ASSESSMENT OF RADIOGRAPHERS' KNOWLEDGE AND AWARENESS ON ENTREPRENEURIAL VENTURES IN RADIOGRAPHY

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PROJECT RESEARCH

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CERTIFICATION

This is to certify that this research project by **AGBONTA GIFT OSAWE** with a matriculation number of **BMS2005175** has been examined and approved for the award of Bachelors of Radiography in the department of Radiography, School of Basic Medical Science, University of Benin, Benin City.

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EXTERNAL EXAMINER	**Date**

DEDICATION

I dedicate all my efforts and struggles of my educational life to God, my dear parents and siblings without them I'm meaningless.

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My sincere appreciation to God for his abundant grace, guidance, and strength throughout the course of this project. I would like to express my profound appreciation to my supervisor, **Mrs Igbinedion F.O** for her patience, invaluable support, and constructive idea which aided this project work. I am deeply indebted to my beloved parents, Mr and Mrs Agbonta for their unwavering support have been a strong pillar throughout my academic journey, and I remain ever thankful for their sacrifices and belief in my potential.

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ABSTRACT

Background: Entrepreneurship has become an essential component of healthcare innovation, offering professionals in technical fields such as radiography opportunities for career advancement and self-reliance. However, many radiographers remain underprepared to explore entrepreneurial ventures due to limited knowledge, poor awareness of support systems, and systemic barriers.

Aim: The study aimed to assess the level of knowledge, awareness, and the factors influencing radiographers' engagement in entrepreneurial ventures in radiography.

Methods: A descriptive cross-sectional survey design was adopted for the study. Data were collected using a structured questionnaire administered to 31 radiographers in Benin City. Descriptive statistics such as frequencies and percentages were used for data analysis, while the Chi-square statistical test was applied to test the hypotheses at a 0.05 level of significance.

Results: The findings revealed that most radiographers had a fair level of knowledge about entrepreneurship but showed low awareness of existing support systems and opportunities for business development in radiography. Major barriers identified included lack of startup capital (71.0%), absence of entrepreneurship training in radiography education (80.6%), and bureaucratic licensing procedures (67.7%). The Chi-square analysis further showed a significant relationship between radiographers' level of knowledge and awareness of entrepreneurial ventures.

Conclusion: The study concluded that radiographers possess moderate knowledge but low awareness and limited practical preparedness for entrepreneurship. Financial limitations, inadequate curriculum emphasis, and insufficient mentorship opportunities were key constraints. It was recommended that entrepreneurship modules be incorporated into radiography curricula, with policy support and access to funding programs to promote self-employment among radiographers.

Keywords: Radiographers, Entrepreneurship, Knowledge, Awareness, Barriers, Support Systems.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In recent years, the field of radiography has undergone significant transformation due to technological advancements, increasing patient demands, and the growing importance of imaging in modern healthcare. Traditionally, radiographers were seen primarily as hospital-based professionals responsible for capturing diagnostic images. However, with the rise in privatization of healthcare services, globalization of medical imaging technology, and the push for innovative service delivery models, the profession is beginning to witness emerging non-traditional roles that include entrepreneurship. These developments have created opportunities for radiographers to establish and manage diagnostic centers, engage in mobile and teleradiology services, or even consult in imaging equipment procurement and training. Nevertheless, the extent to which radiographers are aware of and prepared for such entrepreneurial possibilities remains an area of concern (Al-Worafi, 2024)).

Nigeria's healthcare system faces numerous challenges including inadequate infrastructure, a shortage of qualified professionals, and limited access to essential diagnostic services in rural and underserved areas. These systemic gaps present viable opportunities for private-sector solutions, especially through entrepreneurial initiatives led by health professionals such as radiographers. Establishing privately owned imaging centers, health startups focusing on radiology technology, and freelance consultancy are avenues through which radiographers can improve both their economic standing and the accessibility of imaging services in Nigeria. However, despite the visible need and potential, studies have shown that many radiographers

lack the requisite exposure, business acumen, or motivation to venture into entrepreneurship (Cowling, 2018). This may be attributed to gaps in the radiography curriculum, which often lacks a structured focus on entrepreneurship and innovation.

Entrepreneurship in radiography has been recognized globally as a strategic tool for improving healthcare delivery and professional relevance. According to the World Health Organization (2023), engaging the private sector in health services delivery is a crucial strategy for achieving universal health coverage. In this context, radiographers who understand the prospects of entrepreneurship can contribute significantly to reducing diagnostic delays, especially in resource-limited settings. The ability to run imaging businesses or create innovative diagnostic solutions not only benefits patients but also enhances the professional autonomy and job satisfaction of radiographers. However, the success of these entrepreneurial initiatives is largely dependent on the awareness, mindset, and business literacy of the professionals involved (Okpaleke, 2023).

Moreover, the current economic climate in Nigeria, marked by high unemployment and underemployment among health professionals, makes it imperative to explore alternative career pathways. Entrepreneurial ventures can serve as a means of economic empowerment and professional diversification for radiographers. Unfortunately, anecdotal evidence and some regional studies suggest that many radiographers graduate without adequate knowledge of how to convert their skills into viable business models. Most radiography training institutions in Nigeria prioritize technical and clinical competencies while neglecting essential entrepreneurial skills such as market analysis, funding strategies, customer service, and regulatory compliance (Yousem, 2023). This neglect limits the confidence and willingness of graduates to consider self-employment or enterprise development.

Understanding radiographers' knowledge and awareness levels regarding entrepreneurial ventures is therefore essential for bridging this gap. It would provide valuable insights into whether existing training prepares them adequately for the business side of healthcare delivery. This information would be beneficial for curriculum developers, policymakers, and professional bodies in reviewing and possibly integrating entrepreneurial education into radiography programs. Additionally, such insights can inform the design of targeted interventions such as workshops, seminars, and mentorship programs aimed at equipping radiographers with the skills and confidence needed to pursue entrepreneurship (Mercer, 2024). These initiatives are not only vital for professional development but also for addressing healthcare delivery gaps in the country.

The dynamic nature of healthcare delivery in Nigeria, coupled with the increasing need for innovative service provision, highlights the importance of entrepreneurship in radiography. By assessing radiographers' knowledge and awareness on this subject, this study seeks to uncover critical gaps, promote professional empowerment, and contribute to the broader discourse on sustainable healthcare solutions. With appropriate knowledge and exposure, radiographers can become key players in transforming diagnostic services through entrepreneurial ventures. Therefore, this study is timely, as it aligns with both national development goals and global health strategies that emphasize self-reliance, innovation, and private-sector engagement in healthcare (Bärnreuther, 2023).

1.2 Statement of The Problem

Despite the increasing demand for diagnostic imaging services and the growing privatization of healthcare in Nigeria, many radiographers remain confined to traditional employment settings such as public hospitals and teaching institutions (Okaro & Ohagwu, 2010). This trend suggests a limited exploration of entrepreneurial ventures within the field, even though opportunities such

as establishing private imaging centers, offering teleradiology services, and engaging in equipment sales or consultancy are expanding. The lack of visible radiographer-led businesses raises critical questions about whether radiographers possess the knowledge, attitude, and awareness necessary to identify and pursue these opportunities. If these professionals are inadequately prepared or uninformed about the business aspects of their field, they may miss out on contributing meaningfully to healthcare innovation, job creation, and personal career advancement.

Moreover, there is a noticeable scarcity of empirical data and academic research in Nigeria that focuses specifically on the entrepreneurial readiness of radiographers. While some allied health professions such as pharmacy and nursing are increasingly integrating entrepreneurship into their training and professional culture, radiography appears to lag in this regard (Okpaleke, Nwokorie, & Sani, 2023). This gap in understanding hinders stakeholders including policymakers, educators, and professional bodies from developing targeted programs that foster entrepreneurship among radiographers. Without concrete data on radiographers' current perceptions and preparedness, efforts to promote innovation, self-employment, and economic diversification within the healthcare sector may remain ineffective or misdirected. It is on the basis of the above that the researcher seeks to carry out assessment on Radiographers' knowledge and awareness on the prospects of entrepreneurial ventures in Radiography.

1.3 Research Questions

The following research questions were raised in order to guide the study:

1. What is the level of knowledge radiographers possess regarding entrepreneurial opportunities in radiography?

2. To what extent are radiographers aware of the available support systems and opportunities for entrepreneurship in radiography?
3. What factors influence radiographers' interest or willingness to pursue entrepreneurship in radiography?
4. What barriers hinder radiographers from pursuing entrepreneurial ventures in the Nigerian healthcare system?

1.4 Research Hypothesis

1. **Null Hypothesis (H_{01}):** There is no significant relationship between radiographers' knowledge and awareness of entrepreneurial ventures in radiography.

Alternative Hypothesis (H_{11}): There is a significant relationship between radiographers' knowledge and awareness of entrepreneurial ventures in radiography.

1.5 Aims and Objectives of the Study

The aim of this research is to carry out a study on Radiographers' knowledge and awareness on entrepreneurial ventures in Radiography.

Below are the specific objectives:

1. To assess the level of knowledge radiographers have about entrepreneurial opportunities in their profession.
2. To evaluate the extent of radiographers' awareness of existing support systems, policies, and opportunities for entrepreneurship.
3. To find out the factors influence radiographers' interest or willingness to pursue entrepreneurship in radiography?

