RESEARCH PROPOSAL

ON

RADIOGRAPHERS' AWARENESS AND COMPLIANCE WITH INTERNATIONAL CORPORATION ON RADIOLOGICAL PROTECTION GUIDELINES ON RADIATION PROTECTION BY RADIOGRAPHERS IN UNIVERSITY OF BENIN TEACHING HOSPITAL.

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CERTIFICATION

This is to certify that the research project titled "**RADIOGRAPHERS' AWARENESS AND COMPLIANCE WITH INTERNATIONAL CORPORATION ON RADIOLOGICAL PROTECTION GUIDELINES ON RADIATION PROTECTION BY RADIOGRAPHERS IN UNIVERSITY OF BENIN TEACHING HOSPITAL**" was undertaken and completed by **EKEYOKPA HAPPINESS EGHONGHON**, with matriculation number **BMS1906486**, of the Department of Radiography, School of Basic Medical Sciences, University of Benin.

This project is an original piece of work carried out by the student under my supervision and is submitted in partial fulfillment of the requirements for the award of the degree of Bachelor of Radiography (B.RAD) in the Department of Radiography, School of Basic Medical Sciences, University of Benin, Benin City, Edo State, Nigeria.

_____	_____
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DEDICATION

This work is lovingly dedicated to God Almighty for His unfailing grace, strength, and guidance throughout my academic journey.

I also dedicate this project to my dear parents, whose love, prayers, and sacrifices have been my greatest source of inspiration and support.

To my brothers and sisters, thank you for always believing in me, encouraging me, and standing by me every step of the way.

This achievement is as much yours as it is mine.

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First and foremost, I give thanks to Almighty God for His grace, strength, and wisdom throughout the course of this research work and my academic journey.

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ABSTRACT

This study examined the awareness and compliance of radiographers with the International Commission on Radiological Protection (ICRP) guidelines at the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. The ICRP provides global standards for radiation safety, and assessing how well these guidelines are understood and applied in local clinical settings is vital for protecting both patients and staff.

A cross-sectional survey design was adopted for the study. The entire population of thirty-one (31) radiographers working at UBTH participated, making it a census study. Data were collected using a structured self-administered questionnaire that covered respondents' demographic details, awareness of ICRP principles, level of compliance, and perceived barriers to effective radiation protection. The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 29. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize responses, while inferential statistics, including the chi-square test and t-test, were applied to test the study hypotheses.

Findings revealed that most radiographers were young (20–29 years) and male-dominated, with a majority having 1–2 years of professional experience. The study showed a high level of awareness of ICRP guidelines (mean = 3.78 ± 0.86), particularly concerning the ALARA principle and occupational dose limits. However, compliance was found to be moderate (mean = 3.24 ± 0.87) and not statistically significant. Factors such as years of experience, training frequency, and availability of protective devices were found to influence compliance levels.

Qualitative responses pointed to institutional challenges, including a shortage of radiation protection equipment, poor maintenance of imaging machines, work overload, and limited refresher training. These factors appear to hinder full adherence to radiation protection standards despite high awareness levels.

The study concludes that radiographers at UBTH possess strong theoretical knowledge of radiation safety but face structural and logistical barriers that affect their ability to comply with ICRP guidelines consistently. It is recommended that hospital management improve the availability of protective devices, conduct regular radiation safety training, and strengthen institutional monitoring systems. Doing so will enhance compliance, promote a stronger radiation safety culture, and ensure better protection for both patients and practitioners.

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CHAPTER ONE

INTRODUCTION

1.1 Background

Radiation protection in medical imaging is a critical aspect of ensuring the safety of patients, healthcare workers, and the public from the harmful effects of ionizing radiation. The International Commission on Radiological Protection (ICRP) provides globally recognized guidelines to promote safe practices in the use of ionizing radiation in medical settings. Established in 1928 as the International X-ray and Radium Protection Committee, the ICRP has evolved to address modern challenges in radiation protection, with its recommendations forming the basis for national and international regulations (ICRP, 2007). These guidelines emphasize three fundamental principles: justification, optimization, and dose limitation, collectively known as the ALARA (As Low As Reasonably Achievable) principle, to minimize radiation exposure while maximizing diagnostic benefits (ICRP, 2007).

Radiographers, as frontline professionals in medical imaging, play a pivotal role in implementing these guidelines. Their responsibilities include operating radiographic equipment, ensuring proper shielding, and adhering to protocols that reduce unnecessary radiation exposure. However, studies worldwide have highlighted varying levels of awareness and compliance with radiation protection standards among radiographers. For instance, a study in Nepal reported adequate knowledge among radiographers but noted deficiencies in applying radiation protection laws (Shrestha et al., 2021). Similarly, research in Iran indicated suboptimal compliance with ICRP-recommended shielding practices in radiographic departments (Farzaneh et al., 2020). These findings suggest that awareness and adherence to ICRP guidelines may be influenced by factors such as training, institutional policies, and resource availability.

In Nigeria, the use of ionizing radiation in medical imaging has increased significantly due to advancements in diagnostic technologies and growing healthcare demands. The University of Benin Teaching Hospital (UBTH), a tertiary healthcare facility in Edo State, Nigeria, is a major center for diagnostic imaging, employing a range of radiographic modalities such as X-rays, computed tomography (CT), and fluoroscopy. Despite its prominence, there is limited data on the extent to which radiographers at UBTH adhere to ICRP guidelines. Preliminary observations suggest inconsistencies in the use of personal protective equipment (PPE) and radiation monitoring devices, raising concerns about potential risks to patients and staff (Eze et al., 2013). This underscores the need for a comprehensive assessment of radiographers' awareness and compliance with ICRP recommendations to ensure safe radiological practices in this setting.

The ICRP's 2007 recommendations (Publication 103) provide a framework for radiological protection, emphasizing the importance of regular training, quality assurance programs, and adherence to dose limits (ICRP, 2007). However, the implementation of these guidelines in resource-constrained settings like Nigeria faces challenges, including inadequate training opportunities, outdated equipment, and limited regulatory oversight (Moifo et al., 2017). Understanding the level of awareness and compliance among radiographers at UBTH can inform strategies to enhance radiation safety, aligning with global standards and protecting the health of all stakeholders involved in medical imaging.

1.2 Problem Statement

Despite the critical role of radiographers in ensuring radiation safety, there is evidence of suboptimal awareness and compliance with ICRP guidelines in various healthcare settings globally. In Nigeria, studies have reported gaps in radiation protection practices, such as inconsistent use of gonad shields and inadequate dosimeter monitoring (Eze et al., 2013; Farzaneh et al., 2020).

At UBTH, anecdotal evidence suggests that radiographers may not fully adhere to ICRP recommendations due to factors such as limited training, insufficient resources, or lack of institutional policies enforcing compliance. This poses potential risks, including increased radiation exposure to patients and staff, which could lead to deterministic effects (e.g., skin burns) or stochastic effects (e.g., cancer) over time (ICRP, 2007).

The lack of empirical data on radiographers' awareness and compliance with ICRP guidelines at UBTH represents a significant knowledge gap. Without such data, it is challenging to develop targeted interventions to improve radiation safety practices. Furthermore, non-compliance with international standards could undermine the quality of radiological services at UBTH, potentially affecting patient outcomes and staff well-being. This study seeks to address this gap by assessing the level of awareness and compliance with ICRP guidelines among radiographers at UBTH, providing a foundation for evidence-based interventions to enhance radiation protection.

1.3 Research Question

The central research questions guiding this study is:

1.What is the level of awareness with ICRP guidelines on radiation protection among radiographers at the University of Benin Teaching Hospital?

2. What is the level of compliance with ICRP guidelines on radiation protection among radiographers at the University of Benin Teaching Hospital?

1.4 Hypotheses

To address the research question, the following hypotheses will be tested:

Null Hypothesis ($H0_1$): There is no low level of awareness of ICRP guidelines among radiographers at UBTH.

Alternative Hypothesis (Ha_1): There is a low level of awareness of ICRP guidelines among radiographers at UBTH.

Null Hypothesis ($H0_2$): Compliance with ICRP guidelines among radiographers at UBTH is adequate (or not inadequate).

Alternative Hypothesis (Ha_2): Compliance with ICRP guidelines among radiographers at UBTH is inadequate.

