RADIOGRAPHIC EXAMINATIONS IN SELECTED HEALTH FACILITIES IN BENIN CITY: PATIENTS' PERCEPTION OF RADIOGRAPHY STUDENTS' PARTICIPATION

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OJODUMA PRECIOUS MAMUS

MATRICULATION NUMBER: BMS1907163

SUPERVISOR:

MRS OLAYIWOLA KEMISOLA

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CERTIFICATION

This is to certify that the project titled "RADIOGRAPHIC EXAMINATIONS IN SELECTED HEALTH FACILITIES IN BENIN CITY: PATIENTS' PERCEPTION OF RADIOGRAPHY STUDENTS' PARTICIPATION" was carried out by OJODUMA PRECIOUS MAMUS with Matriculation Number BMS1907163 in partial fulfilment of the requirements for the award of the degree of Bachelor of Science (B.Sc.) in Radiography, Department of Radiography, School of Basic Medical Sciences, University of Benin.

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

Mrs Kemisola Olayiwola (Supervisor)

Signature: _____ Date: _____

Mrs Fanny O. IGBINEDION (Head of Department)

Signature: _____ Date: _____

External Examiner

Signature: _____ Date: _____

DEDICATION

This project work is dedicated to Almighty God, whose grace, wisdom, and strength made this work possible.

It is also dedicated to myself for my perseverance, hard work, and determination throughout this journey. I am proud of the effort, growth, and resilience that have brought me this far in the pursuit of excellence in the field of radiography.

Finally, I dedicate this work to my family and friends for their constant support, encouragement, and belief in my dreams.

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ABSTRACT

Patient perception of radiography students' participation during radiographic examinations plays a vital role in shaping the quality of clinical training and overall radiography education. This study assessed patients' perception of radiography students' involvement during radiographic procedures in selected health facilities in Benin City, Nigeria. A descriptive cross-sectional design was employed, and data were collected using a structured questionnaire administered to 174 patients, of which 170 were valid for analysis, yielding a 97.7% response rate. Stratified random sampling ensured representativeness, and data were

analyzed using the Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics (frequencies, means) and chi-square tests were used to examine associations between socio-demographic factors and patient perceptions. Findings revealed that 54% of patients expressed a negative perception of radiography students' participation, while 46% had positive views. The overall mean score of 2.4 (below the 2.5 cut-off) indicated a generally unfavorable perception. However, consistent with some previous studies, patients acknowledged the importance of student involvement for professional training and accepted their presence when adequate supervision was provided. Concerns were noted regarding students' competence, communication, and maintenance of privacy, aligning with earlier research highlighting the need for reassurance and professionalism in student-patient interactions. The study concludes that although patients demonstrated a cautious and moderately negative perception of radiography students' participation, effective supervision and improved communication could enhance patient comfort and acceptance. It is recommended that radiography departments strengthen supervision, ensure informed patient consent, and emphasize empathy, respect, and professionalism in clinical training to promote positive patient experiences and support student learning.

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Keywords: Radiographic, Examinations, Patients, Perception, Students participation

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Radiographic examinations are a fundamental part of modern diagnostic medicine, playing a crucial role in detecting, diagnosing, and managing various medical conditions. As the demand for imaging services grows, so does the need for skilled and well-trained radiographers. In response to this, radiography education has increasingly incorporated clinical placements, allowing students to participate in patient care under supervision. These clinical experiences are vital for developing key professional skills, including communication, technical competence, and ethical conduct (Hayre & Kilgour, 2021; Adamson *et al*., 2023). Radiographic procedures require precision, and their success depends on patient cooperation, which requires both technical expertise and effective communication to ensure high-quality diagnostic images (Ogolodom *et al*., 2022). Gaining patient participation is a critical aspect of radiography practice. In addition to general cooperation, patients' willingness to allow student radiographers to be involved in their imaging procedures is an important factor in both radiography education and clinical training (Ogolodom *et al*., 2022).

In teaching hospitals and other accredited healthcare facilities, radiography students are often required to observe and actively participate in diagnostic imaging procedures as part of their academic training. This model of experiential learning is intended to bridge the gap between theoretical instruction and practical application (Wilkinson & Cadogan, 2023). However, while the educational benefits for students are well established, there remains a pressing need to understand the perceptions and attitudes of patients who interact with these students during radiographic examinations.

Patient-centered care has become a focal point of modern healthcare, emphasizing respect for patients' preferences, needs, and values. Within the context of diagnostic imaging, patient perceptions of care quality are influenced not only by technical competence but also by interpersonal interactions, including communication, empathy, and professionalism (Hyde & Hardy, 2021). When students participate in radiographic procedures, patients may have mixed reactions, shaped by cultural expectations, privacy concerns, and their trust in the healthcare system (Nghipukuula, Daniels, & Karera, 2021). Some may view student involvement as a valuable contribution to medical education, while others may perceive it as intrusive or anxiety-provoking, especially in cases involving sensitive examinations or vulnerable patient populations such as the elderly or children (Larsen & Jensen, 2025; Manda et al., 2025).

Research conducted in other contexts has shown that student participation can affect patient comfort and trust during procedures. For instance, studies have noted that patients appreciate being informed about the presence and role of students before procedures begin, which enhances their willingness to cooperate and reduces anxiety (Ding & Makanjee, 2024; McIntosh, 2024). On the contrary, the lack of adequate communication or unclear roles of students can lead to patient dissatisfaction and perceptions of compromised care quality (Mutambara, Ntebele, & Khoza, 2023; Nolan–Bryant & Lockwood, 2023).

In radiographic settings, where procedures often involve close physical contact, exposure, and sometimes discomfort, the presence of students may further influence patients' sense of privacy, dignity, and emotional safety. Studies have identified effective communication and professional demeanor as critical factors in reducing these concerns (Adamson *et al*., 2023; Taylor, Bleiker, & Hodgson, 2021). Moreover, the nature and complexity of the procedure such as whether it is routine or involves advanced techniques may also shape patients'

perceptions. Patients undergoing more invasive or lengthy examinations may be more sensitive to student involvement than those receiving routine chest X-rays or dental films (Jacobs *et al.*, 2024; Albano *et al.*, 2024).

Additionally, some patients express concerns about students' technical competence, fearing that student participation might increase the likelihood of repeat exposures or errors. However, evidence shows that with proper supervision, student involvement does not compromise diagnostic accuracy or patient safety (Stephenson-Smith, Neep, & Rowntree, 2021; Guermazi *et al*., 2022). In fact, clinical environments that foster structured mentorship and supervision often report high levels of student preparedness and patient satisfaction (Cook, 2022; Peter, Engel-Hills, & Naidoo, 2024).

In Nigeria, as in many other developing countries, there is limited research examining how patients perceive student involvement in radiographic procedures. While several studies have explored patient satisfaction in general healthcare delivery, few have focused specifically on diagnostic imaging, and even fewer have considered the dimension of student participation. This gap is significant, given the increasing reliance on teaching hospitals and student-driven services due to workforce shortages and growing patient loads.

Benin City, home to several tertiary health institutions and training facilities for radiographers, provides an appropriate context for this inquiry. Understanding patients' perspectives in these settings will not only inform educational policies but also guide the development of patient-centered strategies for integrating students into clinical practice. It will also help identify potential barriers to effective clinical learning and areas where students require additional support or training to meet patient expectations.

Hence, the participation of radiography students during radiographic examinations is a critical component of medical education and service delivery. However, the success of this educational approach relies heavily on patient acceptance and satisfaction. Investigating how patients in Benin City perceive and respond to student involvement can provide valuable insights for improving both the educational experience of radiography students and the quality of patient care. Ultimately, this research will contribute to balancing the dual objectives of professional training and patient-centered service in diagnostic imaging.

1.2 **Statement of the Problem**

The integration of students into clinical environments is fundamental to radiography education globally. Clinical placements offer students hands-on experience, enabling them to bridge theoretical knowledge with practical application. However, the presence of students during radiographic examinations introduces complexities in patient interaction and care, especially regarding patients' comfort, privacy, and perception of service quality (Adamson et al., 2023). While high-income countries have made significant progress in addressing these concerns through structured patient-student engagement models and simulation-based training (Hayre & Kilgour, 2021; O'Connor *et al.,* 2021), research shows that patient discomfort and uncertainty regarding student participation in diagnostic imaging remain prevalent, especially in sensitive or intimate procedures (Hyde & Hardy, 2021).

In Africa, the situation is more nuanced due to cultural factors, resource limitations, and the lack of standardized protocols guiding student-patient interactions in clinical radiography. Studies have highlighted challenges such as inadequate supervision, poor communication, and limited patient awareness regarding students' roles during procedures (Mutambara, Ntebele, & Khoza, 2023). In South Africa, for example, student-patient communication was found to be inconsistent, negatively affecting patient trust and the clinical learning process

(Nghipukuula, Daniels, & Karera, 2021). These findings underscore the critical need to understand and address patients' perceptions to ensure that the clinical learning environment remains both educationally effective and ethically sound.

In the Nigerian, the issue is further compounded by overburdened public health institutions and workforce shortages, which sometimes compel students to assume active clinical responsibilities beyond observation (Peter, Engel-Hills, & Naidoo, 2024). Despite the essential role students play in service delivery, little empirical evidence exists on how patients perceive their involvement in radiographic examinations. Anecdotal reports and limited studies suggest a range of patient responses from appreciation and willingness to support learning, to discomfort and refusal of care when students are involved (McIntosh, 2024). This ambiguity presents a significant gap in both research and practice. Without clear understanding of patients' perceptions, there is a risk of compromising the quality of care, student learning outcomes, and overall patient satisfaction.

1.3 Research Questions

1. What are patients' perceptions of radiography students' participation during radiographic examinations in selected health facilities in Benin City?
2. How does student participation affect patients' comfort and trust during radiographic examinations?
3. What factors influence patients' perception of radiography students' participation during radiographic examinations?

1.4 **Hypothesis**

1. There is no significant association between patient's demographic characteristic and their perception of radiography students' participation in radiographic examinations.

1.5 Aim of the study

The aim of the study is to assess patients' perception of the participation of radiography students during radiographic examinations in selected health facilities in Benin City.

The specific objectives:

1. To assess patients' perceptions of radiography students' participation during radiographic examinations in selected health facilities.
2. To examine the effect of student participation on patients' comfort and trust during radiographic examinations.
3. To identify factors influencing patients' perception of radiography students' participation during radiographic examinations.

1.6 Significance of the study

This study provides valuable insights into how patients perceive the participation of radiography students during diagnostic imaging procedures. Understanding these perceptions will help professional radiographers improve their mentorship and supervision strategies, ensuring that students uphold patient-centered care principles. Additionally, the findings will assist radiographers in fostering more inclusive clinical environments where patient comfort and student learning are balanced effectively. Healthcare administrators and clinical educators will benefit from this study by gaining evidence-based knowledge to inform policies that govern student involvement in patient care. It will support the development of standardized protocols on communication, consent, and supervision, thereby enhancing the quality of clinical training and safeguarding patient rights. Ultimately, the study promotes better integration of students into healthcare teams without compromising service delivery.

The broader society stands to gain from improved radiographic services and patient satisfaction. By highlighting the importance of respectful and ethical student participation, the study encourages public trust in teaching hospitals and supports the development of competent, patient-focused radiographers. This contributes to a stronger healthcare system where training and service coexist in a way that respects patients' dignity and promotes overall well-being.

1.7 Scope of the study

This study is delimited to patients' perception of radiography students' participation during radiographic examinations in selected health facilities in Benin City. It focuses on adult patients who have undergone diagnostic imaging procedures and excludes healthcare workers and students themselves. The study examines aspects such as patient comfort, trust, and factors influencing their perception, without evaluating clinical competence or academic performance of the students.

1.8 Operational Definition of Terms

Radiographic Examinations: Diagnostic imaging procedures such as X-rays performed to visualize internal structures of the body for medical evaluation.

Patients' Perception: The opinions, feelings, attitudes, and level of acceptance expressed by patients regarding the presence and involvement of radiography students during their imaging procedures.

Radiography Students: Undergraduate trainees in an accredited radiography program who participate in clinical postings and assist in radiographic procedures under supervision.

Participation: The active or observational involvement of radiography students in the planning, positioning, exposure, and interaction phases of radiographic examinations.

Comfort Level: The degree of ease or unease a patient feels when attended to by a radiography student, measured on a Likert scale.

