AN EXPLORATORY STUDY OF THE PATIENTS PERCEPTION OF COMFORT AND ANXIETY LEVELS DURING A COMPUTED TOMOGRAPHY (CT) PROCEDURE

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CERTIFICATION

This is to certify that this project work titled **An Exploratory Study of the Patient's Perception of Comfort and Anxiety Levels During a Computed Tomography (CT)** Procedure was carried out by **OSIAGOR FAVOUR CHINASA**, a student of the Department of Radiography, Faculty of Basic Medical Sciences, University of Benin, in partial fulfillment of the requirements for the award of the Bachelor of Radiography.

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DEDICATION

This project is dedicated to JEHOVAH GOD, the source of all wisdom and strength, for His unending love and guidance throughout my academic journey.

It is also dedicated to my beloved MOTHER and family, whose sacrifices, prayers, and encouragement have been my constant source of inspiration.

Lastly, I dedicate this work to all radiography students and professionals who continue to uphold compassion and patient-centered care in medical imaging.

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ABSTRACT

Patient-centered care is increasingly recognized as a critical determinant of quality in diagnostic imaging. Communication between radiographers and patients during computed tomography (CT) procedures plays a central role in shaping psychological responses, particularly in relation to comfort and anxiety. Despite its importance, limited evidence exists in the Nigerian context on how radiographer communication influences patient experience. This study therefore assessed the relationship between radiographer communication and patients' psychological responses during CT examinations. This descriptive cross-sectional survey employed a structured questionnaire to collect data from 97 patients undergoing CT procedures. A purposive sampling technique was used to recruit participants. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 27.0, employing descriptive statistics and Chi-square tests of association. Findings were presented in frequency tables, percentages, and statistical outputs at a significance level of $p < 0.05$. The findings revealed that 63.9% of respondents were first-time CT patients, with the majority reporting heightened anxiety before, during, and after the procedure. While 79.3% acknowledged that radiographers provided clear procedural explanations, only 63.9% felt their anxiety was reduced by the communication received. Chi-square analysis showed no statistically significant association between radiographer communication and psychological responses of comfort and anxiety ($\chi^2 = 9.394$, $df = 1$, $p = 0.659$). Although radiographer communication was effective in providing technical explanations, it was less effective in addressing patients' emotional needs. This underscores a training gap in therapeutic communication and psychological support within radiography practice. The study recommends integrating patient psychology, therapeutic communication, and anxiety management modules into radiography curricula, alongside continuing professional development programs. Healthcare facilities should prioritize staff-patient interaction

strategies as part of routine CT services to improve patient comfort, reduce anxiety, and enhance trust in diagnostic imaging.

Keywords: CT imaging, anxiety, comfort, communication, patient experience, diagnostic imaging.

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Computed Tomography (CT) has become one of the most indispensable diagnostic imaging modalities in modern medicine. CT scans use a combination of X-rays and computer processing to generate cross-sectional images of the body, providing detailed visualizations of internal organs, bones, blood vessels, and soft tissues. These capabilities make CT essential for diagnosing and monitoring a wide range of conditions such as trauma, cancer, stroke, cardiovascular diseases, and abdominal pathologies. Globally, the use of CT has increased significantly over the past two decades, driven by its diagnostic speed, accuracy, and the minimally invasive nature of the procedure (Itri, 2015).

Despite the clinical value of CT imaging, the patient experience during such procedures is often overlooked. Patients undergoing CT scans commonly report heightened levels of anxiety, uncertainty, and physical discomfort, which can arise from multiple sources: unfamiliarity with the equipment, fear of a serious diagnosis, fear of radiation exposure, feelings of claustrophobia, or poor communication with healthcare providers (Dewey, Schink, & Dewey, 2007; Bailey, 2012). High levels of anxiety can negatively impact not only the psychological well-being of the patient but also the quality of diagnostic outcomes. For instance, a highly anxious patient may move during the scan, leading to motion artifacts, repeat scans, and increased radiation dose (Lo Re et al., 2016).