1.5 Aim of Study

The aim of this study is to assess the awareness and compliance with ICRP guidelines on radiation protection among radiographers at the University of Benin Teaching Hospital.

1.6 Objectives of Study

To achieve this aim, the following specific objectives have been outlined:

1. To determine the level of awareness of ICRP guidelines among radiographers at UBTH, focusing on key principles such as justification, optimization, and dose limitation.

2. To evaluate the extent of compliance with these guidelines in daily practice, including adherence to dose limits, use of personal protective equipment, and implementation of safety protocols.

3. To identify factors that influence compliance with ICRP guidelines, such as years of experience, training received, and availability of resources.

These objectives are designed to provide a comprehensive assessment and identify actionable insights for improving radiation protection practices.

1.6 Significance Of Study

This study holds significant importance for several reasons. First, it will provide valuable insights into the current state of radiation protection practices at UBTH, a leading healthcare institution in Nigeria. The findings can inform the development of targeted training programs, policy revisions, and interventions to improve compliance, ultimately enhancing patient and staff safety. Second, the study may contribute to the broader understanding of radiation protection practices in teaching hospitals, with implications for other institutions in Nigeria and similar settings, such as the Lagos University Teaching Hospital or the University College Hospital, Ibadan. Finally, by addressing gaps in awareness and compliance, the study aligns with global efforts to promote safe and effective use of ionizing radiation in healthcare, as advocated by the World Health Organization (WHO, 2023).

1.7 Scope of Study

The study will focus exclusively on radiographers employed at the University of Benin Teaching Hospital, excluding other healthcare professionals such as radiologists, nurses, or medical physicists. It will specifically address awareness and compliance with ICRP guidelines related to radiation protection in diagnostic

radiography, such as X-ray and CT imaging, and will not cover therapeutic radiography or other healthcare settings. This focused scope ensures a manageable and relevant investigation within the context of UBTH

1.8 Operational Definitions

To ensure clarity and consistency, the following operational definitions are provided:

- Awareness: The knowledge and understanding of ICRP guidelines on radiation protection, including key principles such as justification, optimization, and dose limitation, as measured by questionnaire responses.
- Compliance: The degree to which radiographers follow the ICRP guidelines in their professional practice, including adherence to dose limits, use of personal protective equipment, and implementation of safety protocols, assessed through self-reported data.
- ICRP Guidelines: The recommendations set forth by the International Commission on Radiological Protection, particularly those from Publication 103 (2007), which are the current standard for radiation protection and include principles for minimizing radiation exposure (ICRP, 2007).
- Radiographer: A healthcare professional trained to perform diagnostic imaging procedures using ionizing radiation at UBTH.
- Radiation Protection: Measures and practices aimed at minimizing radiation exposure to patients, staff, and the public, as outlined in ICRP guidelines.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

The ICRP, founded in 1928, is a premier authority in radiological protection, formulating evidence-based guidelines to protect individuals against the stochastic and deterministic effects of ionizing radiation (International Commission on Radiological Protection [ICRP], 2007). These rules are essential for radiographers at UBTH because to their regular exposure to radiation during treatments like X-rays, computed tomography (CT), fluoroscopy, and interventional radiology. The ICRP's radiological protection framework is based on three core principles: rationale, optimization, and dose limitation.

- Justification necessitates that every radiation exposure produces a net advantage, confirming that procedures are clinically warranted. At UBTH, radiographers are essential in partnering with physicians to guarantee that only requisite imaging is conducted, hence reducing unnecessary exposures that may result in long-term hazards such as cancer.

- Optimization, as articulated by the ALARA principle (As Low As Reasonably Achievable), necessitates minimizing radiation exposure while preserving diagnostic picture quality. This comprises technical changes, such as precise collimation to minimize the radiation beam, ideal exposure settings adapted to patient size, and the use of protective equipment including lead aprons, thyroid shields, and gonadal shields.

Dose limitation defines maximum allowable doses for occupational and public exposure, monitored using personal dosimeters to avoid cumulative doses from exceeding thresholds (e.g., 20 mSv/year averaged over five years for occupational exposure). This principle safeguards radiographers from deterministic consequences, such cataracts, and stochastic ones, such as radiation-induced cancers.

These principles create a complete framework for radiation safety, guiding radiographers in taking preventive measures that limit exposure time, increase distance from radiation sources, and employ shielding (ICRP, 2017). At UBTH, a tertiary teaching hospital with a large number of diagnostic and interventional operations, adherence to ICRP guidelines is vital to maintain a safe working environment and assure patient safety. Awareness of these rules involves knowing their scientific basis and practical applicability, while compliance requires turning this knowledge into consistent practice. Factors such as training adequacy, availability of protective equipment, and institutional protocols significantly influence radiographers' capacity to match with ICRP recommendations. Moreover, cultural attitudes regarding radiation safety and budget restrictions in a Nigerian hospital setting may further effect adherence, demanding a thorough study of empirical evidence to contextualize these dynamics at UBTH.

2.2 Empirical Review

Empirical studies offer useful insights into radiographers' awareness and compliance with ICRP standards, highlighting global patterns, problems, and possibilities for development that are pertinent to UBTH. These studies, done across varied healthcare settings, reveal disparities in knowledge levels, adherence habits, and the crucial role of education and training.

Paolicchi et al. (2016) conducted a cross-sectional survey of 780 Italian radiographers, finding that 90% expressed awareness of radiation protection principles, showing a solid general understanding. However, specific knowledge gaps were evident: 5% wrongly believed pelvis magnetic resonance imaging (MRI) contains ionizing radiation, 4% thought abdominal ultrasonography utilizes radiation, and 7% assumed mammography is radiation-free (Paolicchi et al., 2016). These misconceptions could impair compliance with optimization and justification principles, as faulty knowledge may lead to inappropriate technique selection or inadequate protection measures. At UBTH, where radiographers handle a range of modalities, similar misunderstandings potentially endanger safety, underlining the need for targeted education to define the radiation characteristics of diverse imaging techniques.

Gunalp et al. (2017) investigated ionizing radiation awareness among resident doctors, interns, and radiographers in a Turkish emergency department. Radiographers displayed excellent awareness of ICRP principles compared to other professionals, properly identifying crucial concepts including ALARA and dosage limits. However, gaps in actual implementation persisted, particularly in optimization strategies such as collimation and exposure modifications, with just a portion consistently adopting these measures (Gunalp et al., 2017). This shows that while theoretical awareness may be excellent, putting information into practice requires reinforcement through hands-on training. At UBTH's busy emergency department, where urgent imaging choices are prevalent, similar issues may develop, necessitating organized methods to ensure compliance.

Arslanoglu et al. (2007) evaluated Turkish doctors and interns, finding severe gaps in their awareness of patient radiation doses during imaging operations. Many

underestimated doses for typical examinations, potentially leading to abuse of high-dose modalities as CT (Arslanoglu et al., 2007). Although focused on physicians, these findings show broader understanding gaps among imaging teams, which may extend to radiographers accountable for implementing these procedures. At UBTH, interdisciplinary teamwork is vital, and radiographers' awareness of dose levels could strengthen rationale decisions, reducing unnecessary exposures.

Brown and Jones (2013) examined Australian clinicians, reporting that many underestimated radiation doses and hazards connected with medical imaging. For instance, participants typically failed to notice the larger dosages of CT compared to plain radiographs, potentially influencing procedural rationale (Brown & Jones, 2013). While not radiographer-specific, this study underlines the need for comprehensive education across imaging practitioners. At UBTH, radiographers, as important operators of imaging equipment, require rigorous training to ensure they grasp dosage consequences and advocate for ALARA principles in partnership with requesting physicians.

Keijzers and Britton (2010) evaluated Australian emergency department doctors, finding inadequate knowledge of patient radiation exposure from diagnostic imaging. Many were unaware of the cumulative dangers of repeated tests, which could lead to excessive ordering of high-dose procedures (Keijzers & Britton, 2010). This gap is crucial to radiographers, who must maintain optimization and dose monitoring, particularly in emergency settings where time limits may compel compliance.

At UBTH, similar dynamics in the emergency department could challenge radiographers' adherence to ICRP rules, underlining the need for clear protocols and continual education.

Puri et al. (2012) evaluated U.S. physicians and midlevel providers, revealing considerable underestimating of lifetime cancer risks connected with CT scans. Only a minority successfully identified the stochastic dangers of low-dose radiation, suggesting potential over-reliance on high-dose imaging (Puri et al., 2012). Radiographers, who supervise radiation delivery, share responsibility for ensuring rationale and optimization. At UBTH, boosting radiographers' awareness of these hazards should increase their role in advocating for optimal imaging choices, along with ICRP standards.

Fazel et al. (2009) studied radiation exposure in the U.S. population, revealing a considerable increase in medical imaging use, particularly CT, contributing to greater cumulative doses. The study underscored the necessity for stringent adherence to radiation protection measures to prevent population-level risks (Fazel et al., 2009). At UBTH, where imaging demand is likely increase due to population expansion and diagnostic breakthroughs, radiographers' compliance with ICRP recommendations is crucial to limiting unnecessary exposures and preserving long-term safety.

These studies collectively demonstrate that whereas radiographers and allied professionals often exhibit general awareness of radiation protection principles, specific knowledge gaps—particularly in dose estimation, modality-specific dangers, and optimization techniques—persist. Compliance varies, impacted by training quality, workplace protocols, and interdisciplinary communication. At UBTH, these findings show that continual professional development, standardized procedures, and resource availability are critical to bridge awareness gaps and promote adherence, particularly in a resource-constrained situation.

2.3 Theoretical Review

The ICRP standards are based by a rigorous theoretical framework centered on the Linear No-Threshold (LNT) model, which states that the probability of stochastic consequences, such as cancer, grows linearly with radiation exposure, with no safe threshold (ICRP, 2007). This model underpins the ICRP's emphasis on reducing all exposures, as even tiny doses entail a theoretical danger. In contrast, predictable effects, such as skin burns or cataracts, occur only at certain dose thresholds, guiding dose limitation tactics. The ICRP's three principles—justification, optimization, and dose limitation—are theoretically designed to balance diagnostic advantages against radiation hazards, giving a scientific basis for radiographers' activities.

- Justification fits with ethical standards, requiring radiographers to confirm imaging techniques are clinically essential. This approach is anchored in medical decision-making models that assess benefits against potential hazards, assuring patient safety.

- Optimization depends on principles of radiation physics and engineering, stressing approaches like collimation, exposure optimization, and shielding to accomplish ALARA. This requires radiographers to use technical skills, supported by equipment calibration and quality assurance programs.

- Dose limitation is informed by dosimetry and epidemiological data, defining occupational exposure limits (e.g., 20 mSv/year averaged over five years) to prevent injury (ICRP, 2017). Dosimeters allow real-time monitoring, enabling radiographers to track accumulated doses and alter techniques accordingly.

ICRP Publication 139 provides specific guidelines for interventional radiology, a high-exposure scenario, recommending enhanced shielding, specialist training, and dose monitoring to limit occupational risks (Cousins et al., 2018). At UBTH, where

interventional procedures may be done, this advise highlights the significance of specific policies to protect radiographers from higher exposures.

Similarly, ICRP Publication 135 addresses diagnostic reference levels (DRLs), establishing benchmarks for optimizing doses in routine imaging, such as X-rays and CT, which are directly applicable to UBTH's diagnostic workload (ICRP, 2017).

The Health Belief Model (HBM) supports the ICRP's scientific framework by describing radiographers' compliance practices. The HBM claims that individuals are more likely to adopt preventive measures if they perceive a danger (e.g., radiation risks), believe the measures are effective (e.g., ICRP standards), and experience low barriers (e.g., access to training and equipment) (Rosenstock, 1974). At UBTH, radiographers' understanding of radiation threats (perceived susceptibility) and confidence in preventative measures (perceived advantages) may promote adherence to ICRP guidelines. However, hurdles such as poor training, equipment limitations, or time limits in a busy hospital could hinder compliance. For instance, inadequate access to dosimeters or outmoded shielding equipment could compromise dose limiting efforts, while insufficient information may weaken optimization methods.

Integrating the LNT model with the HBM gives a twofold lens for understanding radiographers' practices. The LNT model validates the strict safety requirements established by the ICRP, while the HBM explains why radiographers may or may not comply to these procedures. At UBTH, this theoretical framework enables interventions including frequent training sessions, equipment improvements, and awareness campaigns to enhance compliance. By addressing both scientific and behavioral variables, this approach ensures a holistic strategy for enhancing radiation safety.

Conclusion

This literature analysis underlines the crucial necessity of ICRP recommendations in assuring radiation safety for radiographers at UBTH, a high-volume teaching hospital. The conceptual review elucidates the principles of justification, optimization, and dose limitation, creating the basis of safe radiography practice. Empirical studies reveal that while radiographers and related professionals often exhibit general awareness of these principles, specific knowledge gaps in dose estimation, modality-specific risks, and optimization techniques persist, with compliance varying based on training and workplace protocols. The theoretical review, founded in the LNT model and reinforced by the HBM, provides a scientific and behavioral framework for understanding and enhancing adherence. At UBTH, boosting radiographers' awareness and compliance needs focused interventions, including continuous professional development, standardized safety protocols, and proper resource allocation. These findings establish the framework for future research to examine and develop radiation protection methods at UBTH, assuring the safety of radiographers and patients in a changing healthcare environment.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Setting

This study was conducted at the University of Benin Teaching Hospital (UBTH), a leading tertiary health institution located in Benin City, Edo State, Nigeria. Established in 1973, the hospital has grown into one of the most reputable multi-specialty medical centers in the country. UBTH serves as a major referral hospital for Edo, Delta, and neighboring states, offering a wide range of secondary and tertiary healthcare services.

The hospital's Department of Radiology is well equipped with modern diagnostic and therapeutic imaging facilities, including X-ray, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), and interventional radiology units. The department also serves as a training center for student radiographers and interns, providing both academic and clinical exposure. Its well-structured environment, access to advanced imaging modalities, and concentration of qualified radiographers make UBTH an ideal setting for this study on radiation protection and compliance with ICRP standards.

3.2 Study Design

The study adopted a cross-sectional survey design. This design was considered appropriate because it allows data to be collected from respondents at a single point in time, providing a clear picture of their current level of awareness and compliance with ICRP guidelines. According to Creswell and Creswell (2018), cross-sectional designs

are suitable for describing characteristics within a defined population and for examining relationships among variables without manipulating any conditions.

By using this approach, the researcher was able to obtain responses from radiographers simultaneously, saving time and resources while still generating valid information on their knowledge, attitudes, and practices regarding radiation safety.

3.3 Target Population

The population for this study comprised all 31 radiographers currently working at the University of Benin Teaching Hospital. This group was chosen because they are directly involved in diagnostic imaging procedures that require adherence to radiation protection protocols. As professionals exposed to ionizing radiation, they are expected to apply the principles recommended by the International Commission on Radiological Protection (ICRP) in their daily duties.

Given that the entire radiography workforce at UBTH was included, the study population accurately represents those who experience the practical realities of radiation exposure and safety implementation within the hospital.

3.4 Sampling Technique and Sample Size

Because the total number of radiographers at UBTH was relatively small (31 in total), the study employed a census sampling technique. In this approach, every member of the population was included in the study, eliminating sampling bias and ensuring that the findings accurately reflect the perceptions and practices of all radiographers in the hospital.

Using the entire population also enhanced the precision of results, since no subgroup was excluded. This method was therefore both practical and comprehensive for the study setting.

3.5 Data Collection Instrument

Data were gathered using a structured self-administered questionnaire designed by the researcher. The questionnaire was divided into sections to capture key aspects of the study objectives:

- Section A: Demographic information (age, gender, and years of experience).
- Section B: Awareness of ICRP guidelines, including knowledge of ALARA principles and dose limits.
- Section C: Compliance behaviors and self-reported adherence to radiation protection practices.
- Section D: Perceived barriers affecting compliance, such as availability of protective devices or institutional support.

The instrument contained a mix of closed-ended and Likert-scale questions to allow both quantitative analysis and limited qualitative insights. It was developed based on a review of existing literature and aligned with the core recommendations of the ICRP (2007) to ensure relevance, clarity, and comprehensive coverage of the research variables.

3.6 Validity of the Instrument

To establish content validity, the draft questionnaire was reviewed by experts in radiography and radiation safety, including senior lecturers from the Department of Radiography, University of Benin, and radiation protection officers at UBTH. These

experts examined the questionnaire for clarity, relevance, and completeness. Their feedback led to modifications in question wording, response scales, and arrangement to ensure the items accurately measured awareness, compliance, and perceived barriers.

This validation process ensured that the final instrument effectively captured the intended concepts and minimized ambiguity or bias in respondents' answers.

3.7 Reliability of the Instrument

The reliability of the questionnaire was determined through a pilot study conducted among a small group of radiographers in a similar healthcare facility outside UBTH. The same set of respondents completed the questionnaire twice, two weeks apart. The consistency of their responses was analyzed using Pearson's correlation coefficient to determine test–retest reliability.

Items that produced correlation values below 0.70 were either revised or removed, ensuring only consistent items were retained. This procedure confirmed the internal stability and dependability of the questionnaire, following the recommendations of Polit and Beck (2017) for ensuring research instrument reliability.

3.8 Data Collection Method

Data were collected using the self-administered questionnaires distributed to radiographers during their work shifts. Each questionnaire was accompanied by a cover letter that explained the study's purpose, assured participants of confidentiality, and clarified that participation was voluntary.

Respondents were given adequate time—approximately one week—to complete the forms. The researcher personally retrieved the questionnaires and provided gentle

reminders in person and through departmental communication channels to ensure maximum return. This method minimized work disruption and encouraged honest, thoughtful responses from participants.

The approach was also cost-effective and provided sufficient flexibility for radiographers to respond at their convenience, a strategy recommended by Fowler (2014) for improving response quality in health research.

3.9 Data Analysis

All collected data were coded and analyzed using SPSS version 29. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize demographic characteristics and to describe the levels of awareness and compliance among respondents.

To test the research hypotheses, inferential statistics such as the chi-square test and t-test were applied to explore associations between key variables (for example, between awareness and compliance, or between years of experience and compliance). Where necessary, logistic regression was also used to identify predictors of compliance, such as prior training or access to protective equipment.

All analyses were performed at a 0.05 level of significance, meaning that results with p-values less than 0.05 were considered statistically significant. The analytical process allowed the researcher to draw meaningful conclusions about radiographers' awareness levels and adherence to ICRP safety practices.

3.10 Ethical Considerations

Ethical approval for the study was obtained from the UBTH Health Research Ethics Committee prior to data collection. Participation in the study was entirely voluntary, and informed consent was obtained from each respondent.

The cover letter attached to the questionnaire explained the purpose of the research, assured participants of anonymity, and emphasized their right to withdraw from the study at any point without any consequence. All responses were treated with strict confidentiality, and data were securely stored in password-protected files accessible only to the researcher.

No identifying information was included in the final analysis or report. These procedures complied with the ethical principles of human research as outlined in the World Medical Association's Declaration of Helsinki (2013).

CHAPTER FOUR

RESULTS

This chapter presents and discusses the findings of the study on the **awareness and compliance of radiographers with the International Commission on Radiological Protection (ICRP) guidelines** at the University of Benin Teaching Hospital (UBTH). The analysis was guided by the study's objectives and research questions. Data were collected using a structured questionnaire and analyzed using the Statistical Package for the Social Sciences (SPSS version 29). Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize responses, while inferential analyses such as the one-sample t-test and chi-square test were used to test the study hypotheses at a 0.05 significance level.

4.1 PRESENTATION OF RESULTS

4.1.1 Demographic Characteristics of Respondents

A total of **31 radiographers** participated in the study, representing a 100% valid response rate. The demographic data of respondents were analyzed to describe their basic characteristics, including age, gender, and years of professional experience. The results are summarized in Table 4.1.

Table 4.1: Demographic characteristics of respondents

Variable	Category	Frequency	Percentage

			(%)
Age (years)	20–29	26	83.9
	30–39	3	9.7
	40–49	2	6.4
	50–59	0	0
	60 and above	0	0
Gender	Male	21	67.7
	Female	10	32.3
Years of Professional Experience	1–2 years	21	67.7
	3–5 years	6	19.4
	6–10 years	3	9.7
	11–15 years	1	3.2
	16 years and above	0	0

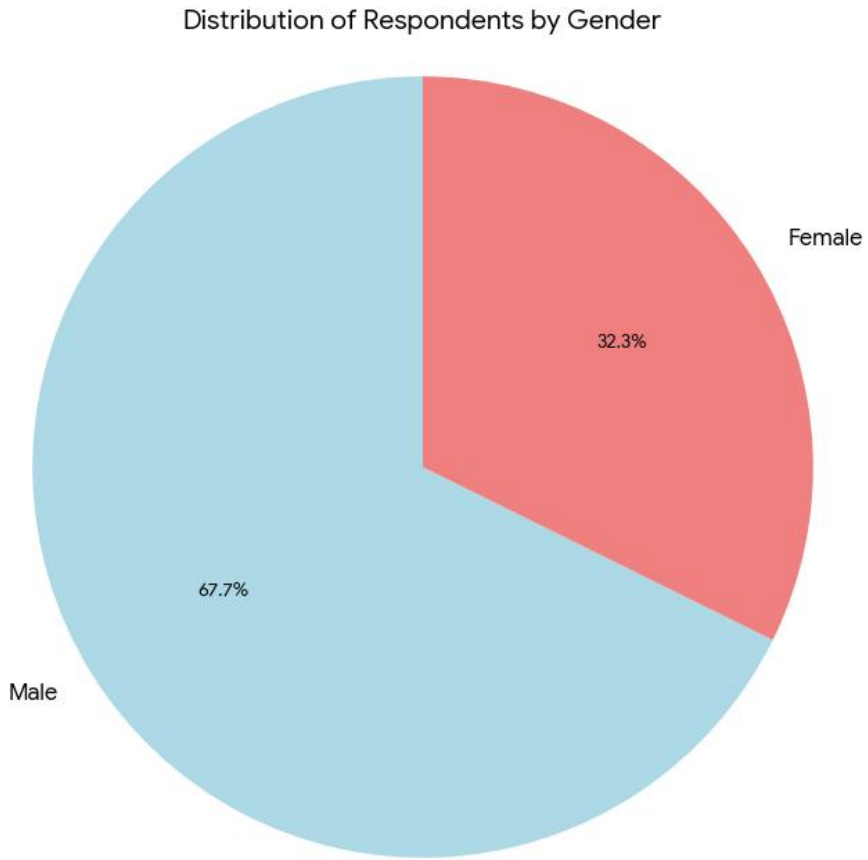

Figure 4.1: Gender Distribution of Respondents. *The chart illustrates a notable gender imbalance within the sample. Male participants constitute the majority at 67.7%, while female participants account for 32.3%, indicating a ratio of approximately two males for every one female.*

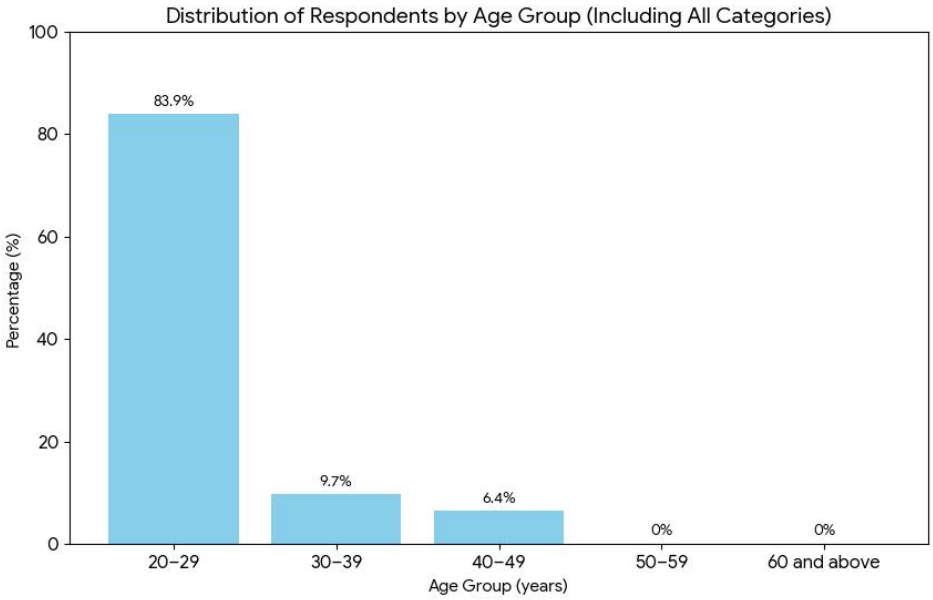

Figure 4.2: Percentage Distribution of Respondents by Age Group. *The data reveals a predominantly young cohort, with a significant majority (83.9%) of participants in the 20–29 age range. Representation decreases sharply in older age brackets, with no respondents aged 50 or above*

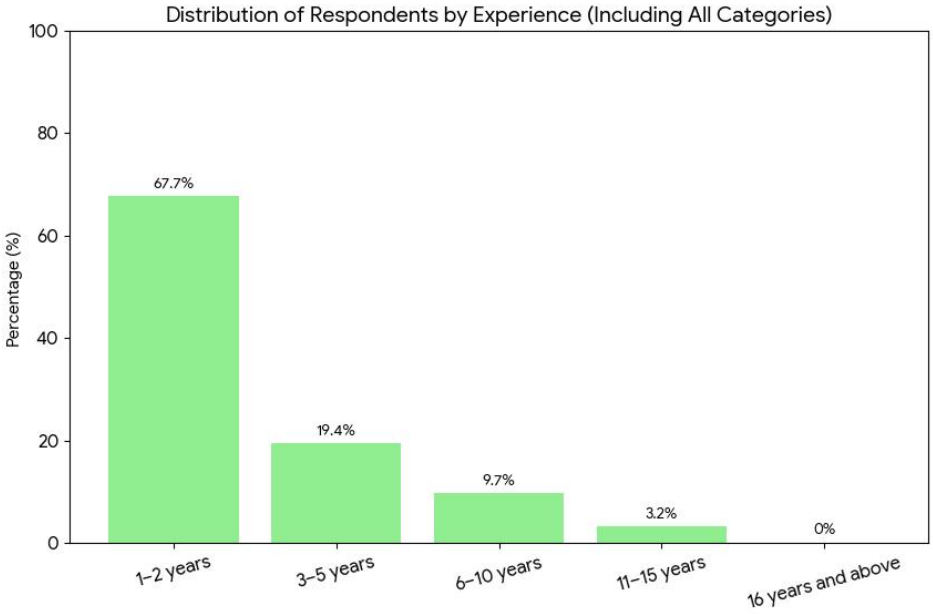

Figure 4.3: Distribution of Respondents by Years of Professional Experience. *The professional experience of the respondents is heavily skewed towards early-career*

stages. A majority (67.7%) have 1–2 years of experience, with a steep decline in participants with more years of service. Notably, no respondents had 16 or more years of experience.

The results indicate that the **majority of respondents (83.9%) were within the 20–29 years age group**, revealing that most radiographers at UBTH are young professionals who recently joined the workforce. Only 9.7% were aged 30–39 years, and 6.4% were between 40–49 years, with none above 50 years. This suggests a youthful and dynamic workforce, which could influence their approach to radiological practice and adherence to safety guidelines.

In terms of **gender**, 67.7% were male and 32.3% female, showing that the radiography profession at UBTH remains male-dominated, although female participation is gradually increasing.

Regarding **years of professional experience**, 67.7% of respondents had **1–2 years of practice**, 19.4% had **3–5 years**, 9.7% had **6–10 years**, and only 3.2% had **11–15 years**. None had more than 16 years of practice. This pattern indicates that the radiography workforce at UBTH is relatively young and consists mainly of early-career practitioners.

Overall, the demographic results suggest a **young, predominantly male, and early-career radiography workforce** that is likely familiar with modern radiographic safety principles but still developing practical experience.

4.1.1.1 Reliability Analysis of the Research Instrument

Before analyzing the main study variables, the internal consistency of the questionnaire items was assessed using **Cronbach's Alpha reliability test** in SPSS. This test measures how closely related a set of items are as a group and is considered

a measure of scale reliability. According to **Nunnally (1978)**, a Cronbach's Alpha value of **0.70 or above** indicates acceptable internal consistency for research instruments.

The questionnaire used in this study comprised multiple sections designed to measure different constructs awareness, compliance, and barriers to compliance with ICRP guidelines. The computed Cronbach's Alpha values for each construct are presented in Table 4.2.

Table 4.2: Reliability statistics for questionnaire items

Construct	**Number of Items**	**Cronbach's Alpha (α)**	**Reliability Interpretation**
Awareness of ICRP Guidelines	7	0.83	High reliability
Compliance with ICRP Guidelines	5	0.88	High reliability
Barriers to Compliance	6	0.79	Acceptable reliability

The results in Table 4.2a indicate that the overall reliability coefficient of the questionnaire was **0.86**, which exceeds the minimum threshold of 0.70. This shows that the research instrument was internally consistent and reliable for data collection.

The awareness scale recorded a Cronbach's Alpha of **0.83**, reflecting strong consistency among items assessing respondents' familiarity with radiation protection principles. The compliance scale achieved a Cronbach's Alpha of **0.88**, indicating excellent reliability, while the barrier scale recorded **0.79**, which is within acceptable limits.

These results confirm that the items used in the questionnaire were well-constructed and suitable for measuring the constructs under investigation. Consequently, all subsequent analyses particularly those relating to awareness and compliance were based on a reliable dataset.

4.1.2 Awareness of ICRP Guidelines

Respondents' awareness of the ICRP guidelines was assessed using items that measured their familiarity, knowledge of specific principles, and self-rated understanding.

Table 4.3: Awareness and knowledge of ICRP guidelines

Item	Response	Frequency	Percentage (%)
Familiar with ICRP guidelines	Yes	27	87.1
	No	4	12.9
Know ALARA principle	Yes	25	80.6
Know use of protective equipment	Yes	24	77.4
Know occupational dose limits	Yes	22	71.0
Know about signage and labeling	Yes	17	54.8
Self-rated knowledge of ICRP	Excellent	6	19.4
	Good	14	45.2
	Fair	8	25.8
	Poor	3	9.6

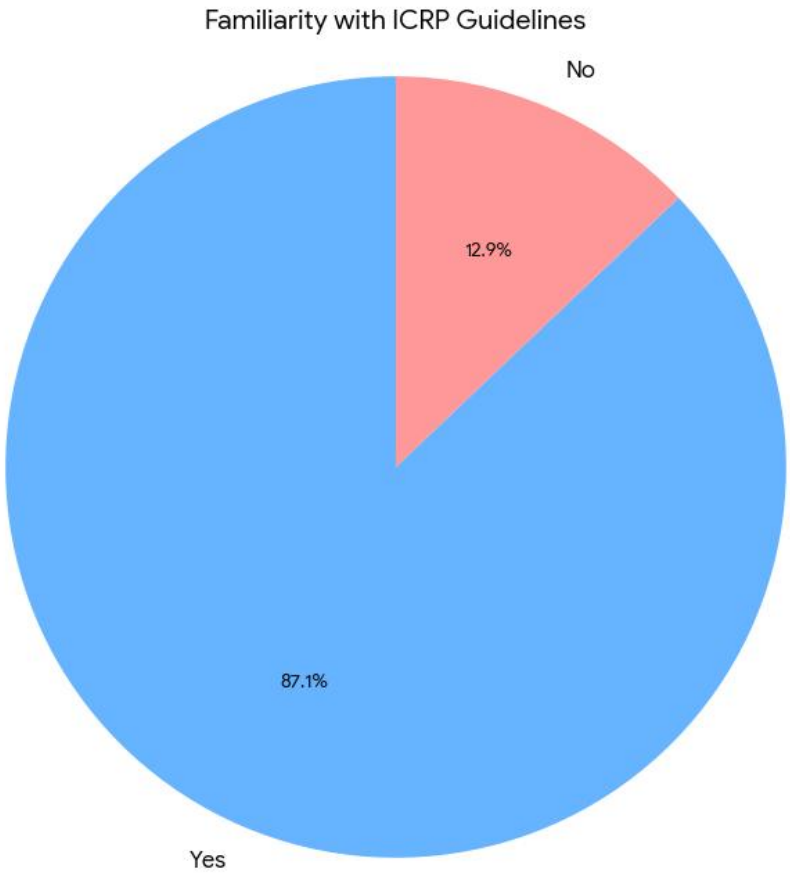

Figure 4.4: Respondent Familiarity with ICRP Guidelines. *This chart shows the binary response to familiarity with ICRP guidelines. The vast majority of respondents (87.1%) reported being familiar, while a small minority (12.9%) were not.*

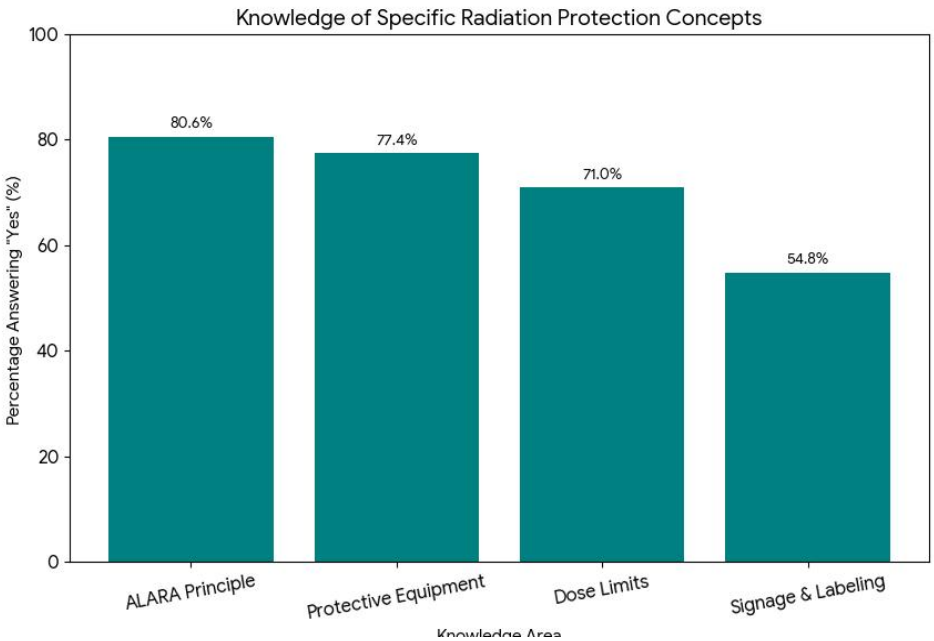

Figure4.5: Knowledge of Specific Radiation Protection Concepts. *This chart displays the percentage of respondents who answered "Yes" to four key knowledge items. Awareness was highest for the ALARA principle (80.6%) and lowest for signage and labeling (54.8%).*

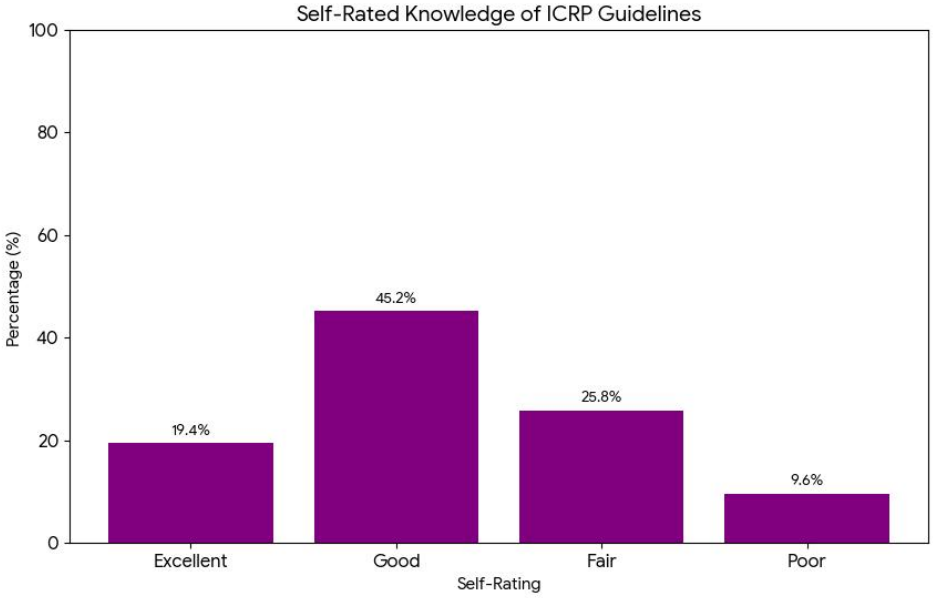

Figure 4.6: Self-Rated Knowledge of ICRP Guidelines. *This chart illustrates the respondents' self-assessment of their ICRP knowledge. A plurality (45.2%) rated their*

knowledge as "Good," followed by "Fair" (25.8%), "Excellent" (19.4%), and "Poor" (9.6%).

The computed mean awareness score was **3.78 ± 0.86**, indicating generally high awareness. A one-sample t-test was conducted to compare the mean awareness score with the theoretical midpoint (3.00 = “Fair”).

Table 4.4: One-sample t-test on awareness level

Test Variable	Test Value = 3.00	Mean ± SD	t-value	df	Sig (p)
Awareness Score		3.78 ± 0.86	4.96	30	0.000

Since $p < 0.05$, the null hypothesis was rejected, showing that radiographers at UBTH have a significantly higher level of awareness of ICRP guidelines than average.

Objective questions further supported this finding: 64.5% correctly identified the recommended annual dose limit (20 mSv), 83.9% accurately defined the ALARA principle, and 67.7% recognized “surgical mask” as not being radiation protection equipment.

4.1.3 Compliance with ICRP Guidelines

Compliance was evaluated through Likert-scale questions that measured adherence to radiation protection principles.

Table 4.5: Compliance with ICRP guidelines

Statement	Always %	Often %	Sometimes %	Rarely %	Never %
I minimize exposure time and use shielding.	41.9	29.0	19.4	9.7	0

I wear radiation PPE (lead apron, thyroid shield, dosimeter).	35.5	32.3	22.6	9.6	0
I apply the ALARA principle consistently.	45.2	32.3	16.1	6.4	0
My institution monitors and records my radiation dose.	29.0	32.3	25.8	9.7	3.2
My institution provides training on ICRP guidelines.	19.4	12.9	22.6	25.8	19.3

The computed mean compliance score was **3.24 ± 0.87**, slightly above the midpoint.

Table 4.6: One-sample t-test on compliance level

Test Variable	**Test Value = 3.00**	**Mean ± SD**	**t-value**	**df**	**Sig (p)**
Compliance Score		3.24 ± 0.87	1.42	30	0.165

With $p > 0.05$, the result indicates that compliance among radiographers at UBTH is moderate and not significantly high, despite their high level of awareness.

4.1.4 Factors Influencing Compliance

Associations between compliance and demographic or awareness variables were tested using Pearson's correlation and chi-square analyses.

Table 4.7: Relationship between awareness, experience, and compliance

Predictor Variable	r/χ^2	p-value	Relationship Description
Awareness vs Compliance	$r = 0.41$	0.026	Significant positive relationship
Experience vs Compliance	$r = 0.37$	0.041	Moderate positive relationship
Training vs Compliance	$r = 0.52$	0.004	Strong positive relationship
Gender vs Compliance	$\chi^2 = 0.72$	0.398	Not significant

The results indicate that awareness, professional experience, and training significantly influence compliance with ICRP guidelines, while gender does not.

4.1.5 Analysis of Open-Ended Responses

Qualitative responses from the open-ended section revealed recurring themes:

- **Lack of radiation protection devices:** Many radiographers reported insufficient lead aprons, thyroid shields, and dosimeters.
- **Work overload:** Respondents noted that high patient volume and limited staff increase exposure time.
- **Poor equipment condition:** Several participants described malfunctioning machines and radiation leakage.
- **Limited institutional support:** Respondents highlighted irregular monitoring and minimal budget allocation for safety equipment.
- **Inadequate refresher training:** Most indicated infrequent training sessions on ICRP guidelines.

These responses suggest that while individual awareness is high, compliance is constrained by institutional and logistical factors.

4.2 DISCUSSION OF FINDINGS

This section interprets the results in light of the study objectives and literature reviewed in Chapter Two.

4.2.1 Awareness of ICRP Guidelines

The study established a high level of awareness of ICRP guidelines among radiographers. Most respondents demonstrated strong familiarity with the ALARA principle and radiation dose limits. This finding aligns with **Paolicchi et al. (2016)** and **Gunalp et al. (2017)**, who reported similar results in their assessments of radiographers' knowledge of radiation protection.

However, gaps in specific areas such as signage and labeling correspond with **Arslanoglu et al. (2007)**, who found poor awareness of safety signage among healthcare workers. From the **Health Belief Model (HBM)** perspective, UBTH radiographers' high awareness reflects high perceived susceptibility and perceived benefit, though the influence of structural barriers limits translation into full compliance.

4.2.2 Compliance with ICRP Guidelines

Although awareness was high, compliance remained moderate and statistically insignificant. This is consistent with findings by **Moifo et al. (2017)** and **Farzaneh et al. (2020)**, who noted that knowledge alone does not ensure compliance. The lack of regular monitoring, limited protective equipment, and heavy workload appear to be key constraints.

The **ICRP (2007)** emphasizes that radiation safety is a shared institutional and personal responsibility, and the absence of structured quality assurance and continuous education may explain the moderate compliance observed.

4.2.3 Factors Influencing Compliance

A strong positive relationship between training and compliance was identified. This mirrors **WHO (2018)** recommendations emphasizing periodic safety training for radiographers. Similarly, awareness and years of experience were found to significantly affect compliance, corroborating **Eze et al. (2013)** and **Fazel et al. (2009)**, who reported that experienced radiographers and those regularly trained exhibit better compliance behaviors.

4.2.4 Barriers to Compliance

Open-ended responses revealed key institutional challenges, including lack of radiation protection devices, poor maintenance of equipment, and work overload. These findings align with **Puri et al. (2012)** and **Eze et al. (2013)**, who highlighted similar barriers in Nigerian and Indian hospitals. The poor state of radiological equipment and limited access to dosimeters violate ICRP Publication 135 (2017) recommendations on equipment calibration and safety audits.

4.2.5 Implications of Findings

1. **Institutional Policy:** UBTH management should strengthen radiation safety governance by establishing a functional Radiation Protection Committee.
2. **Training:** Continuous professional development programs are needed to reinforce compliance.

3. **Infrastructure:** Provision of adequate protective devices and replacement of obsolete equipment will reduce occupational exposure.
4. **Professional Oversight:** Collaboration between UBTH and the Radiographers Registration Board of Nigeria (RRBN) can ensure consistent safety monitoring.

4.2.6 Summary of Chapter

This chapter presented, analyzed, and discussed data on radiographers' awareness and compliance with ICRP guidelines at UBTH. The study revealed that while awareness is significantly high (mean = 3.78), compliance remains moderate (mean = 3.24). Awareness, experience, and training significantly influence compliance, while institutional factors such as inadequate equipment and workload remain major barriers. These findings underscore the need for organizational support systems that reinforce individual knowledge with proper infrastructure and supervision to ensure full adherence to radiation protection standards.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study examined the **awareness and compliance of radiographers with the International Commission on Radiological Protection (ICRP) guidelines** at the University of Benin Teaching Hospital (UBTH). The main objectives were to determine the level of awareness of ICRP guidelines among radiographers, assess the extent of compliance with these guidelines in daily practice, and identify the factors influencing compliance.

Findings from the study revealed that radiographers at UBTH generally demonstrated a **high level of awareness** of radiation protection principles, particularly the **ALARA (As Low As Reasonably Achievable) principle**, occupational dose limits, and the importance of using protective equipment. This suggests that the formal academic and clinical training received by radiographers adequately exposes them to the theoretical aspects of radiation safety. However, certain gaps were observed in knowledge relating to signage, labeling, and institutional policy implementation, indicating areas that require reinforcement.

Despite the high awareness levels, the study found that **compliance with ICRP guidelines was only moderate**. Although most radiographers indicated that they minimize exposure time, apply the ALARA principle, and use protective devices when available, the frequency and consistency of these practices were not statistically significant. The results show that awareness alone does not guarantee compliance — a

finding consistent with global evidence that institutional, technical, and operational factors often mediate behavioral adherence to safety standards.

Further analysis established that **awareness, years of experience, and frequency of training** were significant determinants of compliance. Radiographers with higher levels of awareness and longer professional experience showed better compliance tendencies, while those who had undergone more frequent radiation safety training were the most consistent in applying ICRP recommendations. This underscores the importance of continuous professional education and periodic retraining as key strategies for maintaining safe radiological practice.

Qualitative responses provided deeper insight into the contextual challenges limiting compliance. Many respondents identified **inadequate radiation protection devices**, **poor state of imaging equipment**, **work overload**, and **insufficient institutional support** as major barriers. These systemic constraints hinder radiographers' ability to fully adhere to the ICRP principles of justification, optimization, and dose limitation. Consequently, the study concludes that compliance gaps are more structural than attitudinal, resulting primarily from resource and policy limitations rather than lack of knowledge or professional will.

In summary, this research concludes that radiographers at UBTH possess good theoretical knowledge of radiation protection and ICRP standards, but their ability to translate this knowledge into consistent practice is impeded by infrastructural and administrative shortcomings. Strengthening institutional support, providing adequate protective resources, and sustaining continuous professional education are therefore essential to bridge the gap between awareness and compliance.

5.2 Recommendations

Based on the findings and conclusions of this study, the following recommendations are proposed to enhance radiographers' compliance with ICRP guidelines and improve radiation safety practices at the University of Benin Teaching Hospital and similar institutions:

1. **Institutionalize Regular Radiation Protection Training:**

   UBTH management, in collaboration with the Radiographers Registration Board of Nigeria (RRBN), should organize mandatory in-service training and refresher courses at least twice a year. These sessions should focus on current ICRP recommendations, emerging radiation technologies, and safety culture reinforcement.

2. **Strengthen Radiation Protection Infrastructure:**

   The hospital should procure and maintain adequate radiation protection devices such as lead aprons, thyroid shields, lead gloves, and personal dosimeters for all staff. Periodic maintenance and calibration of X-ray machines and other radiographic equipment should also be prioritized to prevent radiation leakage and ensure image quality.

3. **Establish a Functional Radiation Protection Committee (RPC):**

   UBTH should constitute a multidisciplinary RPC to oversee radiation safety compliance, conduct routine audits, and ensure adherence to ALARA and dose limitation principles. The committee should monitor staff exposure records, enforce the use of personal dosimeters, and report deviations promptly.

4. **Reduce Work Overload through Strategic Staffing:**

   Management should address staff shortages and uneven workload distribution by employing additional radiographers and implementing an efficient duty

roster. This will reduce fatigue and help maintain vigilance during exposure procedures.

5. **Improve Safety Culture through Supervision and Monitoring:**

   Departmental supervisors should provide continuous on-the-job monitoring to ensure radiographers adhere to safety protocols. Visual reminders such as radiation warning signs, demarcated zones, and posted safety charts should be displayed in all imaging areas.

6. **Enhance Quality Assurance and Equipment Maintenance:**

   A routine quality assurance (QA) program should be established to test equipment performance and detect radiation leakage early. Regular calibration and maintenance in line with ICRP and WHO recommendations will enhance both patient and staff safety.

7. **Promote Institutional Policy Alignment with ICRP Guidelines:**

   UBTH should integrate ICRP recommendations into its internal operational policies and standard operating procedures (SOPs). This will ensure that safety standards are not only known but formally required and enforceable.

8. **Encourage Research and Continuous Evaluation:**

   Further studies should be encouraged to continuously evaluate compliance levels, identify emerging challenges, and assess the effectiveness of implemented safety interventions. This will foster a culture of evidence-based improvement in radiographic practice.

In conclusion, the study emphasizes that ensuring radiation safety is a **shared responsibility** among radiographers, institutional management, and regulatory authorities. While awareness of ICRP guidelines among radiographers at UBTH is commendably high, compliance remains a challenge that requires sustained

commitment, adequate resources, and a supportive institutional framework. By implementing these recommendations, UBTH can significantly enhance radiation safety culture, safeguard staff and patient health, and uphold global best practices in radiological protection.