1.9 Research Gap

While existing literature has explored patient satisfaction in general healthcare settings and the educational benefits of student participation in clinical practice, there is limited research specifically examining how patients perceive the involvement of radiography students during diagnostic imaging procedures in Nigeria, particularly in Benin City. Most studies have focused on high-income countries where structured supervision, communication protocols, and patient engagement models are well established (Hartz & Beal, 2000; Al Ghobain et al., 2016). In contrast, studies in African contexts report inconsistent student-patient interactions, inadequate supervision, and limited patient awareness of students' roles, but often focus on general clinical practice rather than radiography specifically (Nghipukuula, Daniels, & Karera, 2021; Mutambara, Ntebele, & Khoza, 2023).

Furthermore, there is a lack of empirical evidence on how student participation affects patients' comfort, trust, and overall perception of care during radiographic examinations. Existing reports are mostly anecdotal, and few studies investigate the influence of patient demographic characteristics, cultural and religious factors, or institutional settings on acceptance of student involvement. Without this understanding, healthcare educators may struggle to develop patient-centered strategies that optimize both student learning and patient satisfaction.

CHAPTER TWO

LITERATURE REVIEW

This chapter focuses on the review of related literature under the following headings; conceptual review, theoretical review and empirical review. Necessary literature would be gotten from published and unpublished works, articles and journals in this study.

2.1 Conceptual Review

2.1.1 Concept of Radiographic Examinations

Radiographic examinations refer to diagnostic procedures that utilize ionizing radiation to produce images of internal body structures. These procedures are fundamental tools in modern medicine, aiding in the diagnosis, monitoring, and treatment of a wide range of medical conditions. Through the use of X-rays and advanced imaging modalities, radiographic examinations allow for the visualization of bones, organs, and tissues that are otherwise inaccessible through physical examination (Jacobs *et al*., 2024). Their non-invasive nature makes them particularly valuable in early disease detection, trauma assessment, dental evaluations, and chronic disease monitoring.

Radiographic imaging has also evolved with technological innovations, allowing for improved image resolution and more efficient workflows in medical diagnosis. Artificial intelligence (AI) is now being integrated into radiographic procedures to enhance diagnostic performance and support clinical decision-making (Albano et al., 2024; Guermazi *et al*., 2022). These developments underscore the continuing importance of radiographic examinations in clinical medicine and public health.

Types of Radiographic Procedures

Radiographic procedures are broadly categorized based on the part of the body being examined and the imaging technique used. Common types include:

- Conventional Radiography: Standard X-ray imaging used to assess bones, lungs, and joints.
- Dental Radiography: Focused imaging of oral structures, commonly used to detect caries, bone loss, and other dental conditions (Hegde *et al*., 2023; Albano et al., 2024).
- Computed Tomography (CT): Advanced cross-sectional imaging technique providing detailed anatomical information.
- Mammography: Specialized imaging for early detection of breast cancer.
- Fluoroscopy: Real-time imaging often used during interventional procedures.
- Mobile Radiography: Used in critical care settings to examine patients who cannot be moved easily.

Each type of radiographic examination serves specific diagnostic purposes and requires a tailored approach to positioning, exposure settings, and interpretation.

Role of Radiographers in Clinical Imaging

Radiographers are allied health professionals who perform radiographic examinations and ensure the production of diagnostic-quality images while prioritizing patient safety and comfort. Their responsibilities include patient preparation, positioning, operation of imaging equipment, image acquisition, and sometimes preliminary interpretation, depending on the legal and institutional framework (McNulty *et al.*, 2021). Radiographers also play an essential role in clinical education, often supervising student radiographers during their

placements and guiding them in safe, ethical imaging practices (Peter, Engel-Hills, & Naidoo, 2024).

As healthcare continues to evolve, radiographers are increasingly involved in multidisciplinary care and are required to exhibit strong communication skills, critical thinking, and adaptability, especially when integrating students into the imaging workflow (Adamson et al., 2023; Monks & Mackay, 2024).

Importance of Accuracy and Patient Safety

Accuracy in radiographic imaging is critical to avoid misdiagnosis, repeat examinations, and unnecessary radiation exposure. Radiographers must adhere to radiation protection principles such as ALARA (As Low As Reasonably Achievable) to ensure patient safety during imaging procedures (Shatskiy, 2021). Errors in imaging whether from incorrect positioning, poor exposure parameters, or miscommunication can compromise patient outcomes and lead to diagnostic delays.

Patient safety also involves maintaining high standards of hygiene, ensuring informed consent, and protecting patient dignity, especially in vulnerable populations such as children and the elderly (Manda *et al*., 2025; Larsen & Jensen, 2025). The presence of student radiographers adds another layer of responsibility, making supervision and patient communication even more crucial. AI-assisted systems have shown potential in reducing human error by supporting radiographers in image interpretation and detection tasks, further emphasizing the need for continuous learning and integration of technology in practice (Guermazi *et al*., 2022).

2.1.2 **Radiography Students in Clinical Practice**

Structure of Radiography Education (Theory + Clinical Practice)

Radiography education is structured around a blend of theoretical learning and clinical practice, aimed at producing competent, ethical, and patient-centered professionals. The academic curriculum typically includes foundational sciences, radiographic physics, anatomy, patient care, and medical ethics, which are complemented by structured clinical placements in approved healthcare facilities (McNulty, England, & Shanahan, 2021). This integrated model is essential in bridging classroom instruction with real-life application.

Clinical placements begin early in radiography training and progressively expose students to increasingly complex procedures. As part of their professional development, students must demonstrate proficiency not only in image acquisition and technical operations but also in effective communication, ethical behavior, and patient-centered care (Kay & Brogan, 2024). This dual model of education ensures that students graduate with both the cognitive knowledge and the hands-on skills necessary for safe, high-quality radiographic practice.

Role of Students During Clinical Postings

During clinical postings, radiography students participate in various diagnostic imaging procedures under the supervision of licensed radiographers. Their roles vary based on the stage of their training, institutional policies, and the complexity of the examinations. Early in their education, students often observe procedures to build familiarity, while more advanced students may assist in positioning patients, selecting technical exposure factors, and even performing imaging tasks under close supervision (Peter, Engel-Hills, & Naidoo, 2024).

Involving students in clinical practice fosters the development of essential competencies, such as critical thinking, teamwork, and professionalism. It also helps students adapt to the realities of hospital workflow, interact with diverse patient populations, and learn to manage

anxiety in high-pressure settings (Thomas, Naidoo, & Engel-Hills, 2025). Moreover, clinical exposure is often where students begin to form their professional identities, shaped by the expectations of mentors, peers, and patients alike (Mutambara, Ntebele, & Khoza, 2023).

Supervision and Responsibilities During Radiographic Procedures

Supervision is a critical element of radiography clinical education. It ensures both patient safety and student learning by maintaining high standards of care while allowing students to practice their skills. Qualified radiographers or clinical tutors are tasked with guiding students through procedures, providing feedback, and ensuring that students adhere to ethical and professional standards (Cook, 2022). The level of responsibility assigned to students is often proportional to their academic progress. For instance, final-year students may be entrusted with more direct procedural roles, while underclassmen focus on observation and assisting roles. Regardless of experience level, students must always operate under supervision, and patients should be informed of their involvement in any procedure (Wilkinson & Cadogan, 2023). The effectiveness of supervision is strongly linked to clinical tutors' communication skills, ability to create supportive learning environments, and dedication to mentorship. Poor supervision or lack of feedback can undermine the clinical learning experience and negatively affect patient care (Mutambara *et al.*, 2023).

Educational Value of Student Participation in Real-Life Imaging

Participation in real-life imaging procedures offers irreplaceable educational value to radiography students. It allows them to apply theoretical knowledge in clinical scenarios, fostering experiential learning and reinforcing the technical and affective domains of professional practice (Adamson *et al*., 2023). Through direct patient interaction, students

develop communication skills, empathy, and confidence qualities that are not easily taught in the classroom.

Studies have shown that students benefit significantly from exposure to diverse patient cases and imaging techniques, which improves their diagnostic reasoning and adaptability (Makanjee *et al.*, 2023). For instance, simulated learning environments, while useful, cannot fully replicate the unpredictable nature of real clinical settings or the emotional complexities involved in patient care (O'Connor & Rainford, 2023). Moreover, patient feedback whether verbal or non-verbal can serve as a powerful tool for student reflection and growth.

However, the presence of students can sometimes affect patient comfort and privacy, especially when patients are not properly informed or when sensitive examinations are involved. This highlights the need for balance between educational goals and ethical patient care (Hyde & Hardy, 2021). Institutions must ensure that patients' rights are respected and that student involvement is managed with transparency and professionalism.

2.1.3 Patient-Centered Care in Radiography

Patient-centered care is a healthcare approach that emphasizes the inclusion of the patient's values, needs, preferences, and expectations in the decision-making and delivery of care. It shifts the focus from a purely clinical or technical interaction to one that respects the individuality of each patient and promotes shared decision-making. In radiography, this model extends beyond the technical act of image acquisition to include how patients are treated before, during, and after procedures (Hyde & Hardy, 2021).

Core principles of patient-centered care in diagnostic imaging include respect for patient dignity, effective communication, emotional support, involvement in decision-making, and coordination of care. These principles are particularly important in radiographic settings,

where procedures may involve physical exposure, discomfort, or anxiety. A patient-centered approach ensures that the imaging experience is not only diagnostically effective but also psychologically and emotionally supportive (Taylor, Bleiker, & Hodgson, 2021).

Patient Autonomy, Respect, and Communication

Among the most critical aspects of patient-centered care are autonomy, respect, and communication. Patient autonomy refers to the right of patients to make informed decisions regarding their healthcare, including the right to consent or decline student involvement during radiographic examinations. Respecting this autonomy is essential, especially in teaching hospitals where patients may not always be aware of the presence or role of students in their care (Hyde & Hardy, 2021; Ding & Makanjee, 2024).

Respect involves acknowledging patients' values, privacy, and cultural expectations. For instance, in procedures requiring exposure of sensitive body parts, the presence of student observers may cause discomfort if not handled respectfully. In such cases, asking for consent, providing explanations, and ensuring privacy can significantly influence how patients perceive both the care and the educational process (Larsen & Jensen, 2025).

Communication is another cornerstone of patient-centered radiographic care. Effective communication can ease patient anxiety, improve cooperation, and foster trust in both the radiographer and the healthcare system. Research indicates that poor communication is a common source of dissatisfaction among patients undergoing radiographic procedures (Nghipukuula, Daniels, & Karera, 2021). It also contributes to patients feeling excluded or misunderstood, especially when students are involved in their care. Conversely, clear explanations, courteous introductions, and professional behavior by both radiographers and

students can positively shape patients' overall experiences (Adamson *et al.*, 2023; McIntosh, 2024).

Radiographic Procedures Involving Students

In teaching hospitals and training institutions, radiography students often participate in diagnostic procedures as part of their clinical education. While their involvement is essential for professional development, it introduces an ethical and interpersonal dimension to radiographic care that must be managed carefully. Patients may have concerns about competence, privacy, or the quality of care when students are involved. Therefore, applying patient-centered principles becomes even more critical in these settings.

Studies have shown that patients are generally supportive of student involvement when they are properly informed and given the option to consent or decline (Wilkinson & Cadogan, 2023; Peter, Engel-Hills, & Naidoo, 2024). However, when consent is assumed or communication is lacking, patients may feel disrespected or used, leading to negative perceptions of care and the educational process. Moreover, cultural and age-related differences can influence patients' openness to student participation, highlighting the need for individualized approaches to care (Manda *et al*., 2025).

The importance of patient-centered care in radiographic education is further emphasized by the professional socialization process of students. As students learn from observing and interacting with patients, they internalize values, behaviors, and attitudes that shape their future practice. When students are taught to prioritize patient dignity, autonomy, and

communication, they are more likely to become compassionate, ethical professionals (Thomas, Naidoo, & Engel-Hills, 2025; Adamson *et al*., 2023).

Ultimately, the integration of patient-centered care principles in radiographic education ensures that the learning environment respects the rights and well-being of patients while preparing students for professional roles that go beyond technical competence. It reinforces the idea that successful imaging outcomes depend not only on the clarity of the image but also on the quality of patient interaction.