4. To explore the challenges and barriers that limit radiographers from becoming entrepreneurs in the healthcare sector.

1.6 Significance of the Study

The significance of this study lies in its potential to uncover the current level of knowledge and awareness that radiographers possess regarding entrepreneurial opportunities within their field. As the healthcare sector evolves and the demand for imaging services continues to grow, understanding how radiographers perceive and respond to entrepreneurial prospects becomes crucial for expanding the profession beyond traditional hospital settings. This study will serve as a valuable resource for policymakers, educators, and professional bodies in developing targeted training programs that encourage innovation, self-employment, and private practice among radiographers. Ultimately, the findings could help promote economic empowerment, job creation, and improved access to radiological services, especially in underserved areas.

1.7 Scope of the Study

This study is limited to assessing the knowledge and awareness of radiographers on the prospects of entrepreneurial ventures within the field of radiography. It specifically focuses on radiographers practicing at the University of Benin Teaching Hospital (UBTH), both in Benin City, Edo State. The study will not cover other healthcare professionals or radiographers outside the selected institutions.

1.8 Operational Definition of Terms

Radiography: A medical imaging technique that uses various forms of radiation, primarily X-rays, CT scans, MRI, and ultrasound to produce images of the internal structures of the body for diagnostic purposes.

Radiographer: A healthcare professional specialized in performing diagnostic imaging procedures, operating imaging equipment, and ensuring patient safety during radiographic examinations.

Entrepreneurial Ventures: Business activities or initiatives that involve setting up and managing a new business or enterprise. In the context of radiography, this refers to the establishment of private imaging centers, offering teleradiology services, providing consultancy in imaging, or engaging in the sales and leasing of medical imaging equipment.

Knowledge: The understanding or awareness of facts, principles, and concepts. In this study, it refers to the radiographers' familiarity with entrepreneurial opportunities, the basics of business management, and the practical aspects of starting and running a business in the field of radiography.

Awareness: The degree to which radiographers are informed or conscious of available entrepreneurial opportunities, resources, support systems (such as grants, training programs, or government policies), and the broader healthcare industry's move towards privatization and innovation.

CHAPTER TWO

LITERATURE REVIEW

2.1 CONCEPTUAL REVIEW

2.1.1 Concept of Entrepreneurship

Entrepreneurship is fundamentally defined as the process of designing, launching, and running a new business, often initially a small enterprise, which offers a product, process, or service for sale or hire. At its core, it involves identifying a gap in the market and creating solutions that meet unmet or under-served needs. Entrepreneurs are typically seen as innovators who introduce new ideas, products, or methods, and who are willing to take risks to bring their visions to life. According to Corrêa (2022), entrepreneurship combines innovation, risk-taking, and proactive decision-making with the ultimate goal of generating value for the entrepreneur and society.

Modern interpretations of entrepreneurship go beyond profit generation to include social and technological transformation. Social entrepreneurship, for instance, focuses on solving societal problems with sustainable business models, while tech entrepreneurship involves leveraging cutting-edge technologies to create scalable solutions (Buonocore et al., 2024). These expanded roles have made entrepreneurship a significant driver of economic growth and social development in both developed and developing countries. In Nigeria, entrepreneurship has gained attention as a viable solution to rising unemployment and economic instability (Abdulrazaq et al., 2024).

Entrepreneurship also reflects a mindset that values opportunity recognition, resource mobilization, and persistence in the face of challenges. Entrepreneurs must be adaptable and

resilient, continuously adjusting to market trends, customer needs, and competitive pressures. This adaptability is essential in rapidly changing sectors like healthcare, technology, and education. Al-Fattal (2024) emphasized that entrepreneurship is not limited to personality traits but is a discipline that can be learned and practiced, which underscores the importance of entrepreneurial education and training programs for aspiring professionals across various fields.

Moreover, the entrepreneurial process is iterative and requires continuous learning and strategic thinking. Entrepreneurs are expected to assess their external environment, develop unique value propositions, and implement growth strategies in a competitive marketplace. They also contribute to job creation, innovation diffusion, and wealth distribution. In low-resource settings, such as Nigeria, entrepreneurship holds the potential to democratize economic participation and reduce dependency on government employment (Audretsch, et al., 2000). Thus, entrepreneurship is not merely a career path but a critical catalyst for national development and transformation.

2.1.2 Importance of Entrepreneurship in Healthcare

Entrepreneurship in healthcare has become increasingly vital in addressing global and local health system challenges, particularly in regions with constrained public health infrastructure. Through innovative business models and services, healthcare entrepreneurs contribute to improved access, efficiency, and quality of care. For example, telemedicine, mobile clinics, and e-health platforms have expanded healthcare delivery beyond conventional hospital boundaries, particularly in underserved areas (Adeghe et al., 2024). These innovations have also reduced geographical and financial barriers, thus improving equity in healthcare access.

The role of healthcare entrepreneurship is also evident in medical technology development and pharmaceutical innovation. Entrepreneurs in these sectors bring new medical devices, diagnostic

tools, and treatment options to the market, thereby accelerating the advancement of medical practice. According to Fernandez-Moure (20216), healthcare entrepreneurs help bridge the innovation gap between research and implementation, translating scientific knowledge into practical applications that benefit patients. Moreover, private healthcare enterprises often provide higher levels of customer service, shorter wait times, and more specialized care, enhancing patient satisfaction.

Entrepreneurial initiatives in healthcare also contribute to economic development by creating employment opportunities, fostering competition, and encouraging investment in health-related infrastructure. This is especially relevant in Nigeria, where the public sector struggles with limited resources, brain drain, and poor service delivery. Entrepreneurship enables health professionals to take control of their careers, offer specialized services, and establish private practices, thus reducing dependence on public health jobs (Becker et al., 2019). In addition, it promotes interdisciplinary collaboration, as healthcare providers partner with tech innovators, financiers, and business experts to deliver holistic solutions.

Healthcare entrepreneurship encourages efficiency and accountability in service delivery. Unlike the bureaucratic nature of some public health systems, private entrepreneurial ventures often operate with performance-based metrics and quality assurance systems. This drives innovation and cost-effectiveness while meeting patient expectations. As Nigeria works toward achieving universal health coverage, the integration of entrepreneurial strategies in healthcare delivery is essential for building resilient, inclusive, and sustainable health systems (Bloom et al., 2018).

2.1.3 Entrepreneurial Opportunities in Radiography

Radiography, a core component of diagnostic medicine, offers a wide range of entrepreneurial opportunities, particularly as technology and healthcare needs evolve. One of the most prominent avenues is the establishment of diagnostic imaging centers, which provide services such as X-rays, CT scans, MRI, and ultrasound to both public and private clients. Given the rising prevalence of non-communicable diseases and trauma cases, demand for medical imaging continues to grow, especially in urban and semi-urban regions (Al-Worafi, 2024). Radiographers with entrepreneurial ambitions can leverage this demand by setting up their own imaging facilities, either independently or in partnership with other medical professionals.

Another major area of opportunity lies in the realm of teleradiology, where radiographic images are transmitted electronically for interpretation across distances. This innovation has revolutionized access to imaging services in rural and underserved communities, where radiologists may be scarce. Teleradiology services offer convenience, cost-effectiveness, and timely diagnoses, which are critical in emergency cases. With the proper infrastructure, radiographers can establish teleradiology hubs that serve multiple hospitals or clinics, thereby increasing both reach and revenue (Al-Worafi, 2024). Entrepreneurs in this domain can also explore partnerships with international networks or develop platforms that connect healthcare providers with remote imaging experts.

Radiographers can also explore entrepreneurship through equipment sales, service and maintenance, radiographic education, and software development. The growing market for portable X-ray machines, digital imaging software, and PACS (Picture Archiving and Communication Systems) presents lucrative opportunities. Radiographers with technical know-how and business acumen can distribute, install, and maintain such equipment or even train other

professionals on their usage. Additionally, with continuous professional development becoming mandatory in many settings, establishing training institutes or offering certification programs in advanced imaging techniques can serve both educational and commercial purposes (Bloom et al., 2018).

Moreover, the intersection of radiography with artificial intelligence (AI) opens new horizons for innovation. AI is increasingly being used for image enhancement, anomaly detection, and workflow optimization in radiology. Radiographers with expertise in data analytics and imaging can develop or market AI-based tools that improve diagnostic accuracy and efficiency. Entrepreneurial radiographers may also consult on regulatory compliance, quality assurance, or start niche practices focusing on pediatric, musculoskeletal, or cardiovascular imaging. As healthcare decentralizes, the role of the radiographer is expanding beyond technical imaging to encompass strategic decision-making and enterprise development (Ahmad et al., 2025).

Below is some list of entrepreneurial opportunities in radiography:

1. Diagnostic Imaging Centers (X-ray, CT, MRI, Ultrasound)
2. Mobile Radiography Services
3. Teleradiology Services
4. Radiographic Equipment Sales and Leasing
5. Equipment Maintenance and Servicing
6. Radiography Training and Continuing Education Institutes
7. Medical Imaging Consultancy Services
8. Radiographic Software and App Development

9. Artificial Intelligence Integration in Imaging
10. Radiography Research and Innovation Hubs
11. Freelance or Contract-based Radiography Practice
12. Establishment of Specialized Imaging Clinics (e.g., Pediatric, Orthopedic)
13. Quality Assurance and Compliance Auditing Services
14. Radiographic Content Creation and Online Education Platforms
15. Importation and Distribution of Radiographic Consumables

2.1.4 Radiographers' Knowledge of Entrepreneurial Ventures

Radiographers' knowledge of entrepreneurial ventures is increasingly gaining attention as the profession evolves beyond traditional hospital-based roles. Entrepreneurial knowledge refers to the understanding of business concepts, innovation strategies, and the ability to identify and exploit market opportunities (Corrêa et al., 2024). In the context of radiography, this includes competencies in business planning, service development, marketing of diagnostic services, and the establishment of private radiology practices or mobile imaging units. However, several studies reveal that while radiographers are highly trained in clinical skills, many lack adequate exposure to entrepreneurship during their academic training (Al-Worafi, 2024). This knowledge gap presents a barrier to self-employment and innovation, especially in Nigeria where the demand for radiology services is high but access remains limited due to infrastructural and financial constraints.