As the emphasis in healthcare continues to shift toward patient-centered care, it is crucial to recognize and respond to the emotional and psychological needs of patients undergoing diagnostic imaging. Patient comfort and emotional security during medical procedures are

integral to both patient satisfaction and clinical effectiveness. The radiology department, often perceived as technologically focused and impersonal, must also adopt this holistic approach. Studies have shown that patient-centered radiology—emphasizing communication, empathy, and emotional support—can significantly reduce anxiety and improve the patient experience (Smith & Brown, 2014; Itri, 2015).

In the Nigerian healthcare context, the integration of patient-centered approaches in diagnostic imaging remains limited. While tertiary hospitals in Nigeria are increasingly equipped with CT technology, patient experiences are often shaped by broader systemic challenges such as understaffing, high patient volumes, lack of information dissemination, poor environmental conditions, and socioeconomic barriers to healthcare access. These factors can intensify patient anxiety and reduce comfort during procedures. Fatukasi et al. (2022) observed that patients undergoing radiological investigations in Nigerian hospitals often display elevated physiological and cognitive anxiety symptoms due to uncertainty, fear of equipment, and lack of interpersonal communication with medical staff.

Moreover, the cultural context within which Nigerian patients receive care also plays a role in shaping their perceptions and reactions. For instance, certain traditional beliefs about radiation, illness, and hospital settings may amplify anxiety. The lack of structured pre-procedural education, inadequate explanation of the scanning process, and the intimidating appearance of CT machines may all contribute to a negative emotional experience. Consequently, patients may feel alienated, fearful, or reluctant to return for future imaging, thus compromising ongoing treatment and follow-up.

Despite these realities, there remains a paucity of empirical studies exploring the patient's perception of comfort and anxiety during CT procedures in Nigeria. Most available literature focuses on technical efficacy, radiation dosage, and operational efficiency, with limited attention to the patient's voice. Existing studies from high-income countries cannot be directly generalized to the Nigerian context due to differences in infrastructure, healthcare delivery models, cultural expectations, and health literacy levels. Therefore, there is a pressing need for locally contextualised research that examines how Nigerian patients experience CT procedures, how they interpret comfort and anxiety, and what practical interventions could improve their experiences.

This study fill that gap by adopting an exploratory approach—collecting both qualitative and quantitative data to uncover the nuanced realities of patients' emotional and physical responses to CT procedures. It will focus on patients attending two tertiary hospitals in Nigeria, with an emphasis on identifying modifiable factors that can enhance patient comfort and reduce anxiety. This includes examining the role of communication by radiology staff, the physical CT environment, patient preparation practices, and institutional protocols.

Ultimately, this research aims to contribute to improving patient-centered radiologic care in Nigeria by offering evidence-based insights that can shape policy, staff training, and clinical workflows. Understanding patients' perspectives will not only enhance the quality of care but also build trust in radiology services, reduce repeat imaging, and support more positive health outcomes.

1.2 Research Gap

Computed Tomography (CT) has become an essential diagnostic imaging modality due to its speed, accuracy, and wide clinical application. Existing studies on CT imaging have largely focused on technical parameters such as radiation dose optimization, image quality, and diagnostic accuracy. While these aspects are crucial, they do not fully address the patient-centered experience, particularly issues related to comfort and anxiety during CT procedures.

Previous studies conducted internationally have acknowledged that patients undergoing advanced imaging procedures may experience anxiety due to factors such as fear of radiation exposure, unfamiliar equipment, confined spaces, and uncertainty about results. However, many of these studies were conducted in developed countries, using standardized anxiety scales that may not adequately reflect the sociocultural and healthcare context of Nigerian patients.

In Nigeria, available literature on CT imaging predominantly emphasizes technical performance and radiation safety, with limited empirical evidence focusing on patients' psychological experiences during imaging procedures. There is also a lack of studies that explore how environmental factors, radiographer–patient communication, and interpersonal care collectively influence patient comfort and anxiety levels during CT examinations.

Therefore, this study seeks to bridge this gap by exploring patients' perceptions of comfort and anxiety during CT procedures within a Nigerian tertiary healthcare setting. By focusing on the emotional and psychological dimensions of imaging care, this research provides context-specific evidence that can inform patient-centered radiography practices and improve overall quality of care.