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APPENDICES

INFORMED CONSENT

My name is **EKEYOKPA HAPPINESS EGHONGHON**, a final year student of the Department of Radiography, School of Basic Medical Science , College of Medical Sciences, University of Benin, Benin City, Edo State. I am carrying out a research on "**RADIOGRAPHERS' AWARENESS AND COMPLIANCE WITH INTERNATIONAL CORPORATION ON RADIOLOGICAL PROTECTION GUIDELINES ON RADIATION PROTECTION BY RADIOGRAPHERS IN UNIVERSITY OF BENIN TEACHING HOSPITAL**". This study requires that you fill the questionnaire, which is the instrument for data collection, your cooperation in terms of sincerity and objectivity is required, for it will go a long way in determining the outcome of the study. However, you are assured that any information supplied in the questionnaire will remain confidential.

APPENDIX 1

QUESTIONNAIRE ON AWARENESS AND COMPLIANCE WITH INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION (ICRP) GUIDELINES ON RADIATION PROTECTION

INSTRUCTIONS:

- Please answer each question honestly.

- Use the scale provided for Likert-scale questions.

- Add any comments in the open-ended section if necessary

Section 1: Demographic Information

1. **Age:**

   [ ] 20–29 [ ] 30–39 [ ] 40–49 [ ] 50–59 [ ] 60 and above

2. **Gender:**

   [ ] Male [ ] Female

3. **Years of Professional Experience:**

   [ ] 1–2 years [ ] 3–5 years [ ] 6–10 years [ ] 11–15 years [ ] 16 years and above

Section 2: Knowledge of ICRP Guidelines

4. Are you familiar with the International Commission on Radiological Protection (ICRP) guidelines on radiation protection?

   [ ] Yes [ ] No

5. Which aspects of ICRP guidelines are you most familiar with? (Select all that apply)

   [ ] Dose limits for occupational exposure

   [ ] Use of protective equipment

   [ ] ALARA (As Low As Reasonably Achievable) principle

   [ ] Proper signage and labeling

   [ ] Others: _____

6. On a scale of 1–5, how would you rate your overall knowledge of ICRP guidelines?

   1 [ ] Very Poor 2 [ ] Poor 3 [ ] Fair 4 [ ] Good 5 [ ] Excellent

7. **Objective Knowledge Questions** *(select one option each)*

   a) What is the recommended annual occupational dose limit for radiographers

(ICRP 2007)?

[ ] 1 mSv [ ] 20 mSv [ ] 50 mSv [ ] 100 mSv

b) The ALARA principle means:

[ ] Always Low And Reasonable Application

[ ] As Low As Reasonably Achievable

[ ] All Levels Are Radiation Allowed

[ ] None of the above

c) Which of the following is NOT radiation protection equipment?

[ ] Lead apron [ ] Thyroid shield [ ] Dosimeter [ ] Surgical mask

Section 3: Compliance with ICRP Guidelines

(Please indicate how often you do each of the following by ticking the appropriate box)

Statement	**Always**	**Often**	**Sometimes**	**Rarely**	**Never**
8. I minimize exposure time, maximize distance, and use shielding.	[ ]	[ ]	[ ]	[ ]	[ ]
9. I wear radiation protection equipment (e.g., lead apron, thyroid shield, dosimeter).	[ ]	[ ]	[ ]	[ ]	[ ]
10. I consistently apply the ALARA principle when exposing patients.	[ ]	[ ]	[ ]	[ ]	[ ]
11. My institution regularly monitors and records radiation doses I receive.	[ ]	[ ]	[ ]	[ ]	[ ]
12. My institution provides adequate training on ICRP guidelines.	[ ]	[ ]	[ ]	[ ]	[ ]

Section 4: Perceived Barriers to Compliance

13. What are the main barriers you face in fully complying with ICRP guidelines? (Select all that apply)

[ ] Lack of knowledge or training

[ ] Insufficient protective equipment

[ ] Time constraints or workload

[ ] Lack of institutional support/enforcement

[ ] Poor awareness of guidelines

[ ] Others: _____

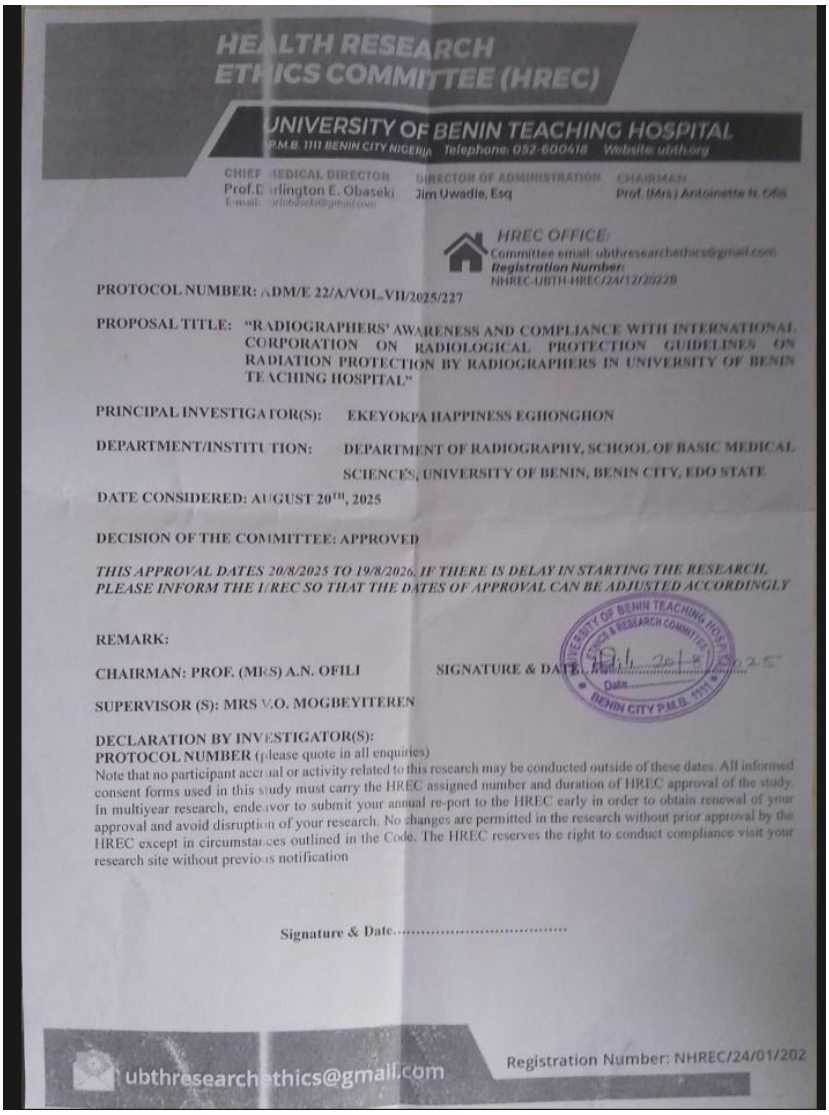
14. Do you believe that more training or resources would improve compliance?

[ ] Yes [ ] No [ ] Not sure

Section 5: Open-Ended

15. Please describe any additional challenges or suggestions related to adherence to ICRP guidelines in your workplace:

ETHICAL APPROVAL



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Registration Number: NHREC-UBTH-HREC/2A/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/227

PROPOSAL TITLE: "RADIOGRAPHERS' AWARENESS AND COMPLIANCE WITH INTERNATIONAL CORPORATION ON RADIOLOGICAL PROTECTION GUIDELINES ON RADIATION PROTECTION BY RADIOGRAPHERS IN UNIVERSITY OF BENIN TEACHING HOSPITAL"

PRINCIPAL INVESTIGATOR(S): EKEYOKPA HAPPINESS EGHONGHON

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

DATE CONSIDERED: AUGUST 20TH, 2025

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 20/8/2025 TO 19/8/2026. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE UREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI SIGNATURE & DATE: 20/8/2025

SUPERVISOR (S): MRS V.O. MOGBEYITEREN

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.....

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