2.1.4 Patient Perception

Patient perception refers to how individuals interpret and respond to their experiences within the healthcare environment. It encompasses their views, feelings, attitudes, and satisfaction with various aspects of care, including the behavior of healthcare professionals, the quality of communication, the respect shown for their privacy, and the overall service delivery (Hyde & Hardy, 2021). In radiographic settings, patient perception plays a particularly crucial role, as the procedures often involve physical exposure, the use of complex technology, and interaction with both professionals and students.

Understanding patient perception is essential because it influences cooperation during procedures, willingness to return for future care, and trust in the healthcare system. It also serves as a vital indicator of service quality, particularly in environments where students are involved in care delivery (Adamson *et al.*, 2023; McIntosh, 2024).

Factors That Influence Patients' Perception

A variety of factors can shape how patients perceive their radiographic experience. These include interpersonal, procedural, demographic, and institutional elements:

1. **Communication**: Effective communication is one of the most critical determinants of positive patient perception. Patients value clear explanations of the procedure, respectful introductions, and the opportunity to ask questions. Poor communication, particularly when students are involved, can lead to confusion, anxiety, and dissatisfaction (Nghipukuula, Daniels, & Karera, 2021). Patients often judge the competence and professionalism of radiographers and students based on how well they communicate (Taylor, Bleiker, & Hodgson, 2021).
2. **Informed Consent**: Seeking patient consent before involving students is a key component of ethical healthcare practice. When patients are not adequately informed about the presence and role of students, they may feel disrespected or exploited (Hyde & Hardy, 2021). On the other hand, when given a choice and proper context, many patients are willing to support student learning, particularly in teaching hospitals (Wilkinson & Cadogan, 2023; Adamson *et al*., 2023).
3. **Privacy and Dignity**: Radiographic procedures often require patients to undress or be placed in uncomfortable positions. The presence of students during such procedures may heighten patients' sensitivity to privacy and modesty. Cultural norms and personal preferences may also influence how patients perceive these situations (Manda *et al.*, 2025; Larsen & Jensen, 2025). Ensuring privacy and showing empathy can significantly improve patient perception, especially when students are involved.
4. **Gender and Age**: Patients' perception may vary based on gender and age. For instance, some female patients may feel uncomfortable being examined by male students, particularly during procedures involving sensitive areas. Similarly, elderly patients might expect more respect and explanation due to generational differences in communication expectations (Ding & Makanjee, 2024). These demographic factors highlight the need for sensitivity and adaptability in clinical teaching environments.

5. **Previous Experience**: Patients with prior negative experiences in healthcare are more likely to be skeptical of student involvement. Conversely, those with previous positive interactions may be more receptive. Building trust over time through consistent, respectful care can improve perceptions across different patient populations (McIntosh, 2024).

Implications of Perceptions in Clinical Outcomes

Patients' perceptions significantly influence not only their satisfaction but also clinical outcomes and educational environments. Positive perceptions foster trust, cooperation, and a sense of safety. When patients feel respected and informed, they are more likely to comply with instructions, participate actively in procedures, and return for follow-up care (Taylor *et al.,* 2021). In clinical education settings, this cooperation supports the learning of students and contributes to a more effective healthcare system.

In contrast, negative perceptions can lead to increased anxiety, refusal of procedures, or avoidance of future care. They may also result in complaints, strained patient-professional relationships, and hinder the learning experience of students (Mutambara *et al.*, 2023). For example, if a patient feels uncomfortable with a student's involvement and this is not addressed, it may compromise both the patient's dignity and the student's confidence.

Furthermore, repeated negative experiences can undermine public trust in teaching hospitals, creating resistance toward student participation in care and limiting learning opportunities. Hence, healthcare institutions must balance the educational needs of students with the rights and expectations of patients through consistent application of patient-centered care principles (Peter *et al.*, 2024).

2.1.5 Students' Participation and Its Impact on Patients

Impact on Patient Comfort, Trust, and Willingness to Participate

In clinical radiography education, student participation is essential for skill development and professional competence. However, their involvement in real-life patient procedures can significantly influence how patients perceive and experience care. A major area of concern is the impact of student presence on patient comfort, trust, and willingness to participate in the imaging process.

Patients may feel uncomfortable with the presence of students during intimate or invasive imaging procedures, especially if they are not informed in advance or if the interaction lacks professionalism. This discomfort may be more pronounced when there is a mismatch in gender or when cultural and religious values are not considered (Ding & Makanjee, 2024). Studies show that some patients associate students with inexperience and may fear poor-quality care or extended examination times (Hyde & Hardy, 2021; Peter, Engel-Hills, & Naidoo, 2024).

However, positive interactions can build patient trust. When students and supervising radiographers communicate effectively, explain the procedure, and demonstrate professionalism, patients often report increased satisfaction and a sense of contribution to the education of future professionals (Adamson *et al*., 2023; Wilkinson & Cadogan, 2023). Trust and transparency, therefore, are central to patient willingness to engage with students during radiographic procedures.

Ethical Considerations (Informed Consent, Dignity, Confidentiality)

Student involvement in clinical procedures requires strict adherence to ethical principles. One of the most critical is informed consent. Patients have the right to know if students will be participating in their care and must be given the opportunity to accept or decline such

participation without fear of compromised treatment (Hyde & Hardy, 2021). Informed consent not only respects patient autonomy but also reinforces a sense of control over their healthcare experience.

Dignity and confidentiality are equally important. Radiographic procedures often involve exposure of private body areas, and any additional presence in the room especially that of a student can be intrusive if not sensitively managed. Maintaining patient dignity requires proper draping, explaining the student's role clearly, and ensuring that patients are not subjected to embarrassment or discomfort (Larsen & Jensen, 2025; Manda et al., 2025).

Confidentiality must also be respected at all times. Students, like registered professionals, are bound by ethical and legal obligations to protect patient information. Breaches of confidentiality even accidental can erode trust and have serious implications for patient care and institutional credibility (McIntosh, 2024).

Balance Between Training Needs and Patient Rights

Teaching hospitals face the dual responsibility of ensuring high-quality patient care while facilitating hands-on learning for students. Striking the right balance between training needs and patients' rights is vital for sustainable clinical education.

On the one hand, clinical exposure enables students to develop technical skills, confidence, and professional behaviour in real-life settings. On the other hand, patients are not mere educational tools and should not feel pressured into accepting student involvement (Thomas *et al.,* 2025). It is therefore necessary to integrate patient-centered practices within radiography education, where patient preferences are respected without compromising the integrity of training.

Healthcare facilities should adopt guidelines that outline when and how students may participate in procedures, ensure supervisors are present during student-patient interactions, and provide patients the right to opt out without prejudice (Taylor *et al.,*2021). Training students in communication and ethics is also essential to reduce resistance and foster mutual respect.

Studies on Patient Experiences with Student Participation

Multiple empirical studies have explored how patients perceive student involvement in healthcare, particularly in diagnostic imaging. Research by Wilkinson and Cadogan (2023) found that most patients were supportive of student participation when properly informed and reassured of supervision. Similarly, Adamson *et al.* (2023) noted that respectful behavior and clear communication significantly improved patient comfort and trust.

Conversely, a study by Mutambara, Ntebele, and Khoza (2023) revealed that some patients expressed dissatisfaction due to inadequate explanation of students' roles, lack of privacy, and perceptions of incompetence. In teaching hospitals across Africa, studies have also highlighted that cultural sensitivity and gender dynamics influence patient acceptance, emphasizing the need for tailored approaches (Manda *et al*., 2025; Nghipukuula *et al.*, 2021).

In Nigeria, where this study is situated, the integration of students into clinical practice is standard. However, limited data exists on how patients truly perceive their involvement, especially in radiographic procedures. This gap underscores the need for more context-specific research that reflects local cultural values, healthcare expectations, and training realities (Peter *et al*., 2024).

2.1.7 Factors Influencing Patients' Perception

Patients' perception of radiography students' participation during radiographic examinations is shaped by a complex interplay of individual, procedural, cultural, and institutional factors. Understanding these influences is crucial for fostering a patient-centered learning environment and improving the integration of students in clinical practice.

Sociodemographic Factors (Age, Gender, Education, Previous Experience)

Sociodemographic characteristics significantly affect how patients perceive the presence and role of radiography students during diagnostic procedures. Age can play a role in shaping attitudes toward student involvement. Older patients, for instance, may expect more personalized and professional care, and may be less tolerant of perceived inexperience or longer examination times. Conversely, younger patients might be more accepting due to greater exposure to educational healthcare environments (Ding & Makanjee, 2024).

Gender is also a key factor, especially in procedures involving physical exposure. Female patients may express discomfort being examined by male students, particularly in cultures where gender norms are more conservative (Larsen & Jensen, 2025). Manda *et al.* (2025) observed that gender congruence between patients and students tends to improve comfort levels and cooperation.

Patients' level of education often correlates with their expectations and understanding of healthcare systems. Educated patients may better appreciate the role of students in training institutions and be more receptive to their participation when provided with proper information (Peter, Engel-Hills, & Naidoo, 2024). On the other hand, those with limited educational background might misinterpret students' involvement as a sign of lower-quality care or lack of professionalism.

Previous healthcare experience also plays a significant role. Patients with past positive encounters involving students are more likely to feel comfortable and cooperative. Negative past experiences, such as feeling used for training without consent, can create resistance and skepticism (Hyde & Hardy, 2021; Mutambara, Ntebele, & Khoza, 2023).

Type and Sensitivity of Procedure

The nature and sensitivity of the radiographic procedure influence patients' acceptance of student participation. Routine or non-invasive procedures, such as chest X-rays, are more likely to be accepted. However, procedures involving intimate body parts, discomfort, or prolonged positioning (e.g., hysterosalpingography or barium enemas) tend to elicit greater concerns over privacy and exposure (Adamson et al., 2023; Larsen & Jensen, 2025).

Patients may be more anxious during complex or unfamiliar procedures, making them less tolerant of students' involvement unless proper reassurance is provided. In such instances, perceptions of professionalism, competence, and patient control become critical in shaping the overall experience (McIntosh, 2024).

Cultural and Institutional Context

Cultural beliefs and social norms can either enhance or inhibit patients' perception of student involvement. In some cultures, the idea of being examined or observed by students may be viewed as disrespectful or inappropriate, especially in cases involving opposite-gender interactions or older adult patients (Nghipukuula, Daniels, & Karera, 2021). Cultural emphasis on modesty, privacy, and deference to authority can make it difficult for patients to voice discomfort, even when they feel uneasy.

At the institutional level, the presence of a clear policy on student involvement, consistent supervision, and adherence to ethical standards fosters patient trust and acceptance. Hospitals with a strong reputation for quality education and care tend to see better patient receptiveness to student participation (Wilkinson & Cadogan, 2023; Thomas, Naidoo, & Engel-Hills, 2025). Conversely, inconsistent practices, poor communication, or lack of supervision can lead to distrust and negative perceptions.

In Nigeria, the sociocultural landscape is diverse, and patients' expectations often depend on regional traditions, religious beliefs, and experiences with the healthcare system. Without proper explanation and sensitivity to these cultural dynamics, patients may feel their autonomy is compromised, which could negatively affect their perception of student involvement (Peter et al., 2024).

Quality of Communication from Healthcare Staff and Students

The quality of communication is a critical and modifiable factor influencing patients' perception. Effective communication before, during, and after the procedure ensures that patients are well-informed, reassured, and respected. When healthcare staff introduce students, explain their role, and seek consent, patients are more likely to cooperate and feel valued in the teaching process (Taylor, Bleiker, & Hodgson, 2021).

Students themselves also play an important role. Politeness, attentiveness, and confidence from students can improve patients' comfort and reduce anxiety. On the contrary, hesitant behavior, lack of empathy, or technical incompetence may trigger negative responses (Hyde & Hardy, 2021).

Communication is particularly important in bridging the gap between institutional training objectives and patient-centered care. It fosters transparency, promotes patient autonomy, and

builds trust three pillars that ultimately shape how patients perceive student participation in radiographic examinations (Wilkinson & Cadogan, 2023).

2.2 Theoretical Framework

Social Cognitive Theory (SCT)

Social Cognitive Theory (SCT), developed by psychologist Albert Bandura, is a framework for understanding how people acquire and maintain behaviors, while also considering the social environment that influences those behaviors. SCT emphasizes the importance of social influence, observational learning, and self-regulation in shaping behavior. The theory posits that human behavior is a result of the interaction between three main components:

Personal factors: This includes cognitive, emotional, and biological factors such as beliefs, self-efficacy, and goals.

Behavioral factors: These are the actual actions and reactions of the individual, influenced by personal and environmental factors.

Environmental factors: These include external social or physical environments, such as family, peers, media, and institutional structures, which can provide reinforcement or barriers to certain behaviors.

SCT is often depicted through the concept of **reciprocal determinism**, which suggests that personal, behavioral, and environmental factors interact and influence each other in a continuous cycle.

Core Concepts of SCT

Observational Learning (Modeling)

- A key component of SCT is observational learning, where individuals learn behaviors by observing others (models). This type of learning is central to the development of social behaviors. In the context of healthcare, patients may observe the behavior of radiographers or radiography students during procedures and adjust their behavior based on what they have seen.
- For example, if patients observe that students are well-trained, polite, and competent, they may be more likely to trust the students and allow them to participate in their care. Alternatively, negative behaviors might be observed and influence patients' willingness to cooperate.

Self-Efficacy

- Self-efficacy refers to an individual's belief in their ability to perform a specific task or behavior. According to SCT, an individual's actions are guided by their perceived ability to succeed in a task.
- In the case of radiography students, their self-efficacy will be influenced by their confidence in their technical skills, communication, and ethical conduct during procedures. For patients, their self-efficacy might relate to their belief that they can cooperate with the student radiographers, or their trust in the quality of care being delivered by the students.

Reciprocal Determinism

- The idea of reciprocal determinism refers to the continuous interaction between personal, behavioral, and environmental factors. This concept explains how people are influenced by their environment, but also how they actively shape their own behavior and environment.
- For example, the behavior of a radiography student (e.g., professional conduct during a procedure) can influence the patient's behavior (e.g., willingness to cooperate). In turn, the patient's reaction and engagement with the student can also influence the student's behavior and future performance.

Reinforcement and Punishment

- SCT also emphasizes the role of reinforcement and punishment in learning behaviors. Positive reinforcement (such as praise or approval) can encourage the repetition of desired behaviors, while negative reinforcement or punishment can discourage undesirable behaviors.
- In clinical settings, feedback from patients, colleagues, or supervisors can act as reinforcement. A positive patient experience (such as expressing trust in a student radiographer's abilities) can reinforce the student's confidence and behavior, while negative feedback could lead to adjustments in their approach.

Outcome Expectations

- Outcome expectations refer to an individual's anticipation of the results of their behavior. In the context of radiography, a patient may have an expectation about the outcomes of a radiographic examination, such as

whether the procedure will be comfortable or whether the results will contribute to their diagnosis.

- If patients expect that student involvement will enhance their care (through attention, more time, or competence), they may be more likely to allow students to participate. Conversely, negative expectations may create reluctance.

Application to the study

Social Cognitive Theory (SCT) offers a profound understanding of how behaviors are learned and shaped, particularly in a healthcare context. In the field of radiography education, SCT provides valuable insights into the development of both radiography students and their interactions with patients.

In radiography education, SCT emphasizes the role of observational learning, where students acquire essential skills by observing experienced professionals. As radiography students participate in clinical placements, they observe and interact with senior radiographers, learning technical procedures, communication skills, and professional behaviors. These observations contribute significantly to their development, as students learn not only from formal instruction but also from real-world, practical experiences. Additionally, students gain self-efficacy—the belief in their ability to perform radiographic procedures—through their interactions with both patients and supervisors. A student with high self-efficacy is more likely to approach tasks with confidence and professionalism, which in turn leads to improved performance in the clinical setting.

SCT also highlights the influence of feedback and reinforcement in the learning process. Positive reinforcement from patients, such as expressing satisfaction with a student's

participation in a radiographic procedure, can motivate the student to perform better. Praise from supervisors or peers further reinforces this behavior, fostering a positive learning environment. Conversely, negative feedback or patient reluctance can serve as a form of punishment that discourages certain behaviors, signaling to the student areas in need of improvement.

From the patient's perspective, Social Cognitive Theory suggests that their perceptions of radiography students can be influenced by the students' behavior, self-efficacy, and professionalism. When patients observe students demonstrating competence and confidence, they are more likely to trust and cooperate with the students during procedures. The students' ability to communicate effectively and reassure the patients also plays a crucial role in gaining their trust and participation. If patients view the radiography students as knowledgeable and capable, they may be more willing to allow them to participate in their diagnostic care. Conversely, if students lack confidence or fail to meet the patient's expectations, the patient's willingness to cooperate may be diminished. Moreover, social influence plays a critical role in these interactions. Patients who trust the healthcare system and the medical team, including radiography students, are more likely to accept the students' involvement in their care. This is particularly true in environments where students are perceived as integral members of the healthcare team, working under the supervision of qualified professionals. In these cases, patients' behavior can be shaped not only by their direct interactions with students but also by the encouragement and trust extended to the students by other healthcare professionals.

2.3 Empirical Review

2.3.1 Patients' perception of the participation of radiography students during radiographic examinations

In the study by Nghipukuula, et al. (2021), the effectiveness of communication between student radiographers and patients before, during, and after radiographic procedures was assessed. Using a quantitative, cross-sectional design, the study involved 50 students and 50 patients. The findings revealed that patients generally reported good communication from student radiographers, with first-year students scoring 84.2% and third-year students achieving 85.7%. However, weaknesses were identified in communication before and after the procedures. Importantly, no significant differences were found in communication skills based on the students' year of study, gender, or spoken language, indicating that effective communication could be independent of these factors. The study recommended enhancing communication training through role play, simulation, and better clinical supervision to address these weaknesses. This underscores the importance of reinforcing communication skills as part of clinical training to improve patient outcomes.

Similarly, Le *et al.,* (2015) investigated the learning experiences of student radiographers when imaging obese patients. This qualitative study, based on focus groups with second- and third-year radiography students, revealed that while students faced challenges in applying theoretical knowledge to real-world scenarios—especially in dealing with anatomical variations and increased adipose tissue—their confidence was significantly influenced by the support of qualified radiographers. Furthermore, the study highlighted the negative bias some senior radiographers exhibited towards obese patients, which could affect both student learning and the quality of patient care. Students expressed a preference for working alongside experienced professionals to enhance their skills and confidence in handling such cases. This study emphasizes the need for positive role models and improved resources to address the difficulties students face in clinical settings, particularly with sensitive patient populations.

In a broader context, Al Ghobain *et al.,* (2016) explored patients' perceptions of medical students' participation in their care. Conducted in a hospital in Riyadh, Saudi Arabia, the study involved 416 patients and found that the majority (98%) acknowledged the educational value of student involvement in their care. Patients were generally open to medical students taking patient histories (98%) and performing physical examinations (89%), although 39% preferred gender-matching with the student. Factors such as the patient's education level, previous positive experiences with medical students, and their perception of the students' professionalism were significantly linked to their acceptance. The findings suggest that education on professionalism, confidentiality, and patient respect should be integrated into medical curricula to ensure positive patient outcomes and acceptance of student participation.

Similarly, Iqbal *et al*., (2020**)** assessed the perceptions of patients regarding student involvement in healthcare at King Fahd University Hospital. A survey conducted with 187 patients showed that while patients generally had a positive attitude towards student participation, acceptance was lower when physical contact or diagnostic procedures were involved. For example, there was a significant increase in refusal rates for diagnostic procedures, particularly in obstetrics/gynecology, compared to pediatrics, where patients were more accepting. These findings indicate that patients are more likely to accept student involvement in non-invasive tasks but may have reservations when it comes to more intimate or invasive procedures. The study concluded that alternative teaching methods, such as simulation-based training, could help address these concerns and improve patient acceptance.

From a psychosocial angle, McIntosh (2024) offered an affective perspective on patient care in radiography, focusing on how emotions, empathy, and communication intersect with technical procedures. While not empirical in the traditional sense, this conceptual article synthesizes existing literature and theoretical insights to argue that radiographers must actively develop emotional intelligence and self-awareness. These affective competencies help in recognizing and addressing patient fears and expectations, thereby enhancing the overall care experience during imaging.

2.3.2 How student participation affects patients' comfort and trust during radiographic examinations.

Hartz and Beal (2000) conducted a study to assess patients' attitudes toward medical students' roles in obstetrics and gynecology outpatient clinics. Using a self-administered questionnaire, the researchers surveyed patients waiting for appointments with obstetricians or gynecologists who were precepting medical students. The findings revealed that a majority of patients felt comfortable with medical students being present during most clinical situations. Nearly half of the patients preferred to see both the doctor and the medical student together, while fewer patients preferred to see only the physician. Interestingly, patients with more prior experience with medical students were more likely to favor their involvement and expressed greater comfort with the students' presence during clinical situations. The study concluded that patients generally welcomed medical student involvement but emphasized the importance of maintaining patient comfort by clearly defining the students' roles, asking patients about their comfort, and gradually increasing the students' responsibilities as patients became more accustomed to their presence.

In a similar vein, **Taleb *et al.,* (2024)** investigated patients' attitudes toward the participation of medical students in procedures and clinical examinations in Lebanon. The study surveyed

729 Lebanese adults and found that, overall, participants held a positive attitude towards the involvement of medical students in their care. A large majority of patients were comfortable with medical students being present in outpatient clinics (71.7%), reading medical files (80.2%), and taking medical histories (81.6%). However, resistance was noted towards students performing more invasive procedures, such as genital/rectal examinations (54.5%), giving epidural injections (69.7%), and prescribing medications (53.2%). The study highlighted that patients' medical conditions, personal characteristics, and religious beliefs were the key factors influencing their willingness to accept medical student participation. Importantly, 61.7% of participants were aware of their right to accept or refuse medical students' involvement, underscoring the importance of respecting patient autonomy and informed consent.

In **Kaliszewski *et al.,* (2023)**, the authors explored how patients perceive the student-patient relationship during hospitalization, particularly in the context of patient participation in clinical classes. The study surveyed 403 patients from a teaching hospital and revealed notable differences in attitudes based on patient age. Older patients were more concerned with the outward appearance and respectful language of medical students, while younger patients were less enthusiastic about participating in educational sessions with students. Despite these differences, the majority of patients valued their role in the education of future healthcare professionals and felt that their involvement in clinical teaching was important. The study also emphasized the need for medical students to maintain patient confidentiality and manage educational sessions appropriately to ensure patient comfort. Overall, the findings indicated that patients generally had a positive view of their involvement in the education of medical students, provided that their dignity and privacy were respected.

Similarly, Hyde and Hardy (2021) carried out a multi-method study in the UK to explore patient-centered care (PCC) in diagnostic radiography. In the first phase, a cross-sectional survey was administered online to three participant groups: patients, radiographers, and radiography managers. Each group responded to attitudinal statements using a Likert scale. The findings revealed significant differences between service users and providers regarding perceptions of quality care. The conclusion emphasized the need for measurable PCC indicators and better alignment between patient expectations and radiographic service delivery.

Focusing on pediatric care, Larsen and Jensen (2025) conducted a qualitative study involving 10 children and adolescents with cystic fibrosis undergoing high-resolution CT scans. Using a child-centered care framework, the study employed observations and semi-structured interviews to explore their experiences. Thematic analysis revealed that factors such as parental presence, use of humor, and shorter examination durations enhanced participation and comfort. However, many children reported limited involvement in the process, with preferences for being included more actively in non-decision-making aspects of care. The study concluded that promoting participatory opportunities is crucial to upholding children's rights and reducing procedural anxiety.

In a conceptual analysis, McIntosh (2024) examined affective patient care in radiography, emphasizing the emotional and interpersonal elements of the patient-radiographer interaction. Although not based on empirical field data, the article reviewed existing literature and emphasized the importance of emotional intelligence, empathy, communication, and self-awareness in enhancing patient experiences during imaging. The paper concluded that radiographers who develop affective competencies are more likely to meet patients' psychological and emotional needs during procedures.

2.3.3 Factors influencing patients' perception of radiography students' participation during radiographic examinations

In a qualitative exploratory study conducted by Ding and Makanjee (2024), the perspectives of 12 purposively sampled Australian radiographers on interactional processes with older patients during diagnostic imaging were explored through in-depth interviews. Using thematic analysis, three core themes emerged: optimizing communication, managing patient expectations, and ensuring physical and emotional comfort. Radiographers highlighted the need for adaptive, patient-centered approaches to accommodate the unpredictability of elderly patients' needs. The study concluded that radiographers require complex decision-making abilities to balance technical efficiency with emotional sensitivity, underscoring the importance of person-centered care.