1.3 Statement of the Problem

While CT imaging is routinely performed and considered relatively non-invasive, many patients report significant emotional distress during the procedure. Factors such as fear of radiation, anxiety about diagnostic results, unfamiliar surroundings, and lack of effective communication from radiographers contribute to heightened stress levels. These psychological factors can affect patient cooperation, procedural success, and overall satisfaction. In the Nigerian context, there is a paucity of research examining patient perceptions during CT examinations. This lack of evidence hinders the development of effective strategies to enhance patient comfort and reduce anxiety in radiologic settings.

1.4 Research Questions

1. What are the common emotional responses experienced by patients during CT procedures?
2. What factors influence patients' perceptions of comfort and anxiety during CT imaging?
3. How does communication with radiographers impact the emotional experience of patients?
4. What practical changes can improve patient comfort during CT examinations?

1.5 Research Hypothesis

Null Hypothesis (H_0): There is no significant relationship between communication, environmental, or procedural factors and patients' perceptions of comfort and anxiety during CT procedures.

Alternative Hypothesis (H_1): Communication, environmental, and procedural factors significantly influence patients' perceptions of comfort and anxiety during CT procedures.

1.6Aim and Objectives of the Study

1.6.1 Aim of Study

To explore patients' perceptions of comfort and anxiety levels during Computed Tomography (CT) procedures in selected Nigerian hospitals.

1.6.2 Objectives of the Study

1. To investigate the psychological responses of patients before, during, and after CT imaging.

2. To identify environmental, procedural, and interpersonal factors contributing to comfort or anxiety.

3. To evaluate the role of radiographer communication in managing patient anxiety.

1.7 Significance of the Study

This study has provided valuable insights into the emotional experiences of patients undergoing CT procedures. Findings will contribute to existing literature by addressing a gap in the Nigerian radiology context. The study aims to inform training programs, improve communication practices, and support the design of patient-friendly imaging environments. Ultimately, this research seeks to enhance patient satisfaction and procedural efficiency in diagnostic radiology

1.8 Scope of study

The study was limited to adult patients undergoing non-emergency CT scans in two selected NHS-affiliated hospitals. It does not include paediatric patients, emergency cases, or other imaging modalities such as MRI or ultrasound

1.9 Operational Definition of Terms

Computed Tomography (CT): A diagnostic imaging procedure using X-rays and computer processing to create cross-sectional images of the body.

Patient Comfort: The perceived physical and emotional ease experienced during medical procedures.

Anxiety: A state of apprehension or fear experienced in anticipation of a diagnostic procedure or its outcome.

Patient-Centred Care: A healthcare approach that respects and responds to individual patient preferences, needs, and values.

CHAPTER TWO

LITERATURE REVIEW

2. Conceptual Review

2.1 Concept of Patient-Centred Care in Radiology

Patient-centred care is a healthcare philosophy that prioritizes the individual needs, preferences, and values of patients during their care journey. In the context of radiology, this approach demands a more empathetic, communicative, and inclusive model that sees patients as partners in the imaging process rather than passive recipients of technical procedures (Hyde & Hardy, 2021). The traditional model of radiologic practice, which emphasizes speed, precision, and efficiency, is being reconsidered in light of growing evidence that emotional and psychological well-being directly influence patient outcomes.

Patient-centred care in radiology involves understanding patient expectations, providing clear and accessible information, ensuring physical and psychological comfort, and encouraging active involvement in decision-making. According to Itri (2015), adopting this model not only enhances patient satisfaction but also reduces repeat imaging and improves compliance. In settings where cultural and linguistic diversity is prevalent, patient-centred care also requires cultural sensitivity and appropriate communication techniques (Antwi et al., 2014). This shift challenges radiographers to integrate soft skills with technical competence, requiring training that bridges the interpersonal and clinical aspects of diagnostic imaging.

Pollard et al. (2019) found that patients who experienced supportive interactions with radiographers felt more at ease, trusted the process, and had more positive perceptions of the imaging experience. Consequently, embracing a patient-centred framework is not simply an

ethical imperative—it is also a practical strategy for improving outcomes and streamlining services.