The absence of structured entrepreneurship education in most radiography curricula significantly contributes to the limited entrepreneurial competencies among practitioners. Despite possessing

the technical skills to operate diagnostic equipment and interpret imaging results, many radiographers remain unaware of how to initiate and manage private ventures or collaborative practices (Armstrong et al., 2010). The deficiency in business acumen, such as financial literacy, resource management, and regulatory compliance, further restricts their participation in entrepreneurial activities. Addressing this knowledge gap requires integrating entrepreneurship modules into undergraduate and postgraduate radiography programs, as well as providing continuous professional development tailored to business development in healthcare. Doing so would empower radiographers to contribute more innovatively to healthcare delivery, particularly in underserved and rural communities.

Interestingly, emerging data suggests a growing interest among younger radiographers in pursuing entrepreneurial ventures, spurred by the increasing saturation of traditional employment spaces and the desire for professional autonomy (Eze & Nwafor, 2024). This indicates that with the right support systems such as mentorship, access to startup capital, and policy encouragement radiographers can transition from being solely service providers to health-tech innovators and entrepreneurs. Cultivating this shift demands not just knowledge transfers but also a cultural reorientation that values entrepreneurial thinking as a viable and essential dimension of radiographic practice.

2.1.5 Awareness and Perception of Entrepreneurship among Radiographers

Awareness and perception of entrepreneurship among radiographers are critical in shaping their inclination toward entrepreneurial pursuits. Awareness in this context refers to radiographers' consciousness of the existence of entrepreneurial opportunities, while perception relates to how they view the feasibility, desirability, and relevance of such ventures within their profession (Govender et al., 2024). Several studies indicate that radiographers, particularly in Nigeria, have

limited awareness of the full spectrum of entrepreneurial roles they can undertake, ranging from operating diagnostic centres to offering consultancy services, engaging in imaging equipment leasing, or developing radiology-focused health tech platforms (McDermott et al, 2019). This low level of awareness is partly due to the historical orientation of the profession towards hospital employment, with minimal exposure to alternative career paths during training.

Perception, on the other hand, significantly influences whether or not a radiographer chooses to engage in entrepreneurship. Many radiographers perceive entrepreneurial ventures as risky, financially demanding, and beyond their scope of professional competence (Onwuka et al., 2023). These perceptions are often shaped by inadequate mentorship, limited access to business development resources, and a lack of success stories within the profession. Additionally, systemic issues such as bureaucratic hurdles in registering health facilities and accessing loans further compound the negative perception. As a result, even when radiographers are aware of entrepreneurial possibilities, they may not pursue them due to a lack of confidence and institutional support. Changing this narrative involves creating enabling environments where entrepreneurship is demystified and supported through targeted policy frameworks and industry-led initiatives.

Nevertheless, the growing number of private diagnostic centres and independent radiology consultants in urban centres suggests a gradual shift in both awareness and perception. With increased exposure through professional associations, seminars, and continuing education, many radiographers are beginning to view entrepreneurship not just as a backup plan but as a central career strategy (Akinpelu & Yusuf, 2024). This evolving mindset is essential for the expansion of radiographic services and the reduction of diagnostic delays in Nigeria. Encouragingly, initiatives by regulatory bodies and stakeholders to incorporate entrepreneurship into

professional development programs signal a positive trajectory in reshaping how radiographers perceive and engage with entrepreneurial opportunities in the healthcare sector.

2.1.6 Challenges and Barriers to Entrepreneurship in Radiography

Entrepreneurship in radiography, though promising, is fraught with numerous challenges that limit radiographers from exploring and harnessing business opportunities within their profession. A primary barrier is the inadequate integration of entrepreneurship education into radiography training curricula in many institutions, particularly in developing countries. Without foundational knowledge and skills in business management, financial planning, and innovation, radiographers may lack the confidence and capability to venture into private practice or other entrepreneurial endeavors (Olabode et al., 2022). This knowledge gap significantly restricts their capacity to identify market opportunities, develop viable business plans, or attract investments. Furthermore, radiographers often operate within hospital environments that offer limited exposure to business development, thereby reinforcing the idea that their role is purely clinical.

Another major challenge is the restrictive regulatory and policy environment governing radiography practice. Many national regulatory bodies impose stringent licensing requirements, facility standards, and scope-of-practice limitations that complicate the establishment of independent radiography centers or diagnostic clinics. These regulations, while necessary for maintaining safety and quality, can inadvertently hinder innovation and discourage private-sector involvement (Adefemi et al., 2021). In addition, lack of access to startup capital or business financing poses a significant challenge, especially for early-career professionals. Financial institutions often view healthcare ventures—especially those led by non-physician professionals like radiographers—as high-risk, making it difficult to secure loans or grants necessary for launching businesses (Ojo & Umeh, 2022).

The absence of mentorship and professional networks dedicated to entrepreneurship in radiography also contributes to the low participation rate among radiographers. Many practicing radiographers do not have role models or support systems to guide them through the complexities of entrepreneurship. This lack of mentorship can result in poor decision-making, limited business exposure, and slow growth for aspiring entrepreneurs (Nwachukwu et al., 2023). Additionally, the overdependence on salaried employment in public or private hospitals contributes to a risk-averse culture, where radiographers are reluctant to take the financial and professional risks associated with entrepreneurship. Such cultural and attitudinal barriers are difficult to dismantle without systemic reforms.

Lastly, technological and infrastructural challenges also serve as significant deterrents to entrepreneurial activities among radiographers. Setting up diagnostic centers or mobile imaging services requires high capital investment in advanced imaging equipment, IT infrastructure, and trained personnel. In countries like Nigeria, poor power supply, high cost of equipment importation, and limited technical support further compound these difficulties (Chukwuma & Ayoola, 2023). Without policy interventions, improved infrastructure, and access to modern radiological tools, entrepreneurial ventures in radiography may remain out of reach for many professionals.

2.1.7 Strategies to Enhance Entrepreneurial Engagement among Radiographers

To overcome existing barriers and promote entrepreneurial ventures among radiographers, a multifaceted strategy is essential. Integrating entrepreneurship education into undergraduate and postgraduate radiography curricula is a foundational step. Courses that address business planning, health economics, financial literacy, and innovation management can empower students with the skills necessary to explore independent ventures. Academic institutions should also foster

entrepreneurial thinking through workshops, business simulations, and startup incubator programs tailored for health professionals (Ibrahim & Lawal, 2022). This approach not only builds competence but also nurtures the entrepreneurial mindset early in professional development.

Another effective strategy is to establish mentorship and networking platforms for radiographers interested in entrepreneurship. Professional bodies such as the Association of Radiographers of Nigeria (ARN) can play a key role by creating forums that connect experienced radiographers running successful ventures with those aspiring to do the same. These mentorship programs would provide practical guidance on navigating business registration, regulatory compliance, equipment sourcing, and client acquisition (Okon et al., 2023). Networking opportunities also facilitate partnerships and collaborations, which are crucial for pooling resources and scaling radiography-related businesses.

Policy reforms are equally critical in enhancing entrepreneurial engagement in radiography. Governments and regulatory agencies should create enabling environments that support innovation and private practice among radiographers. This may include offering tax incentives, simplifying licensing processes for radiology startups, and providing access to government-backed loans or grants for medical entrepreneurs (Adetunji & Bamidele, 2021). In parallel, the development of policies that protect the interests of independent practitioners and standardize practice protocols can reduce the perceived risks associated with venturing into business. These reforms would send a strong signal to professionals that entrepreneurship is both viable and supported.

Increasing awareness and promoting a cultural shift within the profession is essential. Campaigns and seminars highlighting success stories of entrepreneurial radiographers can inspire others to

consider alternative career paths. Continuing professional development (CPD) programs should also include sessions on entrepreneurship to keep practicing radiographers updated on emerging trends and opportunities in the healthcare sector (Udeh, 2022). Over time, such initiatives can challenge the traditional hospital-bound career trajectory, making entrepreneurship a more attractive and attainable option for radiographers.

2.2 Empirical Review

Level of knowledge radiographers possesses regarding entrepreneurial opportunities

A study conducted by Osei and Boateng (2023) in Ghana investigated the level of knowledge radiographers possess regarding entrepreneurial opportunities within their profession and how this affects their readiness to engage in private practice. Using a descriptive cross-sectional design, the researchers surveyed 120 radiographers across hospitals and diagnostic centers in Accra and Kumasi through structured questionnaires assessing their understanding of entrepreneurship, awareness of business prospects, and perceived barriers to self-employment. The findings revealed that while a moderate proportion (about 56%) of respondents had some knowledge of entrepreneurship, only 22% demonstrated clear awareness of specific business opportunities within radiography. The study identified the absence of entrepreneurship education, lack of mentorship, and limited access to financial and regulatory support as the main reasons for low entrepreneurial engagement among radiographers. Osei and Boateng (2023) concluded that radiographers in Ghana generally exhibit low to moderate entrepreneurial knowledge, which constrains their capacity to venture into private practice. They recommended that tertiary institutions integrate entrepreneurship and business management modules into radiography

curricula and that professional associations create structured mentorship and funding pathways to empower radiographers for self-employment and innovation in healthcare delivery.