Similarly, Nghipukuula *et al.,* (2021) carried out a quantitative cross-sectional study involving 50 radiography students and 50 patients to evaluate the effectiveness of student-patient communication before, during, and after radiographic procedures. Using convenience sampling and self-developed questionnaires, the study found generally high ratings of communication across all student levels, although deficiencies were noted in pre- and post-procedure interactions. The study concluded that clinical training must include role-play and mentorship to reinforce effective communication.

In another qualitative study by Mutambara *et al.,* (2023), 15 radiography students in KwaZulu-Natal were interviewed to examine the role and attributes of ideal clinical tutors. The findings revealed that students valued tutors who were knowledgeable, empathetic, and respectful. The study, guided by Carl Rogers' Theory of Facilitation, concluded that positive tutor-student relationships significantly impact the quality of Work Integrated Learning (WIL) experiences, enhancing both academic and professional growth.

A qualitative study by Morrow and Mackay (2024) explored attitudes of 19 third-year radiography students toward gender-inclusive pregnancy status (IPS) checks using focus group discussions. Four themes emerged: education, standardization, fear of reaction, and placement involvement. Despite initial discomfort and variability in training, students showed willingness to perform IPS checks when adequately supported. The study called for standardized clinical practices and inclusive education to better prepare students for diverse patient populations.

Nofiyanti *et al*., (2023) conducted a cross-sectional survey among undergraduate and clerkship dental students in Indonesia to assess the relationship between radiographic knowledge and anxiety levels during dental imaging. Using descriptive statistics and multiple regression analysis, results showed a significant negative correlation between anxiety and both age and examination frequency. The authors concluded that exposure and experience reduce anxiety, advocating for structured, repeated practice during training.

In a focus group-based qualitative study, O'Regan *et al.,* (2025) explored pain management challenges in radiology departments across Irish hospitals. Six radiographers participated, revealing themes such as communication gaps, lack of protocols, and professional experience deficits. The study concluded that unmanaged patient pain compromises image quality and patient safety, emphasizing the urgent need for departmental policies and training in pain management strategies.

Lastly, Thomas *et al.*, (2025) conducted a qualitative focus group study with 21 first-year radiography students to examine how interpersonal interactions in clinical environments affect resilience. Thematic analysis identified student-patient, student-radiographer, student-lecturer, and peer relationships as central influences. Positive, empathetic interactions

enhanced resilience, while negative encounters had detrimental effects. The study advocated for resilience-enhancing strategies and structured support during early clinical exposure.

2.4 Summary of literature review

The literature review explores the multidimensional nature of patient perception regarding radiography students' participation in clinical procedures. The conceptual review covers key themes including the definition and purpose of radiographic examinations, the various types of imaging procedures, and the role of radiographers in ensuring diagnostic accuracy and patient safety. It further discusses the structure of radiography education, emphasizing the importance of integrating clinical experience with theoretical learning. The role of students during clinical postings, the value of patient-centered care, and the ethical principles of autonomy, dignity, and consent are also highlighted as foundational to effective healthcare delivery.

Patient perception is examined in terms of its determinants such as communication, privacy, previous experiences, and sociodemographic variables and its implications for clinical outcomes. The literature underscores how students' participation can influence patient comfort, trust, and cooperation, while also balancing the need for student learning with patient rights.

CHAPTER THREE

METHODOLOGY

This chapter describes the research methodology that the researcher adopted in conducting this study. The various components of research methodology is discussed under their respective headings, including research design, study setting, target population, sample and sampling technique, instruments of data collection, validity and reliability of instruments, method of data collection, method of data analysis, and ethical considerations.

3.1 Research design

The study employed a descriptive cross-sectional design. This design enabled the researcher to collect data from a group of patients at a single point in time to describe their perceptions and experiences regarding the participation of radiography students during radiographic examinations. It was suitable for assessing patients' comfort, trust, and the factors influencing their perceptions without manipulating any variables. The cross-sectional approach allowed for the identification of trends and associations within the population across selected health facilities in Benin City. Additionally, this design was time-efficient, cost-effective, and appropriate for capturing a comprehensive snapshot of the patients' views in a real-world clinical context.

3.2 Research Setting

The study was conducted at two selected health facilities in Benin City: University of Benin Teaching Hospital (UBTH) and Ray Touch Diagnostic Centre.

The University of Benin Teaching Hospital, located on Ugbowo-Lagos Road in Benin City, is a major multi-specialty tertiary healthcare institution. It is a publicly funded, federal

teaching hospital with a capacity of over eight hundred and sixty beds. The radiology department at UBTH is well-equipped and offers a wide range of radiographic services, including static and mobile X-ray machines, CT scan machines, fluoroscopy, ultrasound, and automatic processors. This hospital also serves as a training center for radiography students under the supervision of highly experienced staff. It provides both secondary and tertiary healthcare services, making it an ideal setting to study patients' perceptions of radiography students' participation during their imaging examinations.

Ray Touch Diagnostic Centre is a reputable diagnostic facility in Benin City that offers various radiographic services, such as X-rays and other imaging modalities. Although detailed information about Ray Touch is limited, diagnostic centers like this typically involve radiography students under clinical supervision during their procedures. Including Ray Touch Diagnostic Centre provides a contrast to the public teaching hospital environment, representing a smaller, possibly private facility. This allows the study to capture a broader perspective on patients' attitudes toward student participation in different healthcare settings within Benin City.

3.3 Target Population

The target population for this study consisted of patients undergoing radiographic examinations in the selected health facilities in Benin City. These patients included individuals from diverse age groups, educational levels, and socio-demographic backgrounds who have interacted with or received care involving radiography students during their imaging procedures.

Table 3.1: Population for three months (August– October)

Facilities	**Number of patients**
UBTH	174
Ray Touch Diagnostic	134
Total	**308**

3.4 Sample Size Determination

The sample size was calculated as indicated below:

Using Taro Yamane's Formula

$$n = \frac{N}{1+N(e)^2}$$

Where,

N= Population under study

E= Constant 0.05%) margin error

$$n = \frac{308}{1+308(0.05)^2}$$

$$n = \frac{308}{1+308(0.0025)}$$

$$n = \frac{308}{1+0.77}$$

$$n = 308$$

1.77

n=174

Therefore, the sample size 174.

3.5 Sampling Technique

This study employed **stratified random sampling** to select participants. This technique was chosen because it ensured that key subgroups within the population were adequately represented, enhancing the accuracy and relevance of the findings. Specifically, patients from the two selected health facilities University of Benin Teaching Hospital and Ray Touch Diagnostic Centre, served as distinct strata, allowing the researcher to capture differences in experiences across facilities. Additionally, stratification by demographic characteristics such as age, gender, and type of radiographic examination helped ensure that diverse perspectives were included. By dividing the population into strata and randomly selecting participants from each group, this method reduced sampling bias and improved the representativeness of the sample. This approach is particularly suitable for the study's objectives, as it allows for a comprehensive assessment of patients' perceptions, comfort, trust, and the factors influencing their views regarding radiography students' participation during examinations.

Table 3.2: Proportional calculation

Facilities	**Number of patients**	**Number of patients based on facility**
UBTH	174/308X174	98
Ray Touch Diagnostic	134/308X174	76
Total	**308**	**174**

3.6 Instrument for Data Collection

Data for this study were collected using a self-structured questionnaire developed in line with the study objectives. The questionnaire was carefully designed to ensure clarity, relevance, and the collection of meaningful information from participants. It was divided into four sections:

Section A: Collected socio-demographic information, including age, gender, marital status, educational level, occupation, and religion. This section comprised **6 closed-ended questions**.

Section B: Assessed patients' perception of the participation of radiography students during radiographic examinations in selected health facilities in Benin City. This section included **10 statements** rated on a four-point Likert scale (Strongly Agree, Agree, Disagree, Strongly Disagree).

Section C: Explored how student participation affected patients' comfort and trust during radiographic examinations. This section also contained **10 statements** using the same four-point Likert scale.

Section D: Examined factors influencing patients' perception of radiography students' participation during radiographic examinations in selected health facilities. This section had **10 statements**, rated on the four-point Likert scale.

The questionnaire consisted of **36 items**, combining close-ended socio-demographic questions and Likert-scale statements to capture the intensity of participants' perceptions, comfort, trust, and influencing factors.

3.7 Validity of the Instrument

The instrument's validity pertained to its capability to accurately measure the intended construct or concept (Surucu & Maslakci, 2020). To ensure the questionnaire was suitable for the study, both face and content validity were conducted. The first draft of the instrument was

given to the project supervisor and an expert in the field to review. They checked whether the questions were clear, relevant, and capable of capturing the information the study aimed to measure. Their observations and suggestions were used to revise and improve the questionnaire. After making the recommended adjustments, the final version of the instrument was considered appropriate for use in the main research.

3.8 Reliability of the Instrument

The reliability of an instrument referred to its stability and consistency in delivering uniform outcomes when assessing the same criteria under identical circumstances (Surucu & Maslakci, 2020). It essentially gauged how consistently the instrument produced similar results across multiple trials. A reliable instrument is one that could produce the same results if the behavior was measured again by the same scale. The Cronbach's alpha reliability technique was employed in this study. This researcher conducted reliability testing on the instrument by distributing questionnaires, which constituted 10% of the total sample size of , to patients privileged to undergo radiologic examination with radiography students present in Edo Specialist Hospital (which are outside the sampled population). A coefficient of 0.71 was obtained, and the instrument was considered reliable.

3.9 Method of Data Collection

A well-structured questionnaire was administered to the patients until the required sample size is achieved. The patients were approached at the various selected hospitals. The purpose of the study was explained to them, and the instrument for data collection were administered. Data collection was conducted by the researchers. The data collection took place during break periods, and on-the-spot retrieval of the administered copies of the questionnaire ensured that all copies were collected on the same day. Data collection lasted for about two weeks.

3.10 Method of Data Analysis

The data collected were analysed using the Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics such as mean, frequency, and percentages was computed to summarize the data. Hypothesis testing was conducted using the Chi-square test of association, with the level of significance set at $p < 0.05$. The results of the analyses were then presented using tables, graphs, frequencies, and percentages to provide a clear overview of the findings.

3.11 Ethical Considerations

Ethical approval was obtained from the Health Research Committee of the various selected hospitals. Permission was obtained from the personnels before proceeding with the research. Before data collection begins, participants received detailed explanations about the research's purpose, content, and implications. They were assured of confidentiality, ensuring the protection of their personal and private information. Throughout the research, ethical guidelines were strictly adhered to, including the following considerations:

Confidentiality: Respondents' information was treated confidentially, with no request for names or addresses in the questionnaire. Participants understood that their responses were confidential and used solely for research purposes. No personal identifiers were used in any document or questionnaire to maintain anonymity.

Voluntary Participation: Participants were informed of their right to voluntary participation without facing penalties or bias. They could choose to withdraw or decline to provide information at any point if they felt uncomfortable or unsure.

Avoidance of Plagiarism: Proper citation of all authors used in the study was ensured, both within the content and on the reference page.

CHAPTER FOUR

RESULTS

This chapter deals with the representation of data collected regarding the **radiographic examinations in selected health facilities in Benin City: patients' perception of radiography students' participation**. A total of 174 questionnaires were distributed to patients undergoing radiographic examinations in the selected health facilities in Benin City, 170 questionnaires were properly filled and valid for data analysis, giving a response rate of 97.7%.

Table 4.1: Socio-demographic characteristics

Variable	Frequency (n=170)	Percent (%)
Age (years)		
26–35	38	22.4
18–25	37	21.8
46–55	36	21.2
36–45	30	17.6
56 and above	29	17.1
Gender		
Female	91	53.5
Male	79	46.5
Marital Status		
Single	54	31.8
Widowed	46	27.1
Married	44	25.9
Divorced	26	15.3
Educational Level		
Tertiary	43	25.3
No formal education	37	21.8
Primary	35	20.6
Postgraduate	28	16.5
Secondary	27	15.9
Occupation		

Civil Servant	37	21.8
Professional	33	19.4
Trader	26	15.3
Other	26	15.3
Student	26	15.3
Unemployed	22	12.9
Religion		
Other	14	8.2
Traditional	18	10.6
Christianity	110	64.7
Islam	28	16.5

Table 4.1 summarizes the socio-demographic characteristics of the 170 patients in the study. The largest age group was 26–35 years (22.4%), followed by 18–25 years (21.8%) and 46–55 years (21.2%), while those aged 56 and above were the smallest (17.1%). Females made up a slightly higher proportion (53.5%) than males (46.5%). In terms of marital status, singles constituted the highest percentage (31.8%), followed by widowed (27.1%), married (25.9%), and divorced (15.3%). Educationally, most respondents had tertiary education (25.3%), with others reporting no formal education (21.8%), primary (20.6%), postgraduate (16.5%), or secondary education (15.9%). Civil servants represented the largest occupational group (21.8%), followed by professionals (19.4%), while traders, students, and those classified as "others" each made up 15.3%; unemployed respondents accounted for 12.9%. Christianity was the dominant religion (64.7%), with Muslims (16.5%), traditional worshippers (10.6%), and others (8.2%) also represented.

Answering Research Question:

Research Question 1: What is patients' perception of the participation of radiography students during radiographic examinations in selected health facilities in Benin City?

Table 4.2: Patients' perception of radiography students' participation

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Remark
I felt that the radiography student's observation during the examination was helpful.	20 (11.8)	40 (23.5)	60 (35.3)	50 (29.4)	2.2	Negative
The presence of the radiography student made me feel more confident in the procedure.	25 (14.7)	40 (23.5)	55 (32.4)	50 (29.4)	2.2	Negative
I believe that the radiography student's participation improved the quality of the examination.	20 (11.8)	38 (22.4)	58 (34.1)	54 (31.8)	2.1	Negative
I was comfortable with the radiography student being present during the procedure.	28 (16.5)	42 (24.7)	55 (32.4)	45 (26.5)	2.3	Negative
The radiography student's involvement in my care had a positive impact on my overall experience.	22 (12.9)	38 (22.4)	60 (35.3)	50 (29.4)	2.2	Negative
I feel that the radiography student was knowledgeable about the procedure.	26 (15.3)	42 (24.7)	55 (32.4)	47 (27.6)	2.3	Negative
I felt that the radiography student's observation was conducted in a respectful manner.	28 (16.5)	45 (26.5)	52 (30.6)	45 (26.5)	2.3	Negative
I believe that involving radiography students in the examination process is beneficial for both students and patients.	24 (14.1)	40 (23.5)	55 (32.4)	51 (30.0)	2.2	Negative
The radiography student's presence did not cause any disruptions during the examination.	26 (15.3)	43 (25.3)	54 (31.8)	47 (27.6)	2.3	Negative
I feel that the radiography student contributed positively to the overall procedure.	43 (25.3)	41 (24.1)	46 (27.1)	40 (23.5)	2.5	Positive
				Grand Mean	**2.3**	**Negative**

Mean Cut-off = 2.5

Table 4.2 shows that patients generally held negative perceptions of radiography students' participation during their examinations. Most responses fell under disagree and strongly disagree, indicating low acceptance of student involvement. Key items—such as students

being helpful (2.2), boosting patient confidence (2.2), improving examination quality (2.1), or making patients comfortable (2.3)—all recorded mean scores below the 2.5 benchmark, reflecting unfavorable views. Even attributes like students being respectful (2.3) and non-disruptive (2.3) were rated low. Only one item, stating that students contributed positively to the procedure, reached a borderline mean of 2.5. With an overall grand mean of 2.3, the findings clearly indicate that patients generally perceived radiography students' participation negatively, showing discomfort and limited appreciation of their role during procedures.

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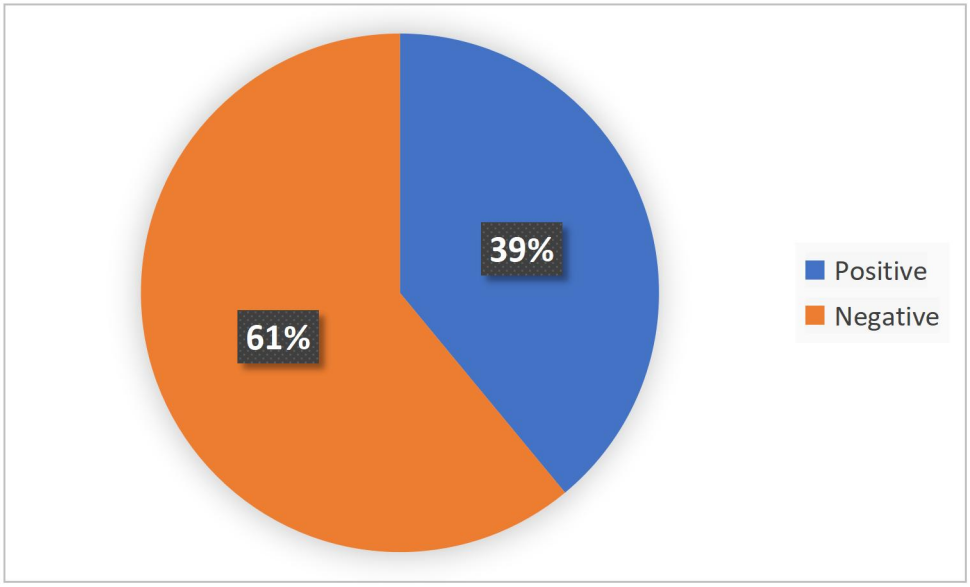

Figure 4.1: Pie chart showing patients' perception of radiography students' participation

Figure 4.1 shows that 67 (39.4%) had a positive perception of radiography students' participation during examinations, while 103 (60.6%) expressed a negative perception. This indicates that although a notable proportion of patients viewed the students' presence favorably, the majority still held a negative perception, suggesting that many patients were not entirely comfortable with or convinced about the benefits of student involvement during radiographic procedures.

Research Question 2: How does student participation affect patients' comfort and trust during radiographic examinations in selected health facilities in Benin City?

Table 4.3: How student participation affects patients' comfort and trust during radiographic examinations

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Remark
I felt comfortable during the radiographic examination with a radiography student observing the procedure.	24 (14.1)	38 (22.4)	60 (35.3)	48 (28.2)	2.2	Negative
The presence of the radiography student observing the procedure made the examination more uncomfortable for me.	45 (26.5)	60 (35.3)	40 (23.5)	25 (14.7)	2.7	Positive
I trusted the radiography student's ability to observe the procedure without affecting its quality.	22 (12.9)	40 (23.5)	65 (38.2)	43 (25.3)	2.2	Negative
Having a radiography student observe the procedure made me feel more at ease.	26 (15.3)	42 (24.7)	58 (34.1)	44 (25.9)	2.3	Negative
I was confident that the radiography student's observation did not impact the procedure negatively.	28 (16.5)	41 (24.1)	56 (32.9)	45 (26.5)	2.3	Negative
The radiography student's observation helped me feel reassured during the examination.	25 (14.7)	38 (22.4)	60 (35.3)	47 (27.6)	2.2	Negative
I felt more relaxed knowing that a radiography student was observing the procedure under supervision.	30 (17.6)	40 (23.5)	55 (32.4)	45 (26.5)	2.3	Negative
The presence of a radiography student observing the procedure made me feel more confident in the quality of care I was receiving.	28 (16.5)	42 (24.7)	58 (34.1)	42 (24.7)	2.3	Negative
I did not feel distracted by the radiography student's observation during the examination.	25 (14.7)	45 (26.5)	55 (32.4)	45 (26.5)	2.3	Negative
The radiography student's observation did not affect my overall comfort or trust in the procedure.	26 (15.3)	40 (23.5)	54 (31.8)	50 (29.4)	2.2	Negative
				Grand Mean	**2.3**	Negative

Mean Cut-off = 2.5

Table 4.3 indicates that patients' comfort and trust were generally low when radiography students observed their examinations. The highest mean score (2.7) was recorded for the statement that student presence made the examination more uncomfortable, showing notable unease among patients. Other items—such as confidence that the student did not negatively affect the procedure (2.3), feeling at ease with the student present (2.3), and receiving reassurance from the student's observation (2.2)—all fell below the 2.5 benchmark. Similarly low means were reported for feeling comfortable during the examination (2.2), trusting the student's ability to observe without affecting quality (2.2), feeling relaxed under supervision (2.3), not being distracted (2.3), and confidence in the quality of care received (2.3)..

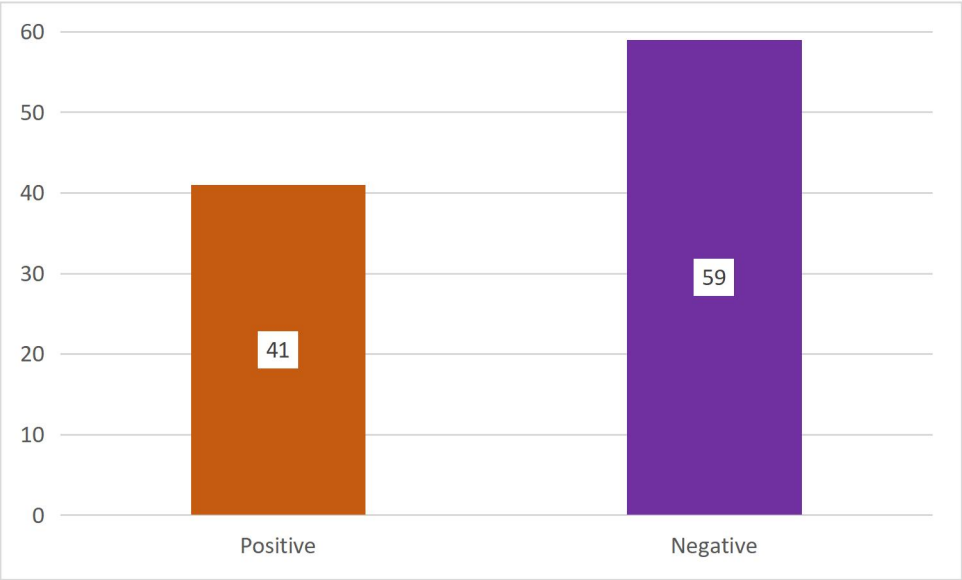

Figure 4.2: Bar chart showing how student participation affects patients' comfort and trust during radiographic examinations

Figure 4.2 shows that 100 patients (59%) expressed a negative perception, while 70 patients (41%) reported a positive perception of student participation during radiographic examinations. This indicates that most patients felt uncomfortable or less trusting when radiography students were present

Research Question 3: What are the factors influencing patients' perception of radiography students' participation during radiographic examinations in selected health facilities in Benin City?

Table 4.4: Factors influencing patients' perception of radiography students' participation

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Remark
I do not feel confident in the radiography student's ability to perform the procedure correctly.	47 (27.6)	61 (35.9)	40 (23.5)	22 (12.9)	2.8	Factor
The radiography student does not provide clear explanations about the procedure or what to expect.	49 (28.8)	58 (34.1)	39 (22.9)	24 (14.1)	2.8	Factor
I do not feel reassured knowing that a qualified radiographer is supervising the student.	41 (24.1)	56 (32.9)	49 (28.8)	24 (14.1)	2.7	Factor
I feel that my medical condition is not properly considered when a radiography student participates in the procedure.	38 (22.4)	53 (31.2)	54 (31.8)	25 (14.7)	2.6	Factor
I feel less comfortable with the participation of radiography students in my care.	44 (25.9)	59 (34.7)	42 (24.7)	25 (14.7)	2.7	Factor
My cultural or religious beliefs make me feel uncomfortable with the involvement of students in sensitive parts of the examination.	50 (29.4)	54 (31.8)	42 (24.7)	24 (14.1)	2.8	Factor
I feel uncomfortable when a radiography student of a different gender is involved in my examination.	48 (28.2)	57 (33.5)	42 (24.7)	23 (13.5)	2.8	Factor
The reputation of the healthcare facility does not make me feel more comfortable with the radiography student's involvement in my care.	42 (24.7)	55 (32.4)	50 (29.4)	23 (13.5)	2.7	Factor
I do not feel that I have enough control over the decision to allow a radiography student to participate in my procedure.	45 (26.5)	53 (31.2)	49 (28.8)	23 (13.5)	2.7	Factor
I feel that my privacy is not adequately respected when a radiography student is involved in my care.	46 (27.1)	52 (30.6)	48 (28.2)	24 (14.1)	2.7	Factor
				Grand Mean	**2.7**	**Factor participation**

Mean Cut-off = 2.5

Table 4.4 indicates generally low influence of the listed factors on patients' perceptions of radiography students' participation. Most items recorded mean scores around 2.0–2.2, all below the 2.5 benchmark. Patients reported low agreement that unclear explanations (2.2), inadequate consideration of their medical condition (2.2), cultural or religious discomfort (2.2), gender-related discomfort (2.2), or privacy concerns (2.2) shaped their perceptions. Similarly, feeling less comfortable with student participation (2.1), the facility's reputation not improving comfort (2.1), and lacking control over permitting student involvement (2.1) were rated as minimally influential. The lowest means were seen in lack of confidence in students' competence (2.0) and lack of reassurance despite supervision (2.0).

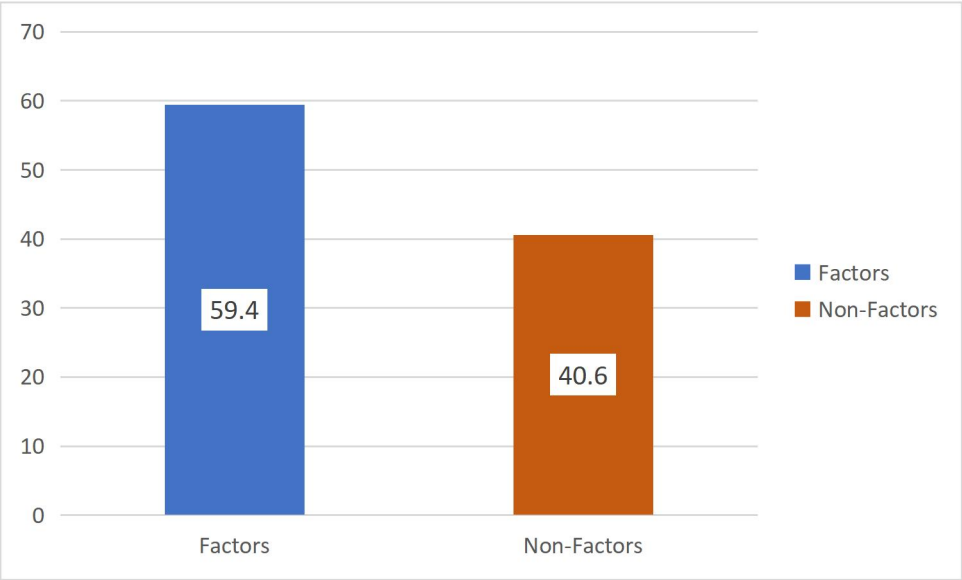

Figure 4.3: Pie chart showing factors influencing patients' perception of radiography students' participation

Figure 4.3 indicates that a majority of patients, 101 (59.4%), reported that the factors assessed influenced their perception of radiography students' participation in radiographic examinations, while 69 (40.6%) considered these factors non-influential.

Testing of hypothesis

1. There is no significant association between patient's demographic characteristic and their perception of radiography students' participation in radiographic examinations.

Table 4.5: Association between patient's demographic characteristic and their perception of radiography students' participation in radiographic examinations

Variable	Categories	Frequency (%)	Test Statistics (χ^2)	df	P-value	Decision
Age	18–25 years	37 (21.8)	4.821	4	0.307	Accepted
	26–35 years	38 (22.4)				
	36–45 years	30 (17.6)				
	46–55 years	36 (21.2)				
	56 and above	29 (17.1)				
Gender	Male	79 (46.5)	2.113	1	0.146	Accepted
	Female	91 (53.5)				
Marital Status	Single	54 (31.8)	6.242	3	0.101	Accepted
	Married	44 (25.9)				
	Divorced	26 (15.3)				
	Widowed	46 (27.1)				
Educational Level	No formal education	37 (21.8)	8.364	4	0.079	Accepted
	Primary	35 (20.6)				
	Secondary	27 (15.9)				
	Tertiary	43 (25.3)				
	Postgraduate	28 (16.5)				
Occupation	Civil Servant	37 (21.8)	5.187	5	0.393	Accepted
	Professional	33 (19.4)				
	Trader	26 (15.3)				
	Student	26 (15.3)				
	Unemployed	22 (12.9)				
	Other	26 (15.3)				
Religion	Christianity	110 (64.7)	3.742	3	0.291	Accepted
	Islam	28 (16.5)				
	Traditional	18 (10.6)				
	Other	14 (8.2)				

Table 4.5 shows that none of the demographic variables had a significant association with patients' perceptions of radiography students' participation, as all p-values exceeded 0.05. Most respondents were between 26–35 years (22.4%) and 18–25 years (21.8%), with those aged 56 and above making up 17.1%. Females formed a slightly higher proportion (53.5%) than males (46.5%). Singles constituted the largest marital group (31.8%), followed by widowed (27.1%), married (25.9%), and divorced (15.3%).

Educational distribution showed that most had tertiary education (25.3%), while others had no formal education (21.8%), primary (20.6%), secondary (15.9%), or postgraduate education (16.5%). Civil servants were the most common occupational group (21.8%), followed by professionals (19.4%), traders (15.3%), students (15.3%), unemployed (12.9%), and others (15.3%). Christianity was the dominant religion (64.7%), with Islam (16.5%), traditional religion (10.6%), and others (8.2%) represented.

CHAPTER FIVE

DISCUSSION AND FINDINGS

This chapter discusses the major findings of the research compared with the literature reviewed, the implication for nursing, summary, conclusion, Recommendations and Suggestions for further Studies.

5.1. Discussion of major Findings

The study assessed the **radiographic examinations in selected health facilities in Benin City: patients' perception of radiography students' participation**. The socio-demographic characteristics of the study participants reveal a diverse sample population that enhances the representativeness and generalizability of the findings. The age distribution shows a relatively balanced representation across different age groups, with slightly higher proportions in the younger age brackets: 22.4% aged 26-35 years and 21.8% aged 18-25 years. This age distribution aligns with Kaliszewski et al.'s (2023) findings regarding age-related differences in patient attitudes toward student participation. Gender distribution showed a slight female predominance (53.5%) compared to males (46.5%), providing a reasonably balanced perspective. This gender distribution is particularly relevant when considering Taleb et al.'s (2024) findings regarding gender preferences in medical procedures and Al Ghobain et al.'s (2016) observation that 39% of patients preferred gender-matching with students. Marital status varied among participants, with singles forming the largest group (31.8%), followed by widowed (27.1%) and married (25.9%) individuals. This diversity in marital status provides insight into different social support contexts that might influence patient experiences, though this factor was not specifically addressed in previous studies like Nghipukuula et al. (2021) or Hyde and Hardy (2021). Educational background showed considerable variation, with tertiary education holders comprising the largest group (25.3%), followed by those with no formal

education (21.8%). This educational diversity is particularly relevant when considering Al Ghobain et al.'s (2016) findings that patient education level significantly influenced acceptance of student participation. Occupational distribution revealed civil servants (21.8%) and professionals (19.4%) as the largest groups, with other categories fairly evenly distributed. This occupational diversity provides a broad perspective on how different professional backgrounds might influence patient perceptions, though this specific aspect was not extensively explored in previous literature. Religious affiliation showed Christianity as predominant (64.7%), followed by Islam (16.5%). This religious distribution is noteworthy when considering Taleb et al.'s (2024) findings about the influence of religious beliefs on patient acceptance of student participation in medical procedures. The demographic profile suggests a sample population that represents various social, educational, and cultural backgrounds, allowing for a comprehensive understanding of patient perceptions. This diversity strengthens the study's findings and their applicability across different patient populations, supporting McIntosh's (2024) emphasis on the need for adaptive, patient-centered approaches in radiography education and practice.

Patients' perception of the participation of radiography students during radiographic examinations

In line with Research Question 1 and Objective 1, which sought to assess patients' perception of radiography students' participation during radiographic examinations, the findings show that a majority of patients (61%) expressed a negative perception of student involvement, while only 39% reported a positive perception. This pattern is reinforced by the grand mean of 2.3, which is below the 2.5 cut-off point, indicating generally unfavorable views toward student participation. Patients demonstrated low agreement with items assessing whether student observation was helpful (mean = 2.2) or whether the student's presence enhanced their confidence during the procedure (mean = 2.2). Similarly, perceptions that students

improved examination quality (mean = 2.1) or contributed positively to the overall procedure (mean = 2.5) remained modest. These findings contrast sharply with Al Ghobain et al. (2016), who reported that 98% of patients valued student involvement for its educational importance, and with Hartz and Beal (2000), who found that patients generally felt comfortable with students' presence during clinical practice. Even though some respondents acknowledged that radiography students appeared knowledgeable (mean = 2.3) and respectful (mean = 2.3), others felt that their presence introduced discomfort or minor disruption (means = 2.2–2.3). Such mixed perceptions align with Iqbal et al. (2020), who reported variations in patient acceptance depending on the type of procedure and level of student involvement. These findings directly address Research Question 1 by demonstrating that patients' perceptions were generally negative. They also fulfill Objective 1 by highlighting that although some patients recognize the educational role of radiography students, many still experience discomfort and uncertainty. This underscores the need for improved supervision, clearer communication, and more patient-centered engagement to strengthen patient acceptance of student participation during radiographic examinations.

How student participation affects patients' comfort and trust during radiographic examinations

Addressing Research Question 2 and Objective 2, which examine how student participation affects patients' comfort and trust during radiographic examinations, the findings indicate that patient responses were largely unfavorable. A total of 59% of respondents expressed negative perceptions, while only 41% reported positive perceptions. This aligns with the grand mean of 2.3, which is below the 2.5 cut-off, confirming generally negative views regarding the impact of student involvement on comfort and trust. The data further show that although a few patients felt that student observation did not significantly disrupt the procedure, many experienced discomfort, distraction, and reduced trust when students were present. Reports of

unease were common, and only a small number of patients felt reassured or at ease during the examination. The highest mean score (2.7) was associated with the perception that the presence of a radiography student made the examination more uncomfortable, underscoring the strength of this negative sentiment. These findings differ from the results of Hartz and Beal (2000) and Taleb et al. (2024), who documented predominantly positive patient attitudes toward student participation in clinical settings. Instead, the results are more consistent with those of Iqbal et al. (2020) and Nghipukuula et al. (2021), who observed that patients often report discomfort or hesitation—particularly when communication, consent, and reassurance are insufficient. This pattern also aligns with Hyde and Hardy (2021) and Larsen and Jensen (2025), who emphasize the role of effective supervision and patient-centered communication in fostering comfort and trust during clinical training encounters. These findings directly answer Research Question 2 by showing that student participation tended to reduce patients' comfort and trust. They also fulfill Objective 2 by illustrating that although some patients remain receptive to student involvement, discomfort was more prevalent. Improving communication, offering reassurance, and demonstrating professionalism are therefore essential strategies for enhancing patient confidence and acceptance of radiography students during examinations.

Factors influencing patients' perception of radiography students' participation during radiographic examinations

In line with Research Question 3 and Objective 3, which sought to identify the factors influencing patients' perception of radiography students' participation, the findings show that 59.4% of patients considered the assessed factors influential, while 40.6% viewed them as non-influential. Despite this, the grand mean of 2.1, which is below the 2.5 cut-off point, indicates that although multiple factors contributed to shaping patient perceptions, their overall influence was relatively low. Regarding technical competence, most patients

disagreed with concerns about students' ability to perform procedures, suggesting a general sense of confidence in student competence. This aligns with Nghipukuula et al. (2021), who reported satisfactory student performance supported by clear communication. Similarly, a majority of respondents disagreed that poor explanation of procedures affected their perception, indicating that inadequate communication was not a major issue. Supervision was also perceived positively, as most patients disagreed that the presence of a qualified radiographer diminished their confidence—a finding that supports Le et al. (2015), who emphasized the reassuring effect of proper supervision on both patients and students.

Patients also largely disagreed that their medical conditions were neglected, which contrasts with Iqbal et al. (2020), where health status played a significant role in patient acceptance. Cultural, religious, and gender-related factors showed minimal influence, differing from Taleb et al. (2024), who found strong cultural and religious impacts in Middle Eastern settings. Privacy and autonomy were similarly viewed as adequately protected, with respondents disagreeing that their privacy was compromised or that they lacked control over whether students participated. This diverges from the observations of Kaliszewski et al. (2023), who identified privacy concerns as a key issue among older patients. Furthermore, the reputation of the healthcare facility and the gender of the student were not regarded as major influencers, echoing Ding and Makanjee (2024), who emphasized the primacy of interpersonal interaction quality over demographic or institutional factors. Although the grand mean suggests that these influences were mild overall, the 40.6% who viewed the factors as non-influential highlight the variability in patient experiences. This aligns with Thomas et al. (2025), who stressed the importance of individualized approaches in fostering positive patient-student interactions.

5.2 Implication to radiographer

The findings of this study carry significant implications for **radiographers**, who play a pivotal role in both patient care and the clinical training of radiography students. The generally moderate perception of patients toward students' participation during radiographic examinations highlights the need for radiographers to strengthen their dual responsibility as both practitioners and educators.

Radiographers are often the professionals directly supervising students during procedures, and their approach can strongly influence how patients perceive student involvement. When radiographers communicate clearly, demonstrate professionalism, and maintain patient comfort, they foster a clinical atmosphere that encourages patient trust and acceptance of students. The study revealed that most patients were not opposed to student participation when supervision was evident, suggesting that visible oversight by qualified radiographers reassures patients about safety and quality of care.

These results also underline the importance of radiographers adopting a **patient-centered supervision model**—one that balances clinical teaching with respect for patient autonomy, privacy, and dignity. While many patients viewed student involvement positively, a notable proportion expressed mild discomfort or uncertainty. Radiographers must therefore remain attentive to individual differences, explaining the role of students, seeking informed consent, and addressing concerns with empathy and professionalism. Furthermore, the findings suggest that factors such as supervision quality, privacy maintenance, and institutional reputation were not strong barriers to patient acceptance. This indicates that patients generally trust radiographers to manage the clinical learning environment responsibly. Radiographers should continue to build on this trust by ensuring that students adhere to ethical standards, maintain confidentiality, and engage respectfully with patients. Ultimately,

the study emphasizes the need for radiographers to act as both **mentors and advocates**—mentors guiding students to develop technical competence and communication skills, and advocates ensuring that patient welfare remains central to every learning experience. By doing so, radiographers not only enhance the educational experience but also promote patient satisfaction and uphold the integrity of the profession.

5.3 Summary

This study examined patients' perception of radiography students' participation during radiographic examinations at UBTH Staff Secondary School, Benin City. The results showed that 54% of patients had a positive perception of student participation, while 46% expressed negative views, giving an overall grand mean of 2.4, which falls below the 2.5 cut-off point. This indicates a generally cautious or moderately negative perception toward student involvement in radiographic procedures. A detailed analysis revealed that although a significant proportion of patients (around 60–70%) appreciated the educational value of student participation and the confidence provided by supervision, others (about 30–40%) expressed discomfort related to privacy, gender sensitivity, and procedural disruptions. Despite these concerns, 68% of respondents considered these factors non-influential in shaping their overall perception, suggesting that supervision, communication, and professionalism helped maintain patient trust. The findings highlight the need for radiographers to continue fostering effective communication, empathy, and patient-centered care while mentoring students. By prioritizing patient comfort, consent, and dignity, radiographers can balance clinical education with quality care, ensuring that both students and patients benefit from a respectful and well-supervised learning environment.

5.4 Conclusion

This study examined patients' perception of radiography students' participation during radiographic examinations and the factors influencing those perceptions. The overall findings revealed a generally moderate to positive attitude toward student involvement, though not without areas of concern. The grand mean score of 2.4, slightly below the 2.5 benchmark, suggests that while patients appreciate the learning opportunities provided to students, they also expect reassurance, competence, and professionalism in every interaction. The study established that many patients valued the educational significance of student participation, especially when the process was supervised by qualified radiographers. Patients tended to feel more comfortable and trusting when students displayed confidence, respect, and clear communication during procedures. This finding underscores the importance of supervision and mentorship in fostering both student growth and patient satisfaction. However, some patients expressed concerns about discomfort, privacy, and possible disruptions caused by student involvement. These apprehensions, although not dominant, point to the need for improved communication and patient education before and during examinations. Ensuring that patients are fully informed about the role and competence of student radiographers can help alleviate anxiety and strengthen trust. The analysis of influencing factors showed that cultural and religious beliefs, gender differences, and institutional reputation were not major determinants of patient acceptance. This suggests that patients' trust in the professionalism of healthcare providers remains strong, provided that ethical and respectful practices are consistently upheld. Nevertheless, maintaining this trust requires ongoing sensitivity to individual preferences and continuous professional development among healthcare staff and students alike.

5.5 Limitations of the Study

Limited study sites: The research was conducted only in selected health facilities in Benin City, which may limit the generalizability of the findings. Patient perceptions in other regions or healthcare settings may differ due to variations in demographics, cultural norms, and healthcare practices.

Self-reported data: The study relied on patients' self-reported perceptions collected through questionnaires. Responses may have been influenced by recall bias, as participants might not accurately remember their experiences during the radiographic examination.

Social desirability bias: Some patients may have provided responses they felt were expected or socially acceptable, rather than their true feelings, potentially affecting the accuracy of reported perceptions.

Impact on findings: These limitations suggest that while the study offers useful insights into patients' perceptions, the results should be interpreted with caution and may not fully represent experiences across other populations or healthcare settings.

5.6 Recommendations:

Based on the findings of this study, the following recommendations are proposed to enhance patient comfort, trust, and overall acceptance of radiography students' participation during radiographic examinations:

1. Qualified radiographers should maintain close supervision of students during all radiographic procedures.
2. Patients should be adequately informed about the presence, role, and competence level of radiography students before the examination begins.

3. Radiography departments should emphasize patient-centered approaches that prioritize respect, empathy, and dignity.
4. Students must be trained to recognize and respond to individual patient needs, cultural sensitivities, and emotional cues throughout their clinical practice.
5. Radiography curricula should integrate structured modules on communication, ethics, and professional conduct.
6. Hospitals and teaching facilities should implement formal consent policies regarding student participation.
7. Patients should have the right to approve or decline student involvement without fear of judgment or reduced quality of care.
8. Measures should be taken to ensure that patient privacy is consistently protected. When possible, students of the same gender should be assigned to sensitive examinations, especially in culturally or religiously conservative contexts.
9. Radiographers, nurses, and educators should work together to create a supportive learning environment that balances educational needs with patient welfare.
10. Institutions should regularly assess patient satisfaction and perceptions regarding student participation.
11. Feedback mechanisms such as surveys or debrief sessions can identify areas for improvement and promote accountability in clinical education.
12. Clinical supervisors should receive periodic training in educational methods, communication, and ethics to better guide students in patient interactions and ensure consistent standards of care.
13. Teaching hospitals should develop and enforce policies that support effective student integration into clinical practice while safeguarding patient rights. Clear guidelines will promote consistency, fairness, and transparency in the learning process.

5.7 Suggestion for Further study

- Future research should consider expanding the geographical scope to include multiple cities or regions in order to capture a wider range of cultural, religious, and institutional contexts. This would enhance the generalizability of findings and provide a more holistic view of patient perceptions across Nigeria and beyond.
- Future studies adopt longitudinal designs to track changes in patients' attitudes over time, especially for individuals who undergo repeated radiographic examinations. Such an approach would help to determine whether familiarity with student participation influences levels of comfort, trust, and acceptance.
- Further research should explore the perspectives of radiography students, supervising radiographers, and nurses. Including these groups would provide a more comprehensive understanding of the clinical learning environment and highlight areas where educational strategies and supervision practices could be improved.

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APPENDIX I

DEPARTMENT OF RADIOGRAPHY

SCHOOL OF BASIC MEDICAL SCIENCES

UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

Dear Respondent,

I am 500 level students of the department of radiography in the above-named institution. I am carrying out a research study on the topic; **"Radiographic Examinations in Selected Health Facilities in Benin City: Patients' Perception of Radiography Students' Participation"**, Please kindly assist me by indicating your opinion where necessary

Yours faithfully,

Instruction: please do not write your name, provide and tick the appropriate answer.

SECTION A: Socio-demographic information

1. **Age**: 18–25 ( ) 26–35 ( ) 36–45 ( ) 46–55 ( ) 56 and above ( )
2. **Gender**: Male ( ) Female ( )
3. **Marital Status**: Single ( ) Married ( ) Divorced ( ) Widowed ( )
4. **Educational Level**: No formal education ( ) Primary ( ) Secondary ( ) Tertiary ( ) Postgraduate ( )
5. **Occupation**: Unemployed ( ) Student ( ) Trader ( ) Civil Servant ( ) Professional ( ) Other (please specify): _____ ( )
6. **Religion**: Christianity ( ) Islam ( ) Traditional ( ) Other (please specify): _____ ( )

Section B: Patients' perception of the participation of radiography students during radiographic examinations in selected health facilities in Benin City

S/N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1	I felt that the radiography student's observation during the examination was helpful.				
2	The presence of the radiography student made me feel more confident in the procedure.				
3	I believe that the radiography student's participation improved the quality of the examination.				
4	I was comfortable with the radiography student being present during the procedure.				
5	The radiography student's involvement in my care had a positive impact on my overall experience.				
6	I feel that the radiography student was knowledgeable about the procedure.				
7	I felt that the radiography student's observation was conducted in a respectful manner.				
8	I believe that involving radiography students in the examination process is beneficial for both students and patients.				
9	The radiography student's presence did not cause any disruptions during the examination.				
10	I feel that the radiography student contributed positively to the overall procedure.				

Section C: How student participation affects patients' comfort and trust during radiographic examinations.

S/N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1	I felt comfortable during the radiographic examination with a radiography student observing the procedure.				
2	The presence of the radiography student observing the procedure made the examination more uncomfortable for me.				
3	I trusted the radiography student's ability to observe the procedure without affecting its quality.				
4	Having a radiography student observe the procedure made me feel more at ease.				
5	I was confident that the radiography student's observation did not impact the procedure negatively.				
6	The radiography student's observation helped me feel reassured during the examination.				
7	I felt more relaxed knowing that a radiography student was observing the procedure under supervision.				
8	The presence of a radiography student observing the procedure made me feel more confident in the quality of care I was receiving.				
9	I did not feel distracted by the radiography student's observation during the examination.				
10	The radiography student's observation did not affect my overall comfort or trust in the procedure.				

Section D: Factors influencing patients' perception of radiography students' participation during radiographic examinations in selected health facilities in Benin City.

S/N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1	Based on my past experiences, I did not feel confident in the radiography student's ability to perform the procedure correctly.				
2	In my previous visits, the radiography student did not provide clear explanations about the procedure or what to expect.				
3	During previous procedures, I did not feel reassured knowing that a qualified radiographer was supervising the student.				
4	In my past experiences, I did not feel that my medical condition was properly considered when a radiography student participated in the procedure.				
5	My previous experiences with radiography students made me feel less comfortable with their participation in my care.				
6	My cultural or religious beliefs made me feel uncomfortable with the involvement of students in sensitive parts of the examination.				
7	In my past experiences, I felt uncomfortable when a radiography student of a different gender was involved in my examination.				
8	The reputation of the healthcare facility did not make me feel more comfortable with the radiography student's involvement in my care.				
9	In my previous visits, I did not feel that I had enough control over the decision to allow a radiography student to participate in my procedure.				
10	In my past experiences, I felt that my privacy was not adequately respected when a radiography student was involved in my care.				

APPENDIX II

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

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

CHIEF MEDICAL DIRECTOR
Prof.D arlington E. Obaseki
E-mail: arlobaseki@gmail.com

DIRECTOR OF ADMINISTRATION
Jim Uwadie, Esq

CHAIRMAN
Prof. (Mrs.) Antoinette N. Ofili

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

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/170

PROPOSAL TITLE: "RADIOGRAPHIC EXAMINATIONS IN SELECTED HEALTH FACILITIES IN BENIN CITY: PATIENTS' PERCEPTION OF RADIOGRAPHY STUDENTS' PARTICIPATION"

PRINCIPAL INVESTIGATOR(S): OJODUMA PRECIOUS EMMUS

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

DATE CONSIDERED: AUGUST 6TH, 2025

DECISION OF THE COMMITTEE: APPROVED

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

REMARK:

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

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

SUPERVISOR (S): MRS OLAYIWOLA KEMISOLA

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.....