2.1.2 Anxiety in Medical Imaging

Anxiety is among the most common psychological reactions to medical imaging, particularly with modalities like CT and MRI that are often associated with serious diagnoses. Dewey et al. (2007) revealed through a systematic review that anxiety in diagnostic imaging is frequently underreported and inadequately addressed in clinical practice.According to Dewey, Schink, and Dewey (2007), patients undergoing imaging procedures report higher anxiety levels than those awaiting other examinations

Factors such as fear of radiation exposure, concerns about the results, claustrophobia, and lack of procedural understanding contribute to elevated anxiety levels. Bailey (2012) identified that uncertainty about scan outcomes, discomfort during the procedure, and lack of communication are primary triggers of patient anxiety.

Heyer et al. (2015) emphasized that patients often internalize their anxiety due to the sterile and rushed nature of imaging environments, which leaves little room for emotional expression. Forshaw et al. (2018) showed that a significant number of outpatients reported heightened anxiety before undergoing imaging over 60% of outpatients, with anxiety levels directly associated with poor communication and inadequate preparatory information.Forshaw et al. (2018) further established that preparing for imaging reported raised anxiety, with younger patients and females more affected. The work of Fakes et al. (2024) further identified that this anxiety could persist post-procedure, suggesting long-term psychological impacts.

The assessment of anxiety in medical imaging often uses standardized tools such as the State-Trait Anxiety Inventory (STAI), developed by Spielberger (1983), which differentiates between situational anxiety and long-standing anxiety traits. Interventions to reduce anxiety include the use of multimedia information, relaxation techniques, music, and patient counselling (Munn & Jordan, 2012). Despite evidence supporting these interventions, they are rarely integrated into routine radiologic workflows, underscoring a gap between research and practice.

2.1.3 Patient Comfort and Environmental Design in Radiology

Comfort in diagnostic imaging refers to both physical and psychological ease. According to Krupinski (2011), environmental factors such as room temperature, noise levels, patient positioning, and lighting significantly influence comfort. Poor environmental design may lead to increased stress and difficulty remaining still during the scan, potentially affecting image quality. Smith and Brown (2014) emphasised the importance of a calming environment and warm interpersonal care in reducing imaging-related distress.

Moreover, the environmental design impacts radiographers as well. Quan et al. (2012) found that well-designed imaging spaces improved job satisfaction among staff, leading to better patient interactions and improved workflow efficiency. Thus, environmental comfort serves both patient-centred and institutional interests

2.1.4 Role of Radiographer Communication.

Hyde et al. (2018) found that preparatory communication is often insufficient, especially in high-volume clinics where efficiency is prioritized. Patients who receive little to no information about what to expect are more likely to experience anxiety, misinterpret sensations, and disengage from the process. Structured pre-procedure briefings, question-and-answer sessions, and visual aids have been shown to mitigate these effects and improve satisfaction.

Antwi et al. (2014) stressed the importance of multicultural communication, particularly in countries like Nigeria where patients may speak different languages or hold different beliefs about health. Poor communication in such contexts can lead to misinterpretation, non-compliance, and increased procedural failures. Training radiographers in cultural competence and patient communication is essential for equitable, effective care.

2.1.5 Computed Tomography: Clinical Importance and Patient Experience

Bailey (2012) found that patients frequently described CT imaging as impersonal and frightening, particularly when staff were perceived as rushed or indifferent. Krupinski (2011) highlighted the sensory stimuli—such as machine noise, movement, and confined space—that can be distressing to patients. Preparatory education, reassurance, and the presence of support personnel have all been recommended as strategies to offset these factors (Smith & Brown, 2014).

Munn and Jordan (2012) demonstrated that patients who received prior education and sensory orientation were more likely to complete imaging successfully without sedation or delays. The experience of CT, therefore, encompasses more than diagnostic accuracy; it includes the patient's emotional and psychological journey, which should be supported throughout.

2.1.6 Computed Tomography in Nigeria healthcare.

The Nigerian healthcare system is characterized by disparities in access, resource constraints, and a dual public-private service structure. CT imaging is increasingly available in tertiary and private hospitals, but affordability, machine downtime, and staffing limitations hinder its optimal use (Fatukasi et al., 2022).