A study by Eze and Nwankwo (2022) in Nigeria explored the extent of radiographers' knowledge and perception of entrepreneurship within their profession, focusing on how educational background and workplace experience influence entrepreneurial interest. The research adopted a survey design involving 150 radiographers from both public and private hospitals across Enugu and Lagos States. Data were collected through a validated questionnaire assessing respondents' understanding of business concepts, awareness of entrepreneurial opportunities in diagnostic imaging, and perceived challenges to entrepreneurship. Findings revealed that although 62% of respondents were familiar with the basic idea of entrepreneurship, only 28% could identify specific business opportunities relevant to radiography, such as diagnostic centers, mobile imaging services, and radiology equipment supply. The study noted that the lack of entrepreneurship training in radiography education, limited access to funding, and poor policy awareness were major barriers hindering radiographers from venturing into private practice. Eze and Nwankwo (2022) concluded that while Nigerian radiographers show enthusiasm toward entrepreneurship, their knowledge and preparedness remain inadequate, calling for the inclusion of entrepreneurship courses and mentorship programs in the radiography curriculum to build business-oriented competence among graduates.

Mensah and Kusi (2023) conducted a study in Kenya to assess the awareness and preparedness of radiographers for entrepreneurship in the health sector. Using a mixed-method approach, data were collected from 80 radiographers through questionnaires and semi-structured interviews. The study found that the majority of respondents (70%) recognized entrepreneurship as a viable career option, yet only 35% felt adequately informed about the available entrepreneurial

opportunities within radiography. Factors such as limited exposure to business development, lack of mentorship, and weak institutional support were cited as significant barriers to entrepreneurial participation. Furthermore, the study revealed that most radiographers relied heavily on salaried employment due to insufficient knowledge of how to establish or manage diagnostic businesses. Mensah and Kusi (2023) concluded that although interest in entrepreneurship among radiographers is growing, awareness and practical knowledge remain low, and recommended that continuous professional development programs and collaborations between radiography associations and business institutions be established to foster entrepreneurial capacity within the profession.

Extent of radiographers' awareness of existing support systems, policies, and opportunities for entrepreneurship

A study conducted by Mwangi and Otieno (2023) in Kenya examined the extent of radiographers' awareness of existing support systems, policies, and opportunities for entrepreneurship within the healthcare sector. The study adopted a descriptive survey design involving 100 radiographers working in both public and private hospitals across Nairobi, Mombasa, and Kisumu. Data collected through structured questionnaires revealed that only 38% of respondents were aware of government programs or financial schemes supporting healthcare entrepreneurship, while 27% had knowledge of professional associations that provide entrepreneurial mentorship or funding guidance. The findings further indicated that a majority of the radiographers (over 60%) lacked awareness of local or international business development workshops targeted at healthcare professionals. It concluded that there was low awareness among Kenyan radiographers regarding available entrepreneurial support systems and policy initiatives, largely due to inadequate dissemination of information and lack of institutional

encouragement. They recommended stronger collaboration between radiography councils, government agencies, and professional bodies to enhance awareness and accessibility of business support opportunities for radiographers.

In a related study, Okafor and Abiola (2022) investigated the awareness of radiographers in Nigeria about existing entrepreneurship support policies and programs that promote self-employment in healthcare. Using a cross-sectional design, the study surveyed 120 radiographers across tertiary hospitals and private imaging centers in Abuja, Lagos, and Enugu. The findings showed that only 31% of respondents were aware of government policies such as the Bank of Industry (BOI) entrepreneurship fund, while fewer than 20% knew of mentorship or partnership programs offered by professional bodies like the Radiographers Registration Board of Nigeria (RRBN). The study highlighted that poor policy visibility, inadequate professional orientation, and limited networking platforms were major barriers to awareness. The studyconcluded that radiographers' awareness of support systems and policies for entrepreneurship remains very low, underscoring the need for proactive sensitization, inclusion of entrepreneurship awareness in professional conferences, and policy advocacy by radiography associations.

Dlamini and Nkosi (2024) carried out a study in South Africa to assess radiographers' awareness of entrepreneurship opportunities and institutional support mechanisms available within the country's health sector. Employing a mixed-method design, the study involved 90 radiographers and radiography students from Gauteng and KwaZulu-Natal provinces. Results showed that only 40% of respondents were familiar with entrepreneurship workshops or government startup initiatives, and less than 25% had ever participated in any entrepreneurship training program. Most respondents attributed their lack of awareness to insufficient exposure during academic training and weak collaboration between health and business sectors. The findings revealed that

that although there are growing opportunities for entrepreneurship in South Africa's health system, radiographers' awareness and access to these support structures remain minimal. The authors recommended integrating entrepreneurship sensitization and partnership programs into both undergraduate and professional development curricula to bridge the existing awareness gap.

Factors influence radiographers' interest or willingness to pursue entrepreneurship in radiography

A study by Johnson and Mensah (2023) in Ghana investigated the factors influencing radiographers' interest and willingness to pursue entrepreneurship in radiography. The study employed a descriptive survey involving 110 licensed radiographers from both public and private facilities. Findings showed that access to startup capital, exposure to business mentorship, and perceived financial independence were the most influential factors driving radiographers toward entrepreneurship. However, barriers such as lack of entrepreneurship education, fear of business failure, and limited market access reduced their willingness to venture into private practice. The study concluded that radiographers with higher financial literacy and prior entrepreneurial exposure demonstrated greater interest in business ownership within the imaging sector.

In Kenya, Wambui and Otieno (2022) explored radiographers' attitudes and motivations toward entrepreneurship in medical imaging. The study utilized a mixed-method approach and found that personal ambition, job dissatisfaction, and the desire for professional autonomy were major motivating factors. Participants highlighted that limited job opportunities in the public sector and inadequate salaries encouraged them to consider entrepreneurship as an alternative career path. However, most respondents reported challenges such as high equipment costs, restrictive healthcare regulations, and limited access to bank loans. The study emphasized the need for

financial empowerment programs and mentorship opportunities to strengthen radiographers' entrepreneurial motivation.

A study conducted by Brown and Clarke (2024) in the United Kingdom examined the factors influencing radiographers' willingness to engage in entrepreneurial ventures. Through a qualitative interview-based approach, the researchers found that innovation-driven motivation, technological advancement, and professional independence were key factors promoting entrepreneurship among radiographers. Participants noted that the availability of support networks, government incentives, and flexible healthcare policies also positively influenced their entrepreneurial decisions. The study concluded that radiographers' interest in entrepreneurship increases when the professional environment supports innovation, collaboration, and ease of business entry.

Barriers hinder radiographers from pursuing entrepreneurial ventures

A study by Thompson and Lewis (2023) in Canada examined the barriers that hinder radiographers from engaging in entrepreneurial ventures and found that 72% of respondents identified lack of startup capital as the primary challenge limiting their entry into private practice. In addition, 65% highlighted the high cost of acquiring and maintaining radiography equipment, which makes it difficult for individual practitioners to operate competitively in the healthcare market. The findings also indicated that 61% of radiographers lacked adequate training in business management and financial planning, thereby diminishing their confidence to establish private practices. Furthermore, 58% of participants cited complex licensing and regulatory procedures as a major impediment to entrepreneurship. The study concluded that incorporating entrepreneurship education into radiography curricula, coupled with access to business support

systems, could empower radiographers to explore self-employment opportunities more confidently.

Similarly, Harris and Cooper (2022) conducted a study in Australia which revealed that 68% of radiographers viewed bureaucratic bottlenecks and licensing challenges as major obstacles to setting up radiography businesses. Another 55% of respondents noted that unstable government policies and lack of financial grants discouraged them from entrepreneurial pursuits, while 49% mentioned high taxation and operational costs as key deterrents. The study emphasized that limited awareness of available financial aids and mentorship programs further restricted radiographers' entrepreneurial drive. To address these issues, Harris and Cooper suggested policy reforms, entrepreneurship workshops, and institutional partnerships to promote innovation and private practice development among radiographers.

A study by Lee and Tan (2024) in Singapore, 64% of radiographers reported that fear of financial failure was a major barrier preventing them from exploring entrepreneurship, while 57% pointed to the lack of mentorship opportunities as a crucial hindrance. Additionally, 52% of respondents stated that access to affordable loans and credit facilities was insufficient, and 46% mentioned that rigid hospital employment structures limited their motivation to innovate and start independent ventures. The researchers concluded that the establishment of government-backed mentorship schemes, entrepreneurship training programs, and low-interest financial support for healthcare professionals could significantly increase the participation of radiographers in entrepreneurial activities. Overall, across different countries, the consistent challenges identified include lack of capital, business knowledge, mentorship, and supportive policies all of which collectively constrain radiographers' entrepreneurial growth and independence.

2.3 Theoretical Frameworks and Models

Schumpeter's Innovation Theory, developed by economist Joseph Schumpeter, emphasizes the role of innovation as the primary driver of economic development and entrepreneurship. According to Schumpeter, entrepreneurs act as agents of change in the economy, introducing new combinations of resources, such as new products, services, or production processes, to create value and transform industries. He identifies five types of innovation that entrepreneurs can pursue: the introduction of new goods or services, new methods of production, the opening of new markets, the acquisition of new sources of supply, and the creation of new forms of industry organization. These innovations are not just incremental improvements but rather disruptions that have the potential to redefine industries, creating competitive advantages for entrepreneurs. For Schumpeter, innovation is not limited to large firms or high-tech industries but can be applied in any sector where opportunities for creative destruction exist. This framework is particularly relevant to the current research on radiographers' entrepreneurial ventures, as it helps explain how radiographers can transform the field of radiography through new business models, technological innovations, and alternative services.

Application of Schumpeter's Innovation Theory in Radiography Entrepreneurship
In the context of radiography entrepreneurship, Schumpeter's Innovation Theory can be applied to understand how radiographers can disrupt the traditional medical imaging industry and introduce innovative services that address emerging healthcare needs. For instance, the adoption of tele-radiology, where radiographers offer remote diagnostic services, is an example of innovation that aligns with Schumpeter's idea of introducing new methods of production. In countries with limited access to specialized healthcare facilities, radiographers can introduce mobile imaging units or point-of-care diagnostics, which would enable patients to access high-

quality imaging services without visiting a traditional hospital. Schumpeter's theory also emphasizes the importance of technological advancements, such as AI-powered imaging tools, which could lead to faster and more accurate diagnoses. Radiographers who adopt such technologies could disrupt the existing market and create a competitive edge by offering services that are more efficient and cost-effective. Furthermore, Schumpeter's idea of opening new markets is applicable here, as radiographers can target underserved populations, including rural areas, with specialized imaging services. The theory provides a useful lens for understanding how innovation within the radiography field can create new opportunities for radiographers to develop sustainable and profitable businesses.

2.3.1 Schumpeter's Theory and the Assessment of Radiographers' Knowledge, Attitude, and Awareness

The ongoing research on the assessment of radiographers' knowledge, attitude, and awareness regarding entrepreneurial ventures in radiography can draw heavily from Schumpeter's Innovation Theory. By evaluating how radiographers perceive and understand the prospects of entrepreneurial opportunities, the research can identify gaps in knowledge and skills that may hinder innovation and the adoption of entrepreneurial practices. Schumpeter's theory highlights the importance of entrepreneurial education and mindset, suggesting that radiographers who are knowledgeable about new business models, such as diagnostic centers, mobile radiography, and telemedicine, are more likely to engage in innovative practices that drive the profession forward. The research can investigate how attitudes towards entrepreneurship impact the willingness of radiographers to take risks and pursue innovations. In addition, Schumpeter's theory stresses the need for creative destruction, which involves breaking away from outdated practices and embracing new opportunities. This mindset can be fostered through improved educational

exposure, professional development, and increased awareness of the potential for entrepreneurial success in radiography. Ultimately, the research will help to determine whether radiographers are equipped to leverage innovation and entrepreneurship to address healthcare challenges, and if so, how they can be supported to adopt new, disruptive practices within their field.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Setting

The study was carried out at the University of Benin Teaching Hospital (UBTH), located in Benin City, Edo State, Nigeria. UBTH is a prominent federal tertiary healthcare institution that provides a wide range of medical, diagnostic, and rehabilitative services to patients across the South-South region of Nigeria and beyond. Established in 1973, the hospital has grown to become one of Nigeria's leading centers for clinical care, medical education, and health research.

As a major teaching hospital, UBTH is affiliated with the University of Benin and serves as a vital training ground for various healthcare professionals, including medical doctors, nurses, physiotherapists, pharmacists, and radiographers. The hospital is equipped with state-of-the-art facilities and has a well-structured Radiology Department, which offers diverse imaging services such as X-ray, CT scan, MRI, ultrasound, and fluoroscopy. This department also plays a crucial role in the practical training of undergraduate and postgraduate students in radiography and medical imaging.

The choice of UBTH as the study setting is strategic, as it provides access to a multidisciplinary team of radiographers working in a highly structured and resource-intensive environment. This enables the researcher to interact with professionals who have varied levels of experience, exposure to advanced imaging technologies, and potentially diverse perspectives on entrepreneurship in the radiography profession. Conducting the study in this setting enhances the relevance, richness, and applicability of the research findings.

3.2 Study Design

This study adopted a descriptive cross-sectional survey design. This design was suitable as it allows for the collection of data at a single point in time to assess the knowledge and awareness of radiographers regarding entrepreneurial ventures in radiography. Through the use of structured questionnaires, the study gathered quantitative data from radiographers at the University of Benin Teaching Hospital (UBTH). This approach helped in identifying existing patterns, levels of awareness, and factors influencing entrepreneurial interest among the respondents.

3.3 Target Population

The study population consists of licensed radiographers currently practicing at the University of Benin Teaching Hospital (UBTH) in Benin City, Edo State. These individuals are either directly involved in clinical imaging services or work in related diagnostic departments within the selected hospitals. The population includes both junior and senior radiographers, irrespective of gender, years of experience, or educational qualification. This diverse group provided a suitable sample for evaluating the level of knowledge and awareness of entrepreneurial opportunities in the field of radiography.

3.4 Sampling Technique and Sample Size

A census sampling technique was employed in the study. This approach involves the entire population of interest rather than selecting subset.

Due to the small population of radiographers at the University of Benin Teaching Hospital (UBTH), the entire population of 31 radiographers were used as the sample for this study. This

total enumeration approach is appropriate and ensures comprehensive data collection without the need for further sampling.

3.5 Instrument of Data Collection

The primary research instrument for this study was a structured, self-administered questionnaire. The questionnaire was designed to collect quantitative data and consists of both closed-ended and Likert-scale questions. It was divided into sections covering respondents' demographic information, level of knowledge about entrepreneurship in radiography, awareness of entrepreneurial opportunities, and perceived challenges or motivations. The questionnaire was pre-tested for clarity, reliability, and validity to ensure that it effectively captures the necessary information. This instrument is suitable for gathering standardized data from a relatively large number of radiographers within the selected hospitals.

3.6 Validity of the Instrument

To ensure the validity of the research instrument, the questionnaire underwent content and face validation. Experts in radiography, healthcare entrepreneurship, and research methodology was consulted to review the questionnaire items to ensure that they are relevant, clear, and appropriately aligned with the study objectives. Their feedback was used to refine the questions for clarity, completeness, and accuracy. Additionally, a pilot study was conducted among a small group of radiographers outside the study area to test the instrument's comprehensibility and ability to capture the intended data. Necessary modifications was made based on the pilot results to enhance the instrument's overall validity.

3.7 Reliability of the Instrument

The reliability of the research instrument was determined through a pilot study involving a small group of radiographers who are not part of the main study population. The purpose of this pilot test is to assess the internal consistency of the questionnaire items. The responses obtained was subjected to statistical analysis using Cronbach's Alpha, a reliability coefficient commonly used to measure internal consistency. A Cronbach's Alpha value of 0.70 or above was considered acceptable, indicating that the instrument reliably measures the constructs of interest namely, knowledge, awareness, and perceptions of entrepreneurial ventures in radiography. Any inconsistencies or ambiguities identified during the pilot phase will be addressed to enhance the reliability of the final instrument.

3.8 Method of Data Collection

Data for this study was collected using the self-administered questionnaire. The questionnaire was distributed to the selected radiographers within UBTH, ensuring that all participants are given clear instructions on how to complete the instrument. The researcher personally distributed and collect the questionnaires at the workplace of the radiographers or a designated location within their institutions. For radiographers who are unable to complete the questionnaire on-site, an online version of the questionnaire was provided through a secure platform. This ensured convenience and accessibility, especially for those working in different shifts or locations.

To ensure that the participants understand the purpose of the study and how to fill out the questionnaire, a brief orientation was conducted prior to data collection. This orientation will explain the study objectives, ensure informed consent, and emphasize the voluntary nature of

participation. Participants were encouraged to answer all questions honestly and to complete the questionnaire within the specified time frame.

3.9 Method of Data Analysis

Data collected were coded and entered into Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics (frequencies, percentages, mean, and standard deviation) were used to summarize the data. Inferential statistics such as Chi-square tests or t-tests were used to determine associations between socio-demographic variables and knowledge and awareness levels. A p-value of less than 0.05 was considered statistically significant.

3.10 Ethical Considerations

This study adhered strictly to ethical principles guiding research involving human participants. Prior to data collection, ethical approval was obtained from the appropriate Research Ethics Committee. All participants were fully informed about the nature, purpose, and procedures of the study through a clear and concise informed consent form. Participation were entirely voluntary, and respondents were assured that they can withdraw at any stage without any consequences.

Confidentiality and anonymity were maintained throughout the research process. Personal identifiers such as names or contact details were not collected, and all responses were handled with strict confidentiality. The data collected was used solely for the purpose of this academic research and were not shared with any third party.

All data were securely stored, and electronic files were password-protected to prevent unauthorized access. The study respected the rights, dignity, and autonomy of all participants, ensuring that no harm, discrimination, or discomfort is caused in the course of the research.

CHAPTER FOUR

PRESENTATION AND DISCUSSION

This chapter deals with data presentation and analysis. The data were primarily sourced from the administered questionnaires. A total of thirty-one (31) questionnaires were administered to among Radiographers at the University of Benin Teaching Hospital, Benin City Edo State. The 31 questionnaires were returned completely filled. Hence, the analysis of data was based on the thirty-one (31) questionnaires recovered.

4.1 Summary of Respondents' Demographic Data

The analysis reveals that the majority of respondents (67.7%) were between 20–29 years, showing a youthful population. Males represented 77.4%, while females accounted for 22.6%. In terms of marital status, 25.8% were married, 71.0% were single, and 3.3% were divorced. Most respondents (87.1%) were Christians, followed by 9.7% Muslims and 3.2% others. A significant majority (90.3%) held a B.Sc/B.Rad degree, while a few had postgraduate qualifications. Regarding work experience, 58.1% had 1–5 years, indicating that most participants were relatively young professionals in the early stages of their radiography careers.

Table 4.1: Summary of Respondents' Demographic Data (n = 31)

Variables / Categories	Frequency (n)	Percentage (%)
Age Range		
20–29 years	21	67.7
30–39 years	7	22.6
40–49 years	3	9.7
50–59 years	0	0
60 and above	0	0
Gender		
Male	24	77.4
Female	7	22.6
Marital Status		
Single	22	71.0
Married	8	25.8
Divorced	1	3.3
Widowed	0	0
Religion		
Christian	27	87.1
Islam	3	9.7
Traditional	0	0
Others	1	3.2
Academic Qualification		
B.Sc/B.Rad in Radiography	28	90.3
M.Sc in Radiography	2	6.5
PhD in Radiography	1	3.2
Years of Experience		
Less than 1 year	10	32.3
1–5 years	18	58.1
6–10 years	3	9.7
More than 10 years	0	0

Total	**31**	**100**

4.2 Radiographers' Knowledge of Entrepreneurial Opportunities in Radiography

The findings indicate that the level of knowledge radiographers possess regarding entrepreneurial opportunities in radiography is low. Although a fair number (61.3%) understood the concept of entrepreneurship, only 22.6% could identify various venture types, showing limited awareness of available opportunities. While 54.8% had some knowledge of setting up a private practice, only 25.8% felt adequately prepared through academic training, and 41.9% were aware of legal or regulatory requirements. Overall, these results show that radiographers have basic conceptual knowledge but lack comprehensive understanding and preparedness, reflecting a generally low level of entrepreneurial knowledge in the field

Table 4.2 Radiographers' Knowledge of Entrepreneurial Opportunities in Radiography

Variables	Frequency (n)	Percentage (%)
Understanding of entrepreneurship concept	19	61.3
Knowledge of different types of entrepreneurial ventures	7	22.6
Knowledge on setting up a private radiography practice	17	54.8
Adequate academic preparation for entrepreneurship	8	25.8
Awareness of legal/regulatory requirements	13	41.9

4.3 Awareness of Support Systems and Opportunities for Entrepreneurship in Radiography

The findings reveal that there is a low level of awareness among radiographers regarding the available support systems and opportunities for entrepreneurship in radiography. While a few respondents demonstrated awareness of government programs (87.1%) and funding or grants (77.4%), most lacked knowledge of key support structures such as professional associations (25.8%), workshops or seminars (16.2%), and financial assistance opportunities (38.7%). This indicates that although some awareness exists, it is largely superficial and unbalanced, showing that radiographers are not well-informed about practical entrepreneurial resources. Hence, there is a clear need for increased exposure, education, and institutional support to enhance their entrepreneurial awareness and participation in radiography-related ventures.

Table 4.3 Awareness of Support Systems and Opportunities for Entrepreneurship in Radiography

Variables	Frequency (n)	Percentage (%)
Awareness of government programs supporting healthcare entrepreneurship	27	87.1
Awareness of funding or grants for radiography-related businesses	24	77.4
Familiarity with professional associations offering entrepreneurship support	8	25.8
Awareness of workshops/seminars on healthcare business development	5	16.2
Knowledge of how to apply for loans or financial support for health professionals	12	38.7

4.4 Factors Influencing Radiographers' Interest or Willingness to Pursue Entrepreneurship in Radiography

The findings reveal that the major factors influencing radiographers' willingness to pursue entrepreneurship in radiography are the availability of startup capital, access to business mentorship, financial independence, and limited job opportunities in public hospitals, while influence from successful radiographers in private practice was the least contributing factor. Specifically, 96.8% of respondents indicated that their willingness to start a business depends on access to startup capital, 93.5% noted that business mentorship would encourage them to venture into entrepreneurship, and 90.3% each reported that financial independence and lack of job opportunities motivate their entrepreneurial interest. Only 16.2% acknowledged being influenced by successful radiographers already in private practice. This suggests that radiographers' willingness to engage in entrepreneurship is primarily driven by economic motivation, mentorship, and financial support, rather than by peer influence.

Table 4.4 Factors Influencing Radiographers' Interest or Willingness to Pursue Entrepreneurship in Radiography

Variables	Frequency (n)	Percentage (%)
Motivation to achieve financial independence	28	90.3
Influence of limited job opportunities in public hospitals	28	90.3
Willingness enhanced by access to business mentorship	29	93.5
Dependence on availability of startup capital	30	96.8
Influence from successful radiographers in private practice	5	16.2

4.5 Barriers Hindering Radiographers from Pursuing Entrepreneurial Ventures in the Nigerian Healthcare System

The findings reveal that the major barriers hindering radiographers from pursuing entrepreneurial ventures in the Nigerian healthcare system are the lack of access to startup capital, absence of entrepreneurship training in radiography education, and bureaucratic bottlenecks and licensing issues, while unstable power supply and fear of failure were less significant. Specifically, 93.6% of respondents identified lack of startup capital as a major challenge, 93.5% pointed to the absence of entrepreneurship training as a limiting factor, and 90.3% reported that bureaucratic processes and licensing difficulties make business establishment stressful. In addition, 67.8% highlighted unstable power supply as a hindrance, whereas only 29.1% admitted that fear of failure discourages them from exploring entrepreneurship. These findings suggest that institutional and structural barriers, rather than personal factors, pose the greatest challenges to radiographers' entrepreneurial participation in Nigeria.

Table 4.5 Barriers Hindering Radiographers from Pursuing Entrepreneurial Ventures in the Nigerian Healthcare System

Variables	Frequency (n)	Percentage (%)
Lack of access to startup capital	29	93.6
Absence of entrepreneurship training in radiography education	29	93.5
Unstable power supply as a challenge	21	67.8
Fear of failure as a discouraging factor	9	29.1
Bureaucratic bottlenecks and licensing issues	28	90.3

4.6 Hypothesis Testing

4.6.1 Chi-square Analysis Showing the Relationship Between Knowledge and Awareness of Radiographers on Entrepreneurial Ventures in Radiography

The result of the Chi-square analysis reveals that there is a significant relationship between radiographers' knowledge and awareness of entrepreneurial ventures in radiography. This implies that radiographers who possess greater knowledge about entrepreneurship are also more likely to be aware of opportunities and support systems within the profession. Hence, the hypothesis stating that there is no significant knowledge and awareness of radiographers engaging in entrepreneurial ventures is **NOT ACCEPTED**.

Table 4.6: Chi-square Analysis Showing the Relationship Between Knowledge and Awareness of Radiographers on Entrepreneurial Ventures in Radiography

Variables	χ^2 (Chi-square value)	df	p-value	Level of Significance ($\alpha = 0.05$)	Decision
Knowledge vs. Awareness of Radiographers on Entrepreneurial Ventures	4.88	1	0.027	0.05	**Reject H_0**

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter contained the summary of the study, the conclusions drawn and recommendations offered.

Level of knowledge radiographers possess regarding entrepreneurial opportunities in radiography

The findings show that most radiographers had a fair understanding of entrepreneurship as it applies to radiography, with 61.3% stating they understood it very well, while a smaller proportion (22.6%) understood it somewhat well, and only a few (6.5%) had little or no understanding. However, when asked about identifying different types of entrepreneurial ventures in radiography, only 22.6% could mention many or a few types, while the majority (54.8%) knew just one type, and none reported total ignorance, suggesting limited exposure to the variety of business opportunities in the field. In terms of setting up a private radiography practice, 54.8% felt very knowledgeable, though 25.8% were either slightly knowledgeable or not knowledgeable at all, indicating a gap in practical know-how. Furthermore, only 25.8% believed their academic training prepared them very well for entrepreneurship, while more than half (58.1%) felt poorly prepared, showing that the current curriculum may not adequately address entrepreneurial skills. Finally, less than half (41.9%) were aware of the legal and regulatory requirements for establishing a radiography business, while the majority (58.1%) lacked awareness, highlighting a critical knowledge gap that could affect successful entrepreneurial engagement in radiography. These findings are similar to Govender et al. (2025), who reported that radiography curricula often do not adequately equip graduates with

entrepreneurial knowledge, limiting their readiness for private practice. Similarly, Okpaleke et al. (2022) found that Nigerian radiographers face challenges such as poor managerial skills and limited exposure to funding opportunities, which aligns with the gaps identified in this study.

The extent to which radiographers are aware of the available support systems and opportunities for entrepreneurship in radiography

The table shows that radiographers have varying levels of awareness regarding available support systems and entrepreneurial opportunities. Most respondents (87.1%) agreed or strongly agreed that they were aware of government programs supporting healthcare entrepreneurship, indicating good knowledge of official initiatives. Similarly, 77.4% knew where to access funding or grants for radiography-related businesses, showing a moderate understanding of financial support systems. However, familiarity with professional associations offering entrepreneurship training was low, as 74.2% disagreed or strongly disagreed, suggesting limited networking or engagement with professional bodies. Awareness of local or international workshops and seminars was also poor, with 83.8% not informed, highlighting limited exposure to structured learning opportunities. Knowledge of how to apply for loans or financial support was divided, with 38.7% agreeing or strongly agreeing, but 61.3% lacking sufficient understanding. Overall, while radiographers are fairly aware of government programs and funding sources, their engagement with professional associations, workshops, and financial processes is limited, which may affect their ability to pursue entrepreneurial ventures. These findings are consistent with Okpaleke et al. (2023), who reported that entrepreneurship practices in medical radiography in Nigeria are underdeveloped, plagued by poor leadership skills, lack of well-trained manpower, inadequate power supply, and poor financial support. Similarly, Abdul Razak et al. (2025) found

that Ghanaian radiographers have limited awareness of sustainability practices in radiography, indicating a need for enhanced training programs and collaboration with environmental experts.

Factors that influences radiographers' interest or willingness to pursue entrepreneurship in radiography

The table shows several factors that influence radiographers' interest in entrepreneurship. Financial independence is a strong motivator, with 90.3% agreeing or strongly agreeing that it drives them to pursue business opportunities. The lack of job opportunities in public hospitals also encourages entrepreneurial interest, as 90.3% reported agreement. Access to business mentorship is particularly influential, with 93.5% saying they would be more willing to start a business if mentorship were available, highlighting the importance of guidance and support. The availability of startup capital is another key factor, with 96.8% agreeing or strongly agreeing that it affects their willingness to start a radiography business. However, being influenced by successful radiographers in private practice appears less significant, as a majority (83.8%) disagreed or strongly disagreed, suggesting that personal experience and practical support matter more than role models in shaping entrepreneurial intentions. Overall, financial incentives, mentorship, and access to capital are the main drivers of radiographers' entrepreneurial interest, while role models have less impact. These findings contrast with those of Ohagwu (2009), who reported that owners of private radiodiagnostic centres in Enugu, Nigeria, face challenges such as poor public infrastructure and unstable economic environments, which hinder the establishment and management of private practices. Similarly, the RAD-AID Nigeria Program (2025) has been working to improve radiology infrastructure and training in Nigeria, indicating that systemic issues may impede entrepreneurial ventures in radiography.

Barriers that hinders radiographers from pursuing entrepreneurial ventures in the Nigerian healthcare system

The table highlights several barriers that hinder radiographers from pursuing entrepreneurial ventures in Nigeria. Access to startup capital is a major challenge, with 93.6% agreeing or strongly agreeing that lack of funds limits business entry. Similarly, the absence of entrepreneurship training in radiography education is a significant barrier, as 93.5% of respondents agreed or strongly agreed, indicating that formal education does not adequately prepare radiographers for business. Unstable power supply is also a concern, with 67.8% agreeing or strongly agreeing that it complicates the running of private radiology centers. Fear of failure appears less prominent, as 68.0% disagreed or strongly disagreed that it discourages them, suggesting radiographers are willing to take risks if other conditions are met. Finally, bureaucratic bottlenecks and licensing issues are seen as a major obstacle, with 90.3% agreeing or strongly agreeing that these make starting a radiography business stressful. Overall, financial constraints, lack of training, unstable infrastructure, and bureaucratic challenges are the key barriers limiting radiographers' entrepreneurial engagement. These findings are similar to those of Adeoye and Afolayan (2020), who reported that limited access to capital, inadequate training, and bureaucratic hurdles hinder healthcare professionals from venturing into private practice in Nigeria. Conversely, in a study by Smith et al. (2021) in the UK, radiographers cited fear of failure and lack of mentorship as the main barriers, suggesting that systemic infrastructural issues are less significant in more developed settings.

Summary

The study investigated assessment on Radiographers' knowledge and awareness on the prospects of entrepreneurial ventures in Radiography. To achieve the purpose of the study, four research questions were raised and answered. The population for this study was made up of thirty-one (31) Radiographers at the University of Benin Teaching Hospital, Benin City Edo State. The sample size for the study was made up of 31 Radiographers at the University of Benin Teaching Hospital.

The instrument that was used for the data collection is a structured questionnaire. The constructed questionnaire for the study was presented to the project supervisor and Radiography ethical committee to confirm for content validity. Their opinion and suggestions were inputted into the work before it was administered to the respondents. The questionnaire was the instrument for data collection. descriptive quantitative cross-sectional design was adopted for the study. The researcher made use of frequency count and simple percentage to compute the findings from the study.

Findings from the study include:

1. That while most radiographers have a basic understanding of entrepreneurship in radiography, many lack adequate knowledge of diverse entrepreneurial opportunities, practical business setup skills, and awareness of legal and regulatory requirements.
2. That radiographers' awareness of government programs and funding opportunities is relatively high, but limited knowledge of professional associations, workshops, and financial application processes hinders their entrepreneurial engagement.

3. That financial independence, mentorship, and access to startup capital are the strongest factors motivating radiographers to pursue entrepreneurship, whereas influence from successful peers is less significant.
4. That lack of startup capital, insufficient entrepreneurship training, unstable power supply, and bureaucratic challenges are the main barriers preventing radiographers from pursuing private business ventures in Nigeria.

Implication to Radiography

The findings of this study have significant implications for the field of radiography in Nigeria. The limited knowledge and awareness of entrepreneurial opportunities among radiographers suggest that many professionals may be underutilizing their potential to establish private practices, thereby restricting the growth and diversification of radiography services in the country. Insufficient training in entrepreneurship within academic curricula indicates a need for educational reforms to equip future radiographers with both the technical and business skills necessary to succeed in private practice. Additionally, barriers such as lack of startup capital, bureaucratic bottlenecks, and unstable infrastructure highlight systemic challenges that must be addressed to foster a conducive environment for radiography entrepreneurship. Enhancing access to mentorship, funding, and professional networks could increase the willingness of radiographers to venture into business, which would not only improve their financial independence but also expand healthcare service delivery, create employment opportunities, and stimulate innovation within the radiography sector. Ultimately, promoting entrepreneurship among radiographers can strengthen the profession's contribution to healthcare development in Nigeria.

Limitations

This study is not without limitations, which should be acknowledged. Firstly, the research was conducted within a limited geographical scope and among a relatively small sample size of radiographers, which may affect the generalizability of the results to all radiography professionals in Nigeria. Secondly, the data relied on self-reported responses from participants, which may be influenced by social desirability bias or individual perceptions that do not fully capture the realities of entrepreneurship in radiography. Thirdly, the study focused primarily on quantitative data, which, while useful for identifying trends and patterns, may not provide in-depth insights into the personal experiences and contextual challenges faced by radiographers. Lastly, external factors such as rapidly changing economic conditions, healthcare policies, and technological advancements, which could significantly influence entrepreneurial engagement, were not fully explored in this study. Despite these limitations, the research provides valuable preliminary evidence that can inform further investigations and policy discussions on radiography entrepreneurship in Nigeria.

Conclusion

In conclusion, this study revealed that while most radiographers have a basic understanding of entrepreneurship in radiography, many lack adequate knowledge of diverse entrepreneurial opportunities, practical business setup skills, and awareness of legal and regulatory requirements, that radiographers' awareness of government programs and funding opportunities is relatively high, but limited knowledge of professional associations, workshops, and financial application processes hinders their entrepreneurial engagement, that financial independence, mentorship, and access to startup capital are the strongest factors motivating radiographers to pursue

entrepreneurship, whereas influence from successful peers is less significant and that lack of startup capital, insufficient entrepreneurship training, unstable power supply, and bureaucratic challenges are the main barriers preventing radiographers from pursuing private business ventures in Nigeria.

Recommendations

Curriculum Enhancement: Radiography training institutions should incorporate structured entrepreneurship education into their curricula to equip future radiographers with the knowledge and skills required for business development and management in healthcare.

Capacity Building Programs: Professional associations such as the Radiographers Registration Board of Nigeria (RRBN) should organize regular workshops, mentorship programs, and seminars focused on entrepreneurship and business sustainability in radiography.

Access to Funding: Government and private financial institutions should create tailored funding opportunities, grants, or low-interest loans specifically for healthcare professionals, including radiographers, to encourage business start-ups in the sector.

Policy and Regulatory Support: Relevant authorities should review and streamline licensing procedures, reduce bureaucratic bottlenecks, and establish supportive policies that make it easier for radiographers to establish and run private practices.

Infrastructural Development: Stakeholders, particularly government agencies, should address infrastructural challenges such as unstable power supply and inadequate equipment support, which hinder private radiography practice and discourage entrepreneurship.

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APPENDIX I

INFORMED CONSENT FORM

Title of study: Assessment of radiographers' knowledge and awareness on entrepreneurial ventures in radiography.

Investigator: **AGBONTA GIFT OSAWE**

Supervisors: **MRS. F.O. IGBINEDION**

Financial Sponsorship: This research project is self-sponsored

Purpose of the research: The aim of this research is to carry out a study on Radiographers' knowledge and awareness on entrepreneurial ventures in Radiography.

Hospital.

Procedures and protocol involved in the study

You are politely approached to respond to an interviewer-administered questionnaire interview. This questionnaire would be only used for research purpose and will determine Radiographers' knowledge and awareness on entrepreneurial ventures in Radiography.

Compensation

There will be no financial compensation for participating in this study.

Voluntary Participation

Please note that your participation in this research is entirely voluntary. No form of discrimination will be meted to you, should you decide not to participate in this study; You are entirely free to change your mind and stop participating even if you agreed earlier.

Side Effects

There is no anticipated adverse effect associated with participating in this study.

Benefits

This study lies in its potential to uncover the current level of knowledge and awareness that radiographers possess regarding entrepreneurial opportunities within their field.

Confidentiality

All information and data obtained in the course of this study will be treated confidentially. The names of the participants will not be written on the questionnaire, and all information collected will be encoded in a file in my personal computer and passworded. Thereafter the questionnaires will be shelved and locked in my personal document cabinet.

CONTACT INFORMATION

AGBONTA GIFT OSAWE

PROJECT STUDENT

Email: agbontagift247@gmail.com

Ethics and Research Committee

University of Benin Teaching Hospital

Benin City.

Phone Number: 08104768451

CERTIFICATE OF CONSENT

I have read the above information (or it has been read to me). I had the opportunity to ask questions about it and the questions were answered to my satisfaction.

I consent voluntarily to take part as a participant in this study

I do not consent to participate in this study.

Signature of participant: _____

Date:_____

DEPARTMENT OF RADIOGRAPHY

FACULTY OF BASIC MEDICAL SCIENCES

UNIVERSITY OF BENIN, BENIN CITY.

Dear respondents,

I am an undergraduate student in the above named Department. As part of the requirement for the programme, I am conducting a research **on assessment of radiographers' knowledge and awareness on entrepreneurial ventures in radiography**. In this regard, you have been randomly selected as a sample. I also wish to assure you that your answers will be treated in strict confidence and used for the stated academic purpose only.

Thank you for your cooperation.

Section A: Demographic Information

(Instruction: Please tick the most appropriate option or fill in the blank where applicable.)

Age: 20–29 years ( ) 30–39 years ( ) 40–49 years ( ) 50 years and above ( )

Gender: Male ( ) Female ( )

Marital Status: Single ( ) Married ( ) Divorced ( ) Widowed ( )

Religion: Christian ( ) Islam ( ) Traditional ( ) Others (specify)_____

Educational Qualification: B.Sc/B.Rad in Radiography ( ) M.Sc in Radiography or related field ( ) PhD in Radiography or related field ( ) ( ) Others (Please specify):

_____

Years of Work Experience: Less than 1 year ( ) 1–5 years ( ) 6–10 years ( ) More than 10 years ( )

Have you received any formal training in entrepreneurship? Yes ( ) No ( )

Have you ever attempted or considered starting a radiography-related business? Yes ( ) No ( )

Section B: Level of knowledge radiographers possess regarding entrepreneurial opportunities in radiography

Instructions: Please tick the option that best describes your response to each statement.

1. I understand the concept of entrepreneurship as it applies to radiography. ( ) Very well ( ) Somewhat well ( ) Slightly ( ) Not at all
2. I can identify different types of entrepreneurial ventures in the radiography field. ( ) Yes, many types ( ) Yes, a few types ( ) Only one type ( ) Not at all
3. I am knowledgeable about how to set up a private radiography practice. ( ) Very knowledgeable ( ) Somewhat knowledgeable ( ) Slightly knowledgeable ( ) Not knowledgeable
4. I am aware of the legal and regulatory requirements for establishing a radiography business in Nigeria. ( ) Yes, I'm aware ( ) No, not aware at all
5. My academic training has prepared me for entrepreneurship in radiography. ( ) Very well ( ) Moderately well ( ) Poorly ( ) Not at all

Section C:The extent to which radiographers are aware of the available support systems and opportunities for entrepreneurship in radiography

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

S/N	ITEMS	SA	A	D	SD
	The extent to which radiographers are aware of the available support systems and opportunities for entrepreneurship in radiography				
11.	I am aware of government programs that support healthcare entrepreneurship.				
12.	I know where to access funding or grants for starting a radiography-related business.				
13.	I am familiar with professional associations that offer entrepreneurship training or support.				
14.	I am informed about local or international workshops/seminars on healthcare business development.				
15.	I understand how to apply for loans or financial support targeted at health professionals.				

Section D: Factors influencing radiographers' interest or willingness to pursue entrepreneurship in radiography

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

S/N	ITEMS	SA	A	D	SD
	Factors influencing radiographers' interest or willingness to pursuing entrepreneurship in radiography				
6.	I am motivated to pursue entrepreneurship in radiography to achieve financial independence.				
7.	The lack of job opportunities in public hospitals influences my interest in entrepreneurship.				
8.	I would be more willing to become an entrepreneur if I had access to business mentorship.				
9.	My willingness to start a business in radiography depends on the availability of startup capital.				
10.	I am influenced by successful radiographers who have ventured into private practice.				

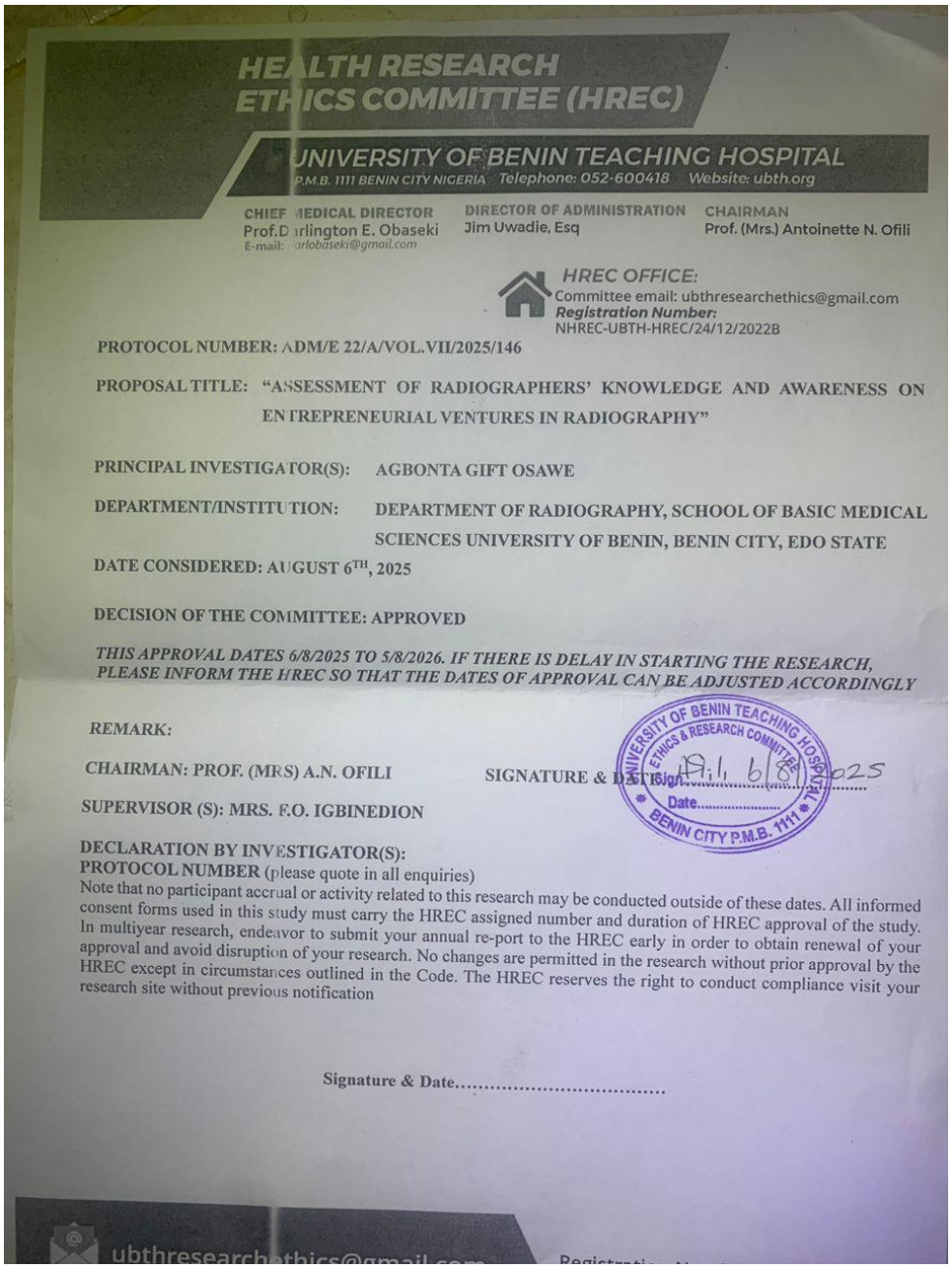
Section E: Barriers that hinders radiographers from pursuing entrepreneurial ventures in the Nigerian healthcare system

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

S/N	ITEMS	SA	A	D	SD
	Barriers that hinders radiographers from pursuing entrepreneurial ventures in the Nigerian healthcare system				
16.	Lack of access to startup capital is a major challenge to starting a radiography business.				
17.	The absence of entrepreneurship training in radiography education is a barrier to business entry.				
18.	I believe the unstable power supply makes it difficult to run a private radiology center.				
19.	Fear of failure discourages me from exploring entrepreneurship.				
20.	Bureaucratic bottlenecks and licensing issues make starting a radiography business too stressful.				

APPENDIX II



HEALTH RESEARCH ETHICS COMMITTEE (HREC)

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Registration Number:
NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/146

PROPOSAL TITLE: "ASSESSMENT OF RADIOGRAPHERS' KNOWLEDGE AND AWARENESS ON ENTREPRENEURIAL VENTURES IN RADIOGRAPHY"

PRINCIPAL INVESTIGATOR(S): AGBONTA GIFT OSAWE

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:

UNIVERSITY OF BENIN TEACHING HOSPITAL ETHICS & RESEARCH COMMITTEE Date..... BENIN CITY P.M.B. 1111

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

SUPERVISOR (S): MRS. F.O. IGBINEDION

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.....

ubthresearchethics@gmail.com