, or diagnosis of these images remotely. It plays an important role in bridging the gap in radiology services, especially in regions where there is a shortage of radiologists (Durairaj, 2022).

Although teleradiology has been in use in some developing countries, its use in Nigeria is still very low. Nigeria is Africa's most populous nation, with over 206 million people as of 2020 but it faces healthcare challenges including poor healthcare access, inadequate funding of health facilities, uneven distribution of healthcare services affecting rural areas and shortage of healthcare workforce particularly radiologists, with only about 250 to 300 practicing across the country. Private healthcare accounts for about 70% of medical services yet many people especially those in rural communities still have limited access. For instance, at Zambuk General Hospital, patients often travel distances just to get radiological reports. Teleradiology provides a solution to address this gap by allowing quicker and more accurate diagnoses, minimizing the need for patients to travel, and reducing both hospital referrals and the duration of hospital stays (Tahir *et al.*, 2022).

In Nigeria, digital imaging systems are gradually replacing analog ones but there are still challenges to its full adoption including Workforce challenges (Elechi *et al.*, 2025) .

Radiographers are key to teleradiology's adoption, they acquire and manage the images that are sent remotely. If they lack training or skill in teleradiology tools, the whole system can fail.

Some radiographers and radiologists may not fully accept teleradiology because they find the technology difficult to use (Bacharach, 2014). This challenge is more common among older professionals and those in rural areas who may not be familiar with digital tools. A study by Tegegne *et al.* reported that although 51.8% had good digital skills, many still found it hard to work with modern technology (Elechi *et al.*, 2024).

In Benin City, conditions like tuberculosis and medical emergencies are common and quick interpretation of medical images can help save lives (Nigatu *et al.*, 2025). Most of the available research focused on telemedicine with only few studies on level of knowledge of Teleradiology and without this information, it is difficult for decision-makers and educators to know what support or training radiographers need.

The purpose of this research is to assess the knowledge and perception of Teleradiology among radiographers in Benin particularly at University of Benin Teaching Hospital (UBTH) and RayTouch Diagnostics. It will help guide decisions and support efforts to improve digital healthcare in Nigeria.

1.2 STATEMENT OF THE PROBLEM

There's constant brain drain in Nigeria which leads to healthcare workforce shortage and limited access to healthcare services especially in rural areas. These challenges have brought the need for innovative solutions like Teleradiology (Umar *et al.*, 2025). With Teleradiology systems, it is possible to send medical images to radiologists who aren't on-site, which reduces patient waiting time and enables faster diagnosis (Ogboghodo *et al.*, 2024). According to a study done by Owoeye *et al.*, (2022) in Benin City it is still not widely used despite its potential benefits.

The slow adoption of Teleradiology is as a result of poor awareness, weak infrastructure, and lack of proper training. Radiographers play a key role in acquiring and handling medical images, so their knowledge and attitude toward Teleradiology really matter, but many of them may not be familiar with how it works or ready to use it in practice (Elechi *et al.*, 2024).

There's little local research showing what they actually know or think about the technology, this stirs up an important question on whether today's radiographers in Benin city really understand Teleradiology well enough and feel positive towards using it effectively. The goal of this research is to identify gaps in training, improve how the technology is introduced, and make radiology services easier to access for everyone.

1.3 RESEARCH QUESTIONS

1. How familiar are radiographers in Benin City with the concept of Teleradiology?
2. What is their perception of Teleradiology in medical imaging?
3. Have they accepted the Teleradiology system in practice?

1.4 HYPOTHESES

1. There is no significant difference in the level of knowledge based on the years of experience of the radiographers.
2. There is no significant relationship between level of knowledge and acceptance of Teleradiology..

1.5 AIM OF THE STUDY

The aim of this study is to assess the level of knowledge and acceptance of Teleradiology among radiographers in Benin City.

1.6 OBJECTIVES OF THE STUDY

The specific objectives of the study are as follows:

1. To assess the level of knowledge of radiographers in Benin City regarding Teleradiology concepts, technologies and applications
2. To evaluate perceptions of Radiographers in Benin City toward Teleradiology implementation in medical imaging practice
3. To determine the level of acceptance of Radiographers in Benin city to adopt Teleradiology systems in their clinical practice

1.7. SIGNIFICANCE OF THE STUDY

The results of this study will establish what radiographers already know about Teleradiology and where more training might be needed. This can help in updating the radiography curriculum, help hospitals plan better staff training and inform health policymakers about where support is mostly needed.

Raising awareness and understanding of Teleradiology could make it easier for more people to accept and use it. This may lead to faster diagnoses, better patient care, and wider access to radiology services especially in parts of Nigeria where such radiological services are still hard to reach.

1.8. SCOPE OF THE STUDY

This study is focused on assessing the knowledge and acceptance of Teleradiology among radiographers in Benin City, Edo State, Nigeria. It covers their level of awareness, understanding, exposure, and attitude toward the use of Teleradiology in clinical practice.

The study population includes practicing radiographers working in selected Hospitals (University of Benin Teaching hospital and RayTouch Diagnostic Center) in Benin.

1.9. OPERATIONAL DEFINITION OF TERMS

1: Teleradiology: The use of telecommunication technology to transmit radiological images (such as X-rays, CT scans, and MRIs) from one location to another for the purpose of diagnosis and consultation.

2.Radiographers: Health professionals who are trained to perform imaging procedures such as X-rays, CT scans, and MRIs. In this study, the term refers to licensed radiographers currently practicing in hospitals or diagnostic centers in Benin.

3. Knowledge: knowledge in this study refers to the respondents' awareness, understanding, and familiarity with Teleradiology uses, limitations and benefits.

4.Perception: The thoughts, beliefs and attitudes of radiographers regarding the usefulness and reliability of Teleradiology in radiographic practice.

5. Acceptance: Acceptance in this study refers to the willingness of respondents to adopt and utilize teleradiology as part of their professional practice. It reflects their readiness and openness toward integrating teleradiology into routine radiographic procedures.

6. Benin City: Benin City is the capital of Edo State, Nigeria, where the study is conducted.

CHAPTER 2

LITERATURE REVIEW

2.1 CONCEPTUAL REVIEW

TELERADIOLOGY

Teleradiology, also called tele-reporting, is the system that involves sending medical images such as X-rays, CT scans and MRIs over telecommunication systems to specialists in other locations for review, interpretation or consultation. This method allows radiologists to interpret images remotely, making it especially useful in regions with limited access to radiology experts (Durairaj, 2022). It is the electronic transmission of radiological images from one location to another with the main purpose of interpreting or consulting a diagnosis and must be subject to codes of conduct agreed upon by professional societies. (Morales Santos *et al.*, 2023).

According to the European Society of Radiology (2014), teleradiology is defined as “the exchange of radiological images and patient-related data between geographically different locations for primary interpretation, expert consultation, and clinical review by digital transmission.”



Figure 2.1: Teleradiology system

2.1.2 Conceptualizations of Teleradiology.

Teleradiology can be classified as either intramural or extramural, based on the type of relationship that exists between the radiologist and the healthcare facility where the images were obtained.

Intramural or intraorganizational Teleradiology: Means that the radiologist, either as an employee or medical staff member, works for or is associated with the organization that acquires the images and cares for the patient. (Tarek *et al.*, 2020) .

Extramural or extraorganizational, Teleradiology:

Means that the interpreting radiologist works for a radiology practice or corporation not otherwise affiliated with the health care entity acquiring the images. (Tarek *et al.* , 2020).

Both types of teleradiology have expanded over time and due to how common they have become, they now play an important role in diagnostic radiology not only in the United States but also the world at large

Within the scope of these definitions, many diagnostic radiology practitioners in the United States are, in fact, at least part-time teleradiologists. (Tarek *et al.*, 2020).

2.1.3. History Of Teleradiology

Teleradiology foundations were laid in the mid-1990s, and its practice increased in prevalence and availability throughout the following decades, propelled by both technological advancements and market forces (Tarek *et al.*, 2020)

Teleradiology was first developed for military purposes, Field units could send radiology images to hospitals in the home country for diagnosis and further patient management. The first teleradiology systems used cameras or video setups to capture images from film, which were then turned into digital files and sent electronically, later on, the laser digitizer came in as an upgrade but it could only scan one image at a time. By the mid-eighties, hospitals began using the first PACS (Picture Archiving and Communication Systems) for clinical use, and this shift from analogue to digital imaging changed how radiology work was done. Teleradiology became possible then but it took about ten more years before it could be properly used, mainly because early computers were slow and expensive, the high cost of sending data also made it hard for many hospitals to adopt. Over time, as technology improved and internet services became cheaper, most of those problems were solved, making teleradiology more common.

In the early days, maintaining good image quality during analogue-to-digital conversion was a big concern. Different methods of compressing data were tried to make transmission faster but

there were arguments about how much image quality was lost. The introduction of better techniques like wavelet compression helped fix this, allowing faster transfer of clear images. Back then, most discussions were about image quality, transmission speed, and compression but these days, the focus has shifted more to things like clinical standards, legal issues, and quality control. (Binkhuysen *et al.*, 2011).

A standard teleradiology system is made up of three main parts: the image-sending unit, the transmission network, and the image-receiving or review unit. The sending unit captures the radiological images and gets them ready for transfer. These images are then sent using a network, which could be the Internet, a WAN, or a LAN. The receiving unit enables radiologists to view, assess, and interpret the images from a different location (Kumar, 2008).



Figure 2.2a: Teleradiology workflow

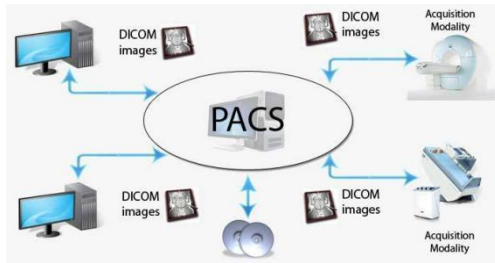


Figure 2:2b: Teleradiology workflow integrating pacs

2.1.4. Key People Involved In Teleradiology

Teleradiology relies on different personnel who work together to make it effective. These key people include:

Radiologists: These are medical doctors who specialize in interpreting medical images like X-rays, CT scans, and MRIs to diagnose and treat diseases. In teleradiology, they analyze transmitted images remotely without being physically present at the facility and provide reports to help doctors diagnose and treat patients.

Radiographers : Radiographers are responsible for capturing high-quality medical images, such as X-rays, CT scans, and MRIs. In a teleradiology setup, they ensure that images are correctly acquired and transmitted to remote radiologists for interpretation.

Patients: They are at the center of teleradiology services. Their trust and acceptance of teleradiology help in its wider use.

2.1.5. Benefits of Teleradiology

Some Benefits of teleradiology are;

- It helps to offer radiology services for rural areas.
- It tries to solve the problem of radiologists shortage.
- A second opinion from an expert to a local Radiologist making diagnosis more authentic.
- Provides readings of a specialized radiologist in a certain field (pediatrics radiology, neuroradiology, cardiovascular imaging, etc.)

- Solves delay of scan interpretation.
- Decreases the workload on other Radiologists.
- Cost effective
- Radiological services are available all the time improving patient care, and preventing the need for patients to travel to find medical services or specialized experts. (Alahmari, 2019).

To expand the listed points in detail, Teleradiology can provide services in rural areas where there is no specialized Radiologist at any time, as well, where there is Radiologists shortage. Teleradiology can provide access to expert Radiologists, some Radiologists may need a second opinion to confirm their diagnosis which will help to decrease the chances of making a mistake. For example Radiologists can face complex cases that require a specialized Radiologist in pediatrics imaging, nuclear medicine, musculoskeletal imaging, etc. This generally will decrease the workload, the waiting time for radiology reports. Teleradiology is cost effective by recruiting the available radiologists in their free time. The availability of a teleradiology system is for all the time (24/7/365) which truly improves access to healthcare. Teleradiology reduces the need for patients to travel to urban areas to seek expert diagnosis and medical opinion. (Alahmari, 2019).

2.1.6. Challenges of Teleradiology

The challenges of teleradiology includes ; -

- Expenses of installing and maintaining a teleradiology system.
- Technological Hurdles
- Legal jurisdiction of a teleradiology system.
- Limited access to obtain previous studies and patients' history.

- Teleradiology training is required, and limited communication with clinicians. (Alahmari.,2019).

To explain the listed points in details;

Teleradiology system maintenance is quite expensive. It needs a network specialist to do the maintenance which is not available sometimes in rural areas and in developing countries. According to Elechi et al. (2024), a key challenge facing telehealth implementation is the unsteady power supply, especially in remote areas where frequent blackouts limit the use of digital medical systems. Also, many healthcare centers lack basic technological devices such as computers and other essential tools required for Teleradiology. Kragsterman (2024) adds that poor internet infrastructure is another major limitation and rural regions where teleradiology is often most needed due to healthcare workforce shortage, struggle with slow or unreliable internet connections and outdated medical equipment.

Another limitation is the legal jurisdiction of a teleradiology system. Radiologists may not be allowed to work from another country using teleradiology, because they do not have a medical license in the country where the teleradiology system is used, they can't work for legal reasons. There is a need for an accreditation scheme for teleradiology service which will cost money and time. One of the most common limitations of teleradiology is the limited access to previous studies and patients' histories which can lead to a wrong diagnosis. Radiologists and Radiographers need specific training on how to use the teleradiology system. (Alahmari, 2019).

2.2 EMPIRICAL REVIEW OF RADIOGRAPHERS KNOWLEDGE AND ACCEPTANCE OF TELERADIOLOGY

Several studies have been carried out in different parts of the world to assess how radiographers understand and view teleradiology. These studies give insight into the level of knowledge, interest, and challenges faced in adopting teleradiology among radiography professionals.

2.2.1 Studies from Other Countries

Ogasawara conducted research in Hokkaido, Japan in 2001 to understand how radiographers perceive teleradiology. In this study, questionnaires were sent to radiographers across the region, and about 1,275 responded, giving a response rate of 65%. The findings showed that almost all respondents had heard of teleradiology, and around 60% were interested in it. However, only a few of them expected to be directly involved in its use. Many believed teleradiology should be used to interpret difficult cases (60%) and emergencies (30%). Interestingly, half of the radiographers thought they should manage the system, though about 37% were concerned about issues related to management between facilities, while 34% raised concerns about the cost of installing the system.

In Kenya, different studies have explored the use and performance of teleradiology. In 2018, a study was done to test a low-cost teleradiology setup that made use of digital X-ray, CT scans, and MRI. This system worked well and showed success in sending images and receiving reports quickly. Another study by Vinayak and colleagues looked at how midwives used point-of-care ultrasound, and it was found that reports were ready within 25 minutes from patient entry to report validation. In 2021, Jacob carried out a study in two teleradiology centres in Nairobi, which revealed that many users, especially radiographers, accepted the system well. However, it

was discovered that regular training was a key factor in improving their experience and confidence.

In Egypt, research by Abodahab in 2021 showed that radiographers were actively involved in sending CT and MRI images using a PACS (Picture Archiving and Communication System). This system was efficient, and there were no major complaints about image transmission. The cooperation between radiographers and radiologists was seen as smooth, and the system was fully accepted by both professionals.

A study by Ranschaert in 2013 looked at the use of teleradiology across different parts of Europe. A total of 368 radiology professionals took part in the study, and about 65% of them were already using teleradiology. The most common uses were for sharing images within the hospital (71%) and reading cases from home during on-call hours (44%). Some of the benefits mentioned included better teamwork among radiologists and an easier way to handle workload. Although many preferred in-house teleradiology, about 35% used external services, mostly for getting second opinions and extra support during emergencies. However, there were some challenges too. About 69% said patient history was not always properly integrated, and 68% said it was hard to communicate with doctors. Despite these issues, around 80% of participants believed teleradiology would become more important in the future. They also noted that for teleradiology to work well, radiographers must be fully involved.

2.2.2 Studies on Challenges in the Use of Teleradiology

In 2022, Ewing conducted a study across Kenya, Ghana, and Egypt and found that there was a general lack of training on how to use teleradiology and understand its benefits. Most health workers, including radiologists and radiographers, had not received proper in-service training. This problem was also mentioned earlier by Essop in 2019, who pointed out that poor training

and lack of preparation made it hard for people to accept teleradiology. Jacob in 2023 also stressed that proper training is necessary for radiologists to handle teleradiology tools confidently. The shortage of qualified personnel also affects the smooth use of teleradiology. Jacob's 2023 study revealed that many hospitals depended on outside radiologists who were not permanent staff. This often caused poor communication between doctors and the reporting radiologists. Britton also highlighted this issue, pointing out that without a proper Service Level Agreement (SLA), coordination becomes difficult and local radiologists may lose their role in leadership. This means that even though teleradiology can help, African countries must address the problem of not having enough radiologists.

Another major issue is the lack of proper technology. In 2019, Essop explained that some end users like radiographers and referring doctors felt they were doing tasks beyond their scope and didn't feel prepared to handle them. Ali also noted in a 2016 study that to handle the huge amount of data in teleradiology, better storage systems must be put in place.

In terms of policy, there are very few clear rules to guide the use of teleradiology in African countries. Jacob in 2023 pointed out that in Ghana, there was no specific plan to retain healthcare workers in rural areas or guide how teleradiology should be used. The same situation applies in other African countries where healthcare technology is not properly regulated. More research is needed to understand how radiographers working in rural areas view these challenges.

2.2.3 Teleradiology in Nigeria

Nigeria, the most populated country in Africa, has many rural areas where people find it hard to access good healthcare. According to the World Bank (2021), around 48.8% of Nigerians lived in rural areas in 2019. Tahir in 2022 noted that the country has many problems like lack of funding, poor healthcare facilities, and not enough healthcare workers.

Because there are not enough radiologists in Nigeria, some radiographers are left to perform and sometimes interpret imaging procedures. For example, during the COVID-19 pandemic in 2020, at Zambuk General Hospital in Gombe State, a patient who needed an X-ray had to carry the film to the doctor and then travel up to 100 km to get it reported by a radiologist in Gombe city. Tahir's research in 2022 explained that teleradiology could have helped by removing the need for this travel, reducing costs, and giving faster and more accurate diagnoses. Still, teleradiology is not widely used in Nigeria, despite its benefits and the clear need due to the shortage of radiologists and poor health indicators.

2.2.4 Teleradiology in Benin City

Benin City, located in southern Nigeria, is the capital of Edo State and is ranked the fourth largest city in the country. According to a 2022 study by Moedozie, the city has over 148 public primary healthcare centres, 223 private primary centres, 9 public secondary healthcare centres, and more than 300 private diagnostic centres. Even with these numbers, many people still struggle to access adequate radiology services, which shows there is a growing demand.

According to Soroosh in 2015, there are only between 250 and 300 radiologists in the whole country, which means one radiologist serves over half a million people. This uneven distribution increases the need for radiographers and diagnostic centres to have regular access to radiologists, which teleradiology can provide.

Because of this, there is a need to check how radiographers in Benin City understand and feel about teleradiology. This study is important because no other research has focused on this group in the region.

2.3. THEORETICAL FRAMEWORK

When introducing a new technology like teleradiology, it's useful to rely on theories that explain why people might accept or reject it. Three main frameworks help explain how radiographers in Benin might view and adopt teleradiology.

First, the Technology Acceptance Model (TAM) says that two beliefs matter most: whether people believe the system will be useful to them and whether they believe it will be easy to use, if radiographers think teleradiology will improve their work (for example, faster image transmission and better Patient flow through) and will not be overly complicated, they are more likely to intend to use it (Holden, 2010).

Second, the Unified Theory of Acceptance and Use of Technology (UTAUT) expands on TAM by adding the effect of social and practical context. It says that besides usefulness and ease, factors like what one's colleagues think (social influence), the technical infrastructure and how much effort it requires (effort expectancy) all influence intention to use the technology (Lee *et al.*, 2025).

In this study, knowledge (defined here as familiarity with teleradiology concepts) plays a key role. Radiographers who understand what teleradiology is, how it works, what it requires and what benefits and challenges it has, are more likely to see it as useful and less likely to view it as difficult. So knowledge acts as a "starting point" influencing beliefs about usefulness/ease. It also helps one feel confident and ready (technology readiness) and encourages others (social influence) when one becomes an early adopter.

CHAPTER 3

RESEARCH METHODOLOGY

INTRODUCTION

This chapter explains how the research titled “**Assessment of Knowledge and Acceptance of Teleradiology among Radiographers in Benin**” was carried out. It outlines the research approach, including the Study design, Research setting, Target population, sampling technique, sample size, the instrument used for data collection, the procedures for ensuring its validity and reliability, methods employed for gathering and analyzing data, as well as the ethical considerations observed throughout the study.

3.1 RESEARCH SETTING

This research was carried out in Benin City, Edo State, using two health facilities: the University of Benin Teaching Hospital (UBTH) and Raytouch Diagnostic Center:

UBTH is a government-owned teaching hospital that provides different levels of healthcare services, it also trains medical students and other health workers. The radiology department there handles many imaging procedures and attends to a large number of patients. It is one of the few centers in the region with both basic and advanced radiology equipment.

Raytouch Diagnostic Center is a privately owned medical facility in the same city. It offers imaging services like X-rays, CT scans, and ultrasound to the public. It is known for its fast service and modern equipment, though it operates on a smaller scale compared to UBTH.

These two centers will help compare the perceptions and experiences of radiographers working in both public and private healthcare environments.

3.2 STUDY DESIGN

This study uses a **descriptive cross-sectional survey** design which involves collecting data from participants at one point in time. This method enables gathering and analyzing information from both groups at once, without needing a follow-up and also makes it possible to compare their responses.

3.3 TARGET POPULATION

The target population for this study include radiographers and intern radiographers in Benin City. Participants were drawn from the University of Benin Teaching Hospital (UBTH) and Raytouch Diagnostic Center.

Radiographers are being included because of their experience with imaging and possible exposure to Teleradiology in daily practice. Intern radiographers, who are recent graduates undergoing clinical training, will bring perspectives from early work experience.

3.4 SAMPLING TECHNIQUE AND SAMPLE SIZE

A **purposive sampling method** was employed to select participants who are likely to have relevant knowledge or exposure to Teleradiology. The sample includes All licensed radiographers and intern radiographers from UBTH and Raytouch Diagnostic Center.

3.5. INSTRUMENT FOR DATA COLLECTION

Data collection for this study involved the use of a **structured questionnaire** designed to assess the knowledge, perception and acceptance of Teleradiology among radiographers and intern radiographers.

The questionnaire is divided into sections covering demographic details, level of Knowledge of Teleradiology, Perception towards the technology and Acceptance of the technology.

3.6 VALIDITY OF THE INSTRUMENT

The questionnaire was reviewed by experienced radiographers and supervisors ensuring it adequately addresses the research objectives and captures relevant aspects of knowledge and Acceptance of Teleradiology. This review helped establish content validity.

3.7 RELIABILITY OF THE INSTRUMENT

The reliability of the questionnaire was checked using Cronbach's alpha, which measures how well the different parts of the questionnaire work together .

3.8 METHOD OF DATA COLLECTION

The data for this study was collected using a structured questionnaire shared electronically. Participants were approached in person at UBTH and Raytouch Diagnostic Center, their WhatsApp number was collected to forward the link to the google form (questionnaire). Before distributing the questionnaire, the purpose of the study was explained to each participant and their consent was obtained. Respondents were asked to complete the questionnaire on their own

with the assurance that their responses will remain anonymous and used strictly for academic purposes.

3.9 METHOD OF DATA ANALYSIS

After collecting responses, the data was checked for completeness and entered into Statistical Package for the Social Sciences (SPSS) version 29 for analysis. Descriptive statistics such as frequencies, percentages, means were used to summarize the data. All results will be presented using tables and charts for clarity.

3.10 ETHICAL CONSIDERATIONS

Before the start of the study, ethical clearance was obtained from the Research and Ethics Committee of the University of Benin Teaching Hospital (UBTH). Participants was informed about the purpose of the study and their voluntary involvement. Only those who give their informed consent were included.

All responses will be kept anonymous and confidential, and no identifying information was collected. The data gathered will be used solely for academic purposes and stored securely to protect participants' privacy.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

This chapter presents the findings obtained from the 46 radiographers who participated in this study. The results are organized according to the research objectives and presented in tables and figures.

Table 4.1: Sociodemographic characteristics of the respondents

	Frequency	Percentage
Age of Respondent		
20 - 29	39	84.8
30 and above	7	15.2
Gender		
Male	29	63.0
Female	17	37.0
Years of Experience in Radiography		
<1 year	10	21.7
1 - 5 years	32	69.6
Above 5	4	8.7
Highest Academic Qualification		
B.Rad	42	91.3
M.Sc	1	2.2
Others	3	6.5
Place of Work		
UBTH	30	65.2
Raytouch	5	10.9
Others	11	23.9

4.1 Sociodemographic Characteristics of Respondents

Table 4.1 presents the sociodemographic characteristics of the study participants. The findings revealed that the majority of respondents (84.8%) were between 20-29 years of age, while only 15.2% were 30 years and above. Regarding gender distribution, males constituted 63.0% of the sample while females represented 37.0%.

In terms of professional experience, most respondents (69.6%) had 1-5 years of experience in radiography, followed by those with less than 1 year of experience (21.7%), and only 8.7% had more than 5 years of experience. The academic qualifications showed that the vast majority held a Bachelor of Radiography degree (B.Rad) at 91.3%, while only 2.2% had a Master of Science degree, and 6.5% had other qualifications.

Concerning place of work, 65.2% of the respondents worked at the University of Benin Teaching Hospital (UBTH), 10.9% at RayTouch Diagnostics, and 23.9% at other facilities.

4.2 Knowledge of Teleradiology among Respondents

Table 4.2: Knowledge of teleradiology among respondents

Question	Wrong	Correct
What does “teleradiology” mean?	3(6.5)	43(93.5)
What type of medical images can be sent using teleradiology?	1(2.2)	45(97.8)
Who receives and reviews images in teleradiology?	1(2.2)	45(97.8)
What is the main benefit of teleradiology for small hospitals?	2(4.3)	44(95.7)
How are medical images usually sent in teleradiology?	4(8.7)	42(91.3)
Can doctors use their personal phones for teleradiology?	11(23.9)	35(76.1)
When is teleradiology most helpful?	4(8.7)	42(91.3)
What should doctors do if they need to share images urgently?	7(15.2)	39(84.8)
Can teleradiology help patients in rural areas?	3(6.5)	43(93.5)
How quickly can a teleradiology report be completed?	2(4.3)	44(95.7)

Table 4.2 presents the knowledge assessment results for teleradiology among the respondents. The findings indicate a generally high level of knowledge across all assessed areas. The majority of respondents (93.5%) correctly answered the question about what teleradiology means, while only 6.5% provided incorrect responses. Understanding of the types of medical images that can be transmitted via teleradiology was even higher, with 97.8% answering correctly. Similarly, 97.8% correctly identified who receives and reviews images in teleradiology, and 95.7% understood the main benefit of teleradiology for small hospitals. Knowledge of how medical images are usually sent in teleradiology was correct among 91.3% of respondents. However,

there was relatively lower knowledge regarding the use of personal phones for teleradiology, with 23.9% answering incorrectly, though 76.1% still demonstrated correct understanding. Knowledge about when teleradiology is most helpful was correct among 91.3% of respondents. Regarding urgent image sharing protocols, 84.8% answered correctly, while 15.2% were incorrect. The understanding that teleradiology can help patients in rural areas was high at 93.5%. Finally, 95.7% correctly understood the timeframe for completing teleradiology reports.

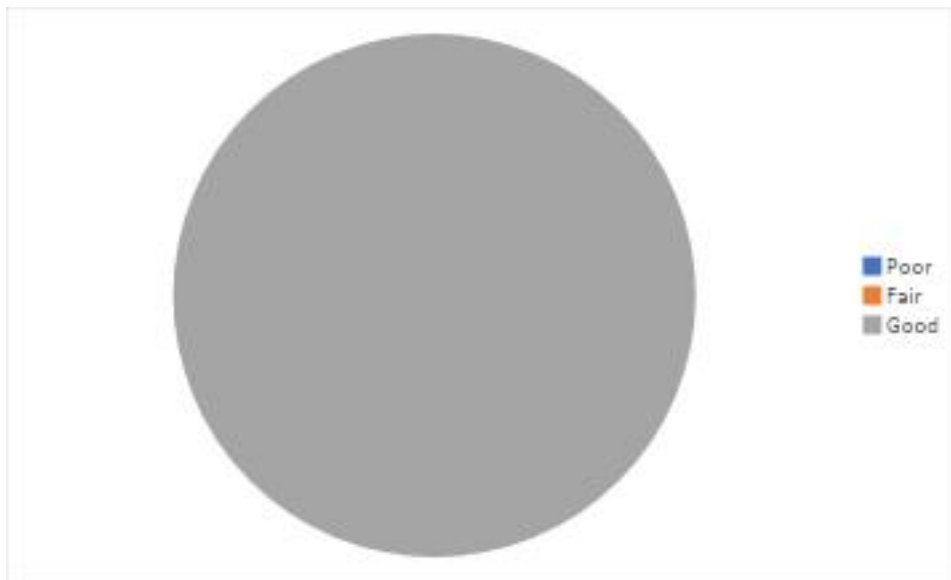


Figure 4.1: Level of Knowledge

Figure 4.1 shows the level of Knowledge of teleradiology. It shows that all the radiographers sampled have good level of knowledge.

4.3 Perception towards Teleradiology

4.3 Perception towards Teleradiology

Table 4.3: Perception towards Teleradiology

	Strongly disagree	Disagree	Agree	Strongly Agree	Mean
Teleradiology will improve the quality of healthcare delivery in Benin City	4(8.7)	2(4.3)	16(34.8)	24(52.2)	3.30
Teleradiology will provide faster access to expert radiological opinions	4(8.7)	1(2.2)	16(34.8)	25(54.3)	3.35
Teleradiology will reduce patient	3(6.5)	0(0.0)	21(45.7)	22(47.8)	3.35

waiting time for radiological reports					
Teleradiology will be beneficial for emergency and after-hours cases	4(8.7)	0(0.0)	17(37.0)	25(54.3)	3.37
Teleradiology will help small hospitals access specialist radiologists	3(6.5)	0(0.0)	17(37.0)	26(56.5)	3.43
Teleradiology implementation will be too expensive for most hospitals in Benin City	3(6.5)	26(56.5)	8(17.4)	9(19.6)	2.50
Poor internet connectivity will be a major barrier to teleradiology implementation	3(6.5)	5(10.9)	22(47.8)	16(34.8)	3.11
Teleradiology will lead to job losses among radiographers	18(39.1)	24(52.2)	3(6.5)	1(2.2)	1.72
Patient data security will be compromised with teleradiology	6(13.0)	32(69.6)	7(15.2)	1(2.2)	2.07
Teleradiology will reduce the need for face-to-face patient-doctor interaction	4(8.7)	8(17.4)	28(60.9)	6(13.0)	2.78

Table 4.3 presents respondents' perceptions regarding various aspects of teleradiology implementation. The results show predominantly positive perceptions across most benefit-related statements. Regarding the potential benefits, 52.2% strongly agreed that teleradiology will improve healthcare quality in Benin City, with a mean score of 3.30. The highest agreement was observed for the statement that teleradiology will help small hospitals access specialist radiologists, with 56.5% strongly agreeing (mean = 3.43). Similarly, 54.3% strongly agreed that teleradiology will provide faster access to expert opinions (mean = 3.35) and be beneficial for emergency cases (mean = 3.37). However, perceptions regarding potential challenges showed mixed responses. Concerning implementation costs, 56.5% disagreed that it would be too expensive, though 19.6% still believed cost would be prohibitive (mean = 2.50). Internet connectivity was identified as a significant concern, with 47.8% agreeing and 34.8% strongly agreeing it would be a major barrier (mean = 3.11). Fears about negative impacts were generally

low. The majority (91.3%) disagreed or strongly disagreed that teleradiology would lead to job losses among radiographers (mean = 1.72). Similarly, 82.6% disagreed or strongly disagreed that patient data security would be compromised (mean = 2.07). Regarding the impact on face-to-face interaction, responses were more mixed, with a mean score of 2.78.

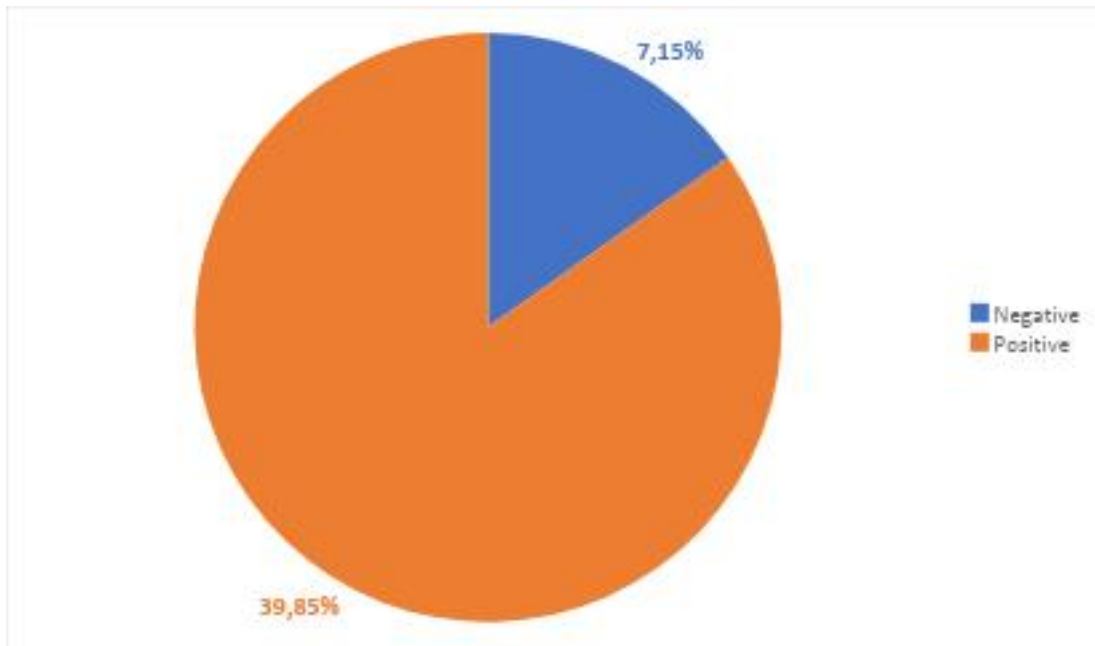


Figure 4.2: Level of Perception of teleradiology

Figure 4.2 Shows the level of perception towards teleradiology. It shows that 7(15.2%) have negative attitude while the remaining 39(84.8%) have positive attitude.

4.4 Acceptance of Teleradiology

Table 4.4: Acceptance of teleradiology

	Strongly disagree	Disagree	Agree	Strongly agree	Mean
I am willing to learn how to use teleradiology systems	2(4.3)	3(6.5)	22(47.8)	19(41.3)	3.26
I would be comfortable sending medical images through teleradiology platforms	1(2.2)	1(2.2)	27(58.7)	17(37.0)	3.30
I believe teleradiology will enhance	1(2.2)	6(13.0)	24(52.2)	15(32.6)	3.15

my professional skills					
I am ready to adapt my current work practices to include teleradiology	1(2.2)	1(2.2)	29(63.0)	15(32.6)	3.26
I support the implementation of teleradiology in my workplace	1(2.2)	0(0.0)	28(60.9)	17(37.0)	3.33
I am concerned about the technical complexity of teleradiology systems	2(4.3)	16(34.8)	22(47.8)	6(13.0)	2.70
I worry that teleradiology will increase my workload significantly	8(17.4)	20(43.5)	15(32.6)	3(6.5)	2.28
I am confident I can master teleradiology technology with proper training	1(2.2)	0(0.0)	25(54.3)	20(43.5)	3.39
I believe my hospital has the necessary infrastructure for teleradiology	2(4.3)	8(17.4)	25(54.3)	11(23.9)	2.98
I would recommend teleradiology implementation to other healthcare facilities	2(4.3)	2(4.3)	21(45.7)	21(45.7)	3.33

Table 4.4 presents the findings on radiographers' acceptance of teleradiology systems. The results demonstrate high levels of acceptance across multiple dimensions. Regarding willingness to learn, 41.3% strongly agreed they are willing to learn teleradiology systems, with an additional 47.8% agreeing (mean = 3.26). Comfort with sending medical images through teleradiology platforms was high, with 37.0% strongly agreeing and 58.7% agreeing (mean = 3.30). The highest acceptance was observed for confidence in mastering the technology with proper training, where 43.5% strongly agreed and 54.3% agreed (mean = 3.39). Support for implementation in the workplace was also strong, with 37.0% strongly agreeing and 60.9% agreeing (mean = 3.33). Similarly, willingness to recommend teleradiology to other facilities showed high acceptance (mean = 3.33). Concerns about technical complexity were moderate, with 47.8% agreeing it is a concern (mean = 2.70). However, worry about increased workload was relatively low, with most respondents disagreeing (mean = 2.28). Belief in their hospital's infrastructure readiness showed moderate acceptance (mean = 2.98), indicating some uncertainty about organizational preparedness.

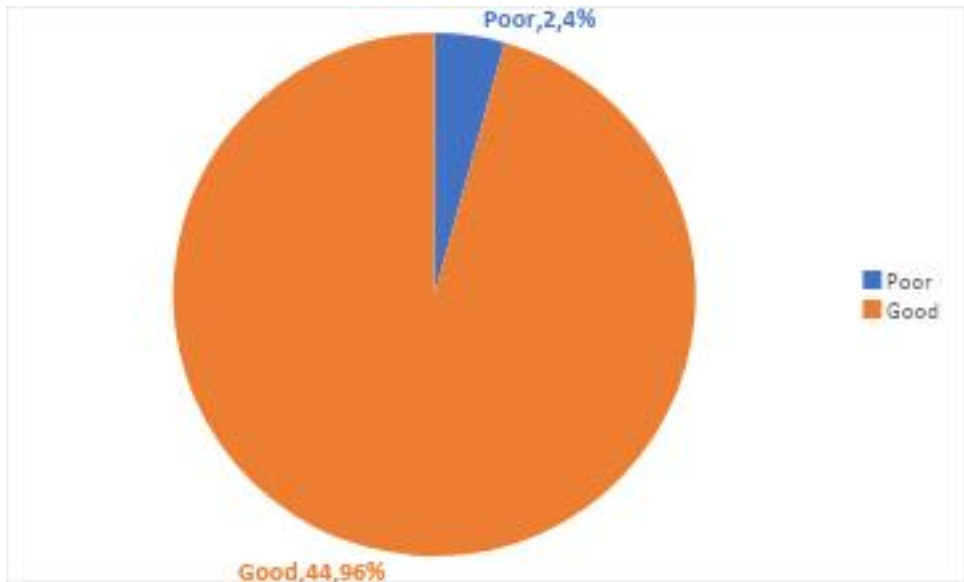


Figure 4.3: Level of acceptance of Teleradiology

Figure 4.3 shows the level of acceptance of Teleradiology. It shows that 2(4.3%) have poor acceptance, while 44(95.7%) have good acceptance level.

4.5 DISCUSSION

This study assessed the knowledge, perception, and acceptance of teleradiology among radiographers in Benin City, focusing on practitioners at the University of Benin Teaching Hospital (UBTH) and RayTouch Diagnostics Center. The findings provide valuable insights into the readiness of radiographers to adopt teleradiology systems in their clinical practice.

4.5.1 Sociodemographic Characteristics

The demographic profile of respondents revealed a predominantly young workforce, with 84.8% aged between 20-29 years and most having 1-5 years of experience (69.6%). This age distribution suggests a workforce that is likely more receptive to technological innovations and digital healthcare solutions. The finding aligns with Tegegne and colleagues’ observation that

younger healthcare professionals generally demonstrate better digital literacy and adaptability to new technologies.

The male predominance (63.0%) in the sample reflects the current gender composition of the radiography profession in Nigeria, though this is gradually changing with increased female enrollment in radiography programs. The fact that 91.3% held Bachelor's degrees indicates a well-educated workforce with foundational knowledge that can be built upon for teleradiology training.

The concentration of respondents at UBTH (65.2%) reflects the institution's role as a major teaching hospital and training center for radiographers in the region. This distribution provided perspectives from both large public hospital settings and smaller private diagnostic centers, enriching the study's findings.

4.5.2 Knowledge of Teleradiology

The study revealed remarkably high knowledge levels regarding teleradiology among respondents, with over 90% answering correctly on most knowledge assessment items. This finding is encouraging and somewhat unexpected given the limited implementation of teleradiology in Nigeria as documented by Tahir and colleagues in 2022.

The high knowledge scores, particularly in understanding basic teleradiology concepts (93.5%), types of transmissible images (97.8%), and the role of radiologists in the system (97.8%), suggest that radiographers in Benin City have received theoretical exposure to teleradiology, possibly through their academic training or continuing professional development activities. This contradicts earlier concerns by Elechi and colleagues regarding limited awareness of digital health technologies among Nigerian radiographers.

However, the relatively lower correct response rate (76.1%) regarding the use of personal phones for teleradiology indicates a knowledge gap in security protocols and appropriate technology use. This is particularly important given the security concerns highlighted in the perception section of this study. The finding echoes Ewing's 2022 observation about inadequate training on teleradiology security measures across African countries.

The high knowledge level about teleradiology's benefits for rural areas (93.5%) is particularly significant given Nigeria's healthcare accessibility challenges. This awareness suggests that radiographers understand the potential of teleradiology to address the country's uneven distribution of healthcare services, as documented by the World Bank statistics showing 48.8% of Nigerians living in rural areas.

4.5.3 Perception towards Teleradiology

Respondents demonstrated predominantly positive perceptions regarding the potential benefits of teleradiology. The highest mean score (3.43) was observed for the belief that teleradiology will help small hospitals access specialist radiologists. This perception aligns well with Nigeria's reality of having only 250-300 radiologists serving over 200 million people, as noted by Soroosh in 2015.

The positive perception regarding improvement in healthcare quality (mean = 3.30), faster access to expert opinions (mean = 3.35), and benefits for emergency cases (mean = 3.37) reflects an understanding of teleradiology's potential to transform healthcare delivery in Benin City. These findings are consistent with Ogasawara's 2001 study in Japan, where 60% of radiographers expressed interest in teleradiology for handling difficult and emergency cases.

Importantly, radiographers in this study largely dismissed fears about job displacement, with a mean score of only 1.72 on the statement about teleradiology leading to job losses. This positive

attitude contrasts with technology adoption resistance observed in some healthcare settings and suggests that radiographers view teleradiology as a tool to enhance rather than replace their professional role.

However, significant concerns were identified regarding infrastructure challenges. The high mean score (3.11) for poor internet connectivity as a barrier reflects real challenges in Nigeria's digital infrastructure. This finding corroborates Kragsterman's 2024 observation about poor internet infrastructure being a major limitation to teleradiology implementation in developing countries, particularly in rural areas. The concern is well-founded given that internet connectivity issues have been documented as a persistent challenge in Nigeria's healthcare digitalization efforts.

Interestingly, cost concerns were not as prominent as might be expected (mean = 2.50), with 56.5% disagreeing that implementation would be too expensive. This may reflect awareness of cloud-based solutions and mobile teleradiology applications that have reduced implementation costs compared to traditional PACS systems.

Data security concerns were minimal (mean = 2.07), suggesting confidence in modern encryption and data protection technologies. This contrasts with findings from some Western studies where data security remains a prominent concern. However, this low concern level may also reflect limited awareness of specific cybersecurity risks, which could be addressed through targeted training programs.

4.5.4 Acceptance of Teleradiology

The acceptance levels observed in this study were consistently high across all measured dimensions, with mean scores ranging from 2.98 to 3.39. The highest acceptance was demonstrated for confidence in mastering the technology with proper training (mean = 3.39),

indicating that radiographers do not view teleradiology as insurmountably complex but recognize the need for adequate training.

The high willingness to learn (mean = 3.26) and adapt current work practices (mean = 3.26) suggests that radiographers in Benin City are ready for the paradigm shift that teleradiology represents. This readiness is crucial for successful implementation, as noted by Jacob in 2023, who emphasized that radiographer acceptance is a key factor in teleradiology success.

Strong support for workplace implementation (mean = 3.33) and willingness to recommend the system to other facilities (mean = 3.33) indicate not just personal acceptance but advocacy for broader adoption. This is particularly important given that successful teleradiology networks often depend on interconnected facilities sharing resources and expertise.

The moderate concern about technical complexity (mean = 2.70) is reasonable and highlights the need for user-friendly interfaces and comprehensive training programs. This finding aligns with Bacharach's 2014 observation that technology complexity can be a barrier, particularly for older professionals and those in resource-limited settings.

Importantly, radiographers did not perceive teleradiology as significantly increasing their workload (mean = 2.28), suggesting they understand it as a workflow enhancement rather than an additional burden. This perception is critical for sustainable adoption, as workload concerns have been cited as barriers to technology adoption in other studies.

The somewhat lower score for belief in hospital infrastructure readiness (mean = 2.98) reflects realistic awareness of current infrastructural limitations, particularly at UBTH and smaller diagnostic centers. This pragmatic assessment underscores the need for infrastructure development to accompany training and policy initiatives.

The findings of this study show both similarities and differences when compared with previous research. Like Ogasawara's 2001 Japanese study, this research found high awareness and interest in teleradiology among radiographers. However, unlike that study where few expected direct involvement, radiographers in Benin City demonstrated high readiness for active participation in teleradiology systems.

The positive attitudes observed align with Abodahab's 2021 findings in Egypt, where radiographers showed full acceptance of PACS-based teleradiology systems. However, the infrastructure concerns identified in this study echo challenges documented by Essop in 2019 in South Africa and Ewing in 2022 across multiple African countries.

Unlike Ranschaert's 2013 European study where 69% reported inadequate patient history integration, radiographers in this study showed more optimism about system implementation, possibly because they are viewing teleradiology as a future solution rather than critiquing an existing system.

CHAPTER FIVE

CONCLUSION, RECOMMENDATIONS AND SUGGESTATIONS FOR FURTHER STUDIES

5.1 CONCLUSION

This study successfully assessed the knowledge, perception, and acceptance of teleradiology among radiographers in Benin City. The findings revealed that radiographers possess good knowledge of teleradiology concepts and applications, with over 90% demonstrating correct understanding of most assessed areas. Their perception toward teleradiology is predominantly positive, recognizing its potential to improve healthcare quality, increase access to expert opinions, and support underserved areas. Acceptance levels are high, with radiographers expressing willingness to learn, adapt their practices, and support implementation.

However, significant concerns exist regarding internet infrastructure and the need for comprehensive training programs. These concerns are not rooted in resistance to change but rather in realistic assessment of current technological and organizational readiness.

The study addresses a significant gap in Nigerian healthcare literature by providing empirical data on radiographers' readiness for teleradiology adoption. It confirms that radiographers are not barriers to implementation but Teleradiology implementation requires adequate support through infrastructure development, training, and clear implementation policies.

5.2 RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

1. The healthcare facilities in Benin City should invest in reliable internet connectivity and establish backup systems to ensure uninterrupted teleradiology services. This may include dedicated internet lines, backup generators, and alternative connectivity solutions.
2. Institutions should develop comprehensive training programs that address not only technical skills but also security protocols, legal requirements, and workflow integration. Training should be ongoing rather than one-time, addressing emerging technologies and best practices.
3. The Department of Radiography at the University of Benin and other training institutions should integrate comprehensive teleradiology modules into their curricula, including hands-on training with teleradiology platforms.
4. Regular workshops and seminars on teleradiology should be organized for practicing radiographers to maintain and enhance their knowledge and skills.
5. The Radiographers Registration Board of Nigeria (RRBN) should develop clear standards, guidelines, and best practices for teleradiology implementation and practice in Nigeria.

5.3 LIMITATIONS OF THE STUDY

This study has several limitations that should be considered when interpreting the findings:

1. The sample size of 46, while appropriate for the target population, limits the generalizability of findings.
2. The study assessed knowledge, perception, and acceptance without observing actual teleradiology use, as systems are not yet widely implemented in the study area.
3. Self-reported data through questionnaires may be subject to social desirability bias, with respondents potentially providing answers they believe are expected rather than their true views.

4. The cross-sectional design captured data at a single point in time, providing a snapshot rather than understanding how attitudes might change with exposure to actual systems.

Despite these limitations, the study provides valuable baseline data on radiographer readiness for teleradiology in Benin City and offers important insights for planning implementation strategies.

5.4 Suggestions for Future Research

1. Future research should track the actual implementation process and adoption outcomes over time to identify evolving challenges and success factors.
2. Research comparing teleradiology knowledge and acceptance across different Nigerian cities would provide broader insights into national readiness.
3. Action research accompanying actual teleradiology implementation would provide valuable practical insights into overcoming barriers.

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APPENDIX

QUESTIONNAIRE

ASSESSMENT OF KNOWLEDGE AND ACCEPTANCE OF TELERADIOLOGY AMONG RADIOGRAPHERS IN BENIN CITY.

I am a final year student of the Department of Radiography, School of Basic Medical Sciences, University of Benin. I am conducting a research project in Partial fulfillment for the award of a Bachelor of Radiography degree.

I kindly ask for your time and honest responses in completing this questionnaire. Your participation is important and will be greatly appreciated.

GENERAL INSTRUCTION FOR PARTICIPANTS:

Do not write personal details not asked (for example phone number) and be truthful as much as possible. Tick [✓] where appropriate. Please answer all questions

SECTION A: DEMOGRAPHIC INFORMATION

(Tick (✓) the appropriate response or fill in where necessary.)

1. Age: Below 20 20–29 30 and above
2. Gender: Male Female
3. Years of experience in radiography: Less than 1 year 1–5 years More than 5 years
4. Highest academic qualification: B.Rad MSc Others (specify): _____
5. Place of work: University of Benin Teaching Hospital (UBTH) RayTouch Diagnostics Center Others

SECTION B: KNOWLEDGE OF TELERADIOLOGY

Tick (✓) the best answer that suits the questions

1. What does "teleradiology" mean? A) Taking X-rays with a telephone B) Sending medical images over the internet to doctors far away C) Using television to show medical images D) Storing images on a computer
2. What type of medical images can be sent using teleradiology? A) Only X-rays B) Only CT scans C) X-rays, CT scans, MRIs, and ultrasounds D) Only ultrasounds
3. Who looks at the medical images in teleradiology? A) Nurses B) Radiologists (doctors who specialize in reading medical images) C) Technicians D) Patients
4. What is the main benefit of teleradiology for small hospitals? A) It makes images look better B) It's cheaper than regular X-rays C) They can get expert opinions without having a radiologist on-site D) It takes less time to take pictures
5. How are medical images usually sent in teleradiology? A) By mail B) Over secure, encrypted internet connections C) By fax machine D) By telephone
6. Can doctors use their personal phones for teleradiology? A) Yes, any phone works B) Only if they have special medical apps with proper security C) No, never allowed D) Only for emergencies
7. When is teleradiology most helpful? A) During normal business hours only B) Only on weekends C) At night and during emergencies when local doctors aren't available D) Only during holidays
8. What should doctors do if they need to share images urgently? A) Use any available app quickly B) Use approved, secure medical platforms even if it takes longer C) Send by regular text message D) Wait until the next day

9. Can teleradiology help patients in rural areas? A) No, it only works in cities B) Yes, it brings expert medical opinions to remote areas C) Only if they have special equipment D) It doesn't make any difference

10. How quickly can a teleradiology report be completed? A) Always takes several days B) Can be done within minutes to hours depending on urgency C) Only during business hours D) Takes at least one week

SECTION C: PERCEPTION TOWARDS TELERADIOLOGY

Tick [✓] the option that best reflects your opinion

1 – Strongly disagree; 2- Disagree; 3 – Agree; 4- Strongly agree

Statement 1 2 3 4

1. Teleradiology will improve the quality of healthcare delivery in Benin City
2. Teleradiology will provide faster access to expert radiological opinions
3. Teleradiology will reduce patient waiting time for radiological reports
4. Teleradiology will be beneficial for emergency and after-hours cases
5. Teleradiology will help small hospitals access specialist radiologists
6. Teleradiology implementation will be too expensive for most hospitals in Benin City
7. Poor internet connectivity will be a major barrier to teleradiology implementation
8. Teleradiology will lead to job losses among radiographers
9. Patient data security will be compromised with teleradiology
10. Teleradiology will reduce the need for face-to-face patient-doctor interaction

SECTION C: ACCEPTANCE OF TELERADIOLOGY SYSTEMS

1 – Strongly disagree; 2- Disagree; 3 – Agree; 4- Strongly agree

Instructions: Please circle the number that best represents your opinion.

Statement 1 2 3 4

1. I am willing to learn how to use teleradiology systems
2. I would be comfortable sending medical images through teleradiology platforms
3. I believe teleradiology will enhance my professional skills
4. I am ready to adapt my current work practices to include teleradiology
5. I support the implementation of teleradiology in my workplace
6. I am concerned about the technical complexity of teleradiology systems
7. I worry that teleradiology will increase my workload significantly
8. I am confident I can master teleradiology technology with proper training
9. I believe my hospital has the necessary infrastructure for teleradiology
10. I would recommend teleradiology implementation to other healthcare facilities

APPENDIX

ETHICAL APPROVAL

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL
P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

CHIEF MEDICAL DIRECTOR **DIRECTOR OF ADMINISTRATION** **CHAIRMAN**
Prof. Darlington E. Obaseki Jim Uwadiae, Esq Prof. (Mrs.) Antoinette N. Ofili
E-mail: utobaseki@gmail.com

HREC OFFICE:
Committee email: ubthresearchethics@gmail.com
Registration Number: NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADME 22/A/VOL.VI/2025/159

PROPOSAL TITLE: "ASSESSMENT OF KNOWLEDGE AND PERCEPTION OF TELERADIOLOGY AMONG RADIOGRAPHERS IN BENIN CITY"

PRINCIPAL INVESTIGATOR(S): DARLINGTON BRIDGET UCHECHUKWU


DEPARTMENT/INSTITUTION: DEPARTMENT OF RADIOGRAPHY, SCHOOL OF BASIC MEDICAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

DATE CONSIDERED: AUGUST 6TH, 2025

DECISION OF THE COMMITTEE: APPROVED


THIS APPROVAL DATES 6/8/2025 TO 5/8/2026. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY


REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI **SIGNATURE & DATE:**  6/8/2025

SUPERVISOR (S): DR. G E. OKUNGBOWA

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

Signature & Date:  13/08/2025

 ubthresearchethics@gmail.com Registration Number: NHREC/24/01/202

APPENDIX II
QUESTIONNAIRE

ASSESSMENT OF KNOWLEDGE AND ACCEPTANCE OF TELERADIOLOGY
AMONG RADIOGRAPHERS IN BENIN CITY.

I am a final year student of the Department of Radiography, School of Basic Medical Sciences, University of Benin. I am conducting a research project in Partial fulfillment for the award of a Bachelor of Radiography degree.

I kindly ask for your time and honest responses in completing this questionnaire. Your participation is important and will be greatly appreciated.

GENERAL INSTRUCTION FOR PARTICIPANTS:

Do not write personal details not asked (for example phone number) and be truthful as much as possible. Tick [✓] where appropriate. Please answer all questions

SECTION A: DEMOGRAPHIC INFORMATION

(Tick (✓) the appropriate response or fill in where necessary.)

1. Age: Below 20 20–29 30 and above
2. Gender: Male Female
3. Years of experience in radiography: Less than 1 year 1–5 years More than 5 years
4. Highest academic qualification: B.Rad MSc Others (specify): _____
5. Place of work: University of Benin Teaching Hospital (UBTH) RayTouch Diagnostics Center Others

SECTION B: KNOWLEDGE OF TELERADIOLOGY

Tick (✓) the best answer that suits the questions

1. What does "teleradiology" mean? A) Taking X-rays with a telephone B) Sending medical images over the internet to doctors far away C) Using television to show medical images D) Storing images on a computer

2. What type of medical images can be sent using teleradiology? A) Only X-rays B) Only CT scans C) X-rays, CT scans, MRIs, and ultrasounds D) Only ultrasounds

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SECTION C: PERCEPTION TOWARDS TELERADIOLOGY

Tick [✓] the option that best reflects your opinion

1 – Strongly disagree; 2- Disagree; 3 – Agree; 4- Strongly agree

Statement 1 2 3 4

1. Teleradiology will improve the quality of healthcare delivery in Benin City
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9. Patient data security will be compromised with teleradiology
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SECTION C: ACCEPTANCE OF TELERADIOLOGY SYSTEMS

1 – Strongly disagree; 2- Disagree; 3 – Agree; 4- Strongly agree

Instructions: Please circle the number that best represents your opinion.

Statement 1 2 3 4

1. I am willing to learn how to use teleradiology systems
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9. I believe my hospital has the necessary infrastructure for teleradiology
10. I would recommend teleradiology implementation to other healthcare facilities

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Jim Uwadie, Esq

CHAIRMAN
Prof. (Mrs.) Antoinette N. Ofili



HREC OFFICE:

Committee email: ubthresearchethics@gmail.com

Registration Number:

NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/150

PROPOSAL TITLE: "ASSESSMENT OF KNOWLEDGE AND PERCEPTION OF TELERADIOLOGY AMONG RADIOGRAPHERS IN BENIN CITY"

PRINCIPAL INVESTIGATOR(S): DARLINGTON BRIDGET UCHECHUKWU

DEPARTMENT/INSTITUTION: DEPARTMENT OF RADIOGRAPHY, SCHOOL OF BASIC MEDICAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

DATE CONSIDERED: AUGUST 6TH, 2025

DECISION OF THE COMMITTEE: APPROVED

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REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI

SIGNATURE & DATE:

SUPERVISOR (S): DR. G. E. OKUNGBOWA



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Signature & Date:

[Handwritten Signature] 13/08/2025



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Registration Number: NHREC/24/01/202