In Nigeria, patients often arrive for imaging with minimal prior information due to poor referral communication or low health literacy. This gap leads to elevated anxiety, miscommunication, and dissatisfaction (Antwi et al., 2014). Moreover, sociocultural beliefs about radiation, disease, and Western medicine shape patient expectations and fears, often in ways that differ from assumptions made by healthcare providers.

Fatukasi et al. (2022) identified key factors contributing to patient anxiety in Nigerian imaging centres, including inadequate communication, long wait times, and perceptions of unfriendly staff. The authors recommended integrating culturally tailored educational interventions, better communication protocols, and staff training in empathy to improve patient experiences.

The need for locally relevant research is urgent. While many international studies have explored anxiety in medical imaging, few address the unique dynamics of low-resource, multicultural environments such as those found in Nigeria. Bridging this gap is essential for equitable healthcare delivery.

2.2 Empirical Review

The empirical body of research on patient comfort and anxiety during computed tomography (CT) procedures is substantial and has expanded significantly over the past two decades. This section synthesizes findings from key studies that have investigated various factors contributing to patient experiences, particularly those involving anxiety, comfort, environmental conditions, communication with radiographers, and cultural contexts.

Bailey (2012) conducted one of the foundational studies exploring patient anxiety during imaging studies, highlighting the psychological toll these procedures may impose. This study

revealed that anxiety often stems from both intrinsic factors (e.g., personal health beliefs) and extrinsic elements such as the CT environment, interactions with staff, and insufficient procedural information. Bailey emphasized the necessity of a structured, empathetic, and informative approach in radiologic services to alleviate patient anxiety.

In a systematic review, Dewey, Schink, and Dewey (2007) analyzed data from multiple diagnostic imaging studies and reported consistent findings of heightened anxiety levels across diverse patient populations. They noted that women and younger individuals reported greater anxiety, and that prior negative experiences and lack of information were significant predictors of distress. This review supported the integration of psychological assessments and patient-centered interventions into imaging protocols.

Fatukasi et al. (2022) contributed a significant Nigerian perspective to this domain. Their research, based in a Nigerian teaching hospital, examined physiological and cognitive responses of patients undergoing radiologic procedures. They found that anxiety was common and exacerbated by long waiting periods, poor communication, and perceived indifference from radiographers. Importantly, their study recommended targeted staff training, improved procedural explanations, and better appointment scheduling systems to improve patient experiences.

Forshaw et al. (2018) conducted a large-scale survey across multiple imaging departments to examine the prevalence and predictors of anxiety in outpatients awaiting diagnostic imaging. They reported that nearly 60% of patients experienced raised anxiety levels prior to their procedures. The study identified a strong correlation between pre-procedural anxiety and

patients' perception of inadequate information or support, reinforcing the need for comprehensive pre-examination counselling.

Fakes et al. (2024) extended this inquiry by exploring anxiety trajectories and predictors post-imaging. Their longitudinal data showed that anxiety does not always resolve after the procedure, particularly among patients who felt rushed or uninformed. This underscores the importance of follow-up interactions and reassurance even after the imaging procedure is completed.

Lo Re et al. (2016) conducted a comparative study examining anxiety levels across various imaging modalities, including CT, MRI, and X-rays. They discovered that CT procedures elicited moderate anxiety levels, which were significantly higher when patients perceived the scan as critical to diagnosing life-threatening conditions. This perception was influenced by minimal pre-examination communication and unfamiliarity with the equipment and procedure.

Heyer et al. (2015) investigated CT-specific anxiety and confirmed that the lack of procedural transparency and poor patient preparation were critical factors. Their study employed anxiety rating scales pre- and post-imaging and demonstrated significant reductions in anxiety when patients were provided with detailed information and given time to ask questions before their scans.

Hyde et al. (2018) conducted a cross-sectional study analyzing the provision of preparatory information to CT and MRI outpatients. Their results indicated that many patients did not receive sufficient preparatory guidance, which significantly correlated with increased anxiety.

They proposed that radiology departments adopt standardized preparatory protocols that ensure every patient receives appropriate verbal and written information.

Pollard et al. (2019) conducted qualitative interviews and surveys to assess patient perceptions of communication in diagnostic radiography. Their data revealed that patients frequently encountered vague or hurried interactions with radiographers, which diminished their trust and comfort. Clear, empathetic, and culturally sensitive communication was associated with reduced anxiety and improved compliance.

Antwi, Kyei, and Quarcoopome (2014) addressed multicultural communication in radiology and how it affects imaging outcomes. Their research, conducted in Ghana, found that language barriers and cultural mismatches between radiographers and patients often led to confusion, procedural delays, and increased anxiety. The study recommended integrating multicultural training into radiographer education to bridge these gaps.

Quan, Joseph, and Ensign (2012) assessed how imaging room environments affect patient and staff experiences. They found that patients exposed to calming, well-lit, and clean environments were more satisfied and less anxious. Moreover, staff working in such environments reported less job-related stress, which further enhanced patient-staff interactions. These findings suggest that environmental design should be considered a clinical tool in reducing patient anxiety.

Flory and Lang (2011) focused on emotional distress experienced by patients in radiology waiting areas. Their study revealed that noise, long wait times, overcrowding, and lack of staff communication all contributed to heightened anxiety levels before imaging procedures.

They recommended architectural and administrative improvements such as better queue management and creating quiet zones to alleviate waiting room distress.

Munn and Jordan (2012) evaluated the effectiveness of interventions such as educational materials, music therapy, and sedation in reducing patient anxiety during high-technology imaging procedures. Their systematic review concluded that while sedation was effective, non-pharmacological approaches like patient education and environmental improvements offered significant benefits without associated risks or costs.

Krupinski (2011) emphasized the importance of perceptual and cognitive factors in medical imaging. She argued that patients' perceptions of CT imaging are shaped not just by physical experience but also by their prior knowledge, cultural beliefs, and interactions with healthcare providers. This holistic view suggests that improving perception through education and empathy can significantly reduce anxiety and discomfort.

Smith and Brown (2014) evaluated patient comfort and anxiety reduction strategies in diagnostic imaging. Their study found that practical interventions such as playing calming music, explaining procedures step-by-step, and minimizing patient wait times had a direct positive impact on the patient experience.

Taken together, these empirical studies clearly show that anxiety and discomfort during CT procedures are multifactorial and influenced by both modifiable (communication, environment, preparation) and non-modifiable (age, gender, prior experiences) factors. Interventions that target modifiable factors—such as improving staff communication, providing preparatory materials, enhancing the physical environment, and adopting culturally

responsive care—can substantially improve patient outcomes and satisfaction in radiologic services.

These findings emphasize the urgent need for healthcare institutions, especially in resource-constrained settings like Nigeria, to adopt comprehensive, evidence-based strategies that are tailored to their patient populations. Continuous education for radiographers, infrastructural investments, and procedural transparency are critical to transforming the patient experience in diagnostic imaging.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Setting.

This study was conducted in two hospitals in Nigeria with functional CT facilities. University of Benin Teaching hospital and Raytouch diagnostic hospital. These hospitals were selected based on accessibility, high patient volume, and availability of non-emergency CT imaging services. The selected settings provide a rich and practical environment for assessing patients' experiences of comfort and anxiety in CT procedures under routine clinical conditions.

3.2 Research Design

This study adopts an exploratory methods research design, incorporating quantitative approaches. This design is appropriate for gaining a comprehensive understanding of patient perceptions and experiences, particularly in areas where limited prior research exists. The quantitative component helps identify trends and measure the prevalence of anxiety and comfort levels using structured questionnaires.

3.3 Target Population

The target population consists of adult patients (aged 18 years and above) who have recently undergone non-emergency CT procedures at the selected hospitals. Patients included must be mentally capable of responding to interview or survey questions and must consent to participate in the study. Emergency cases, paediatric patients, and those under sedation or with cognitive impairments will be excluded.

3.4 Sampling Technique and Sample Size

This study adopts a Quantitative sampling approach to effectively accommodate the components of the exploratory research design.

Quantitative Sampling Technique and Size

For the quantitative component, a stratified random sampling technique was used. Patients who meet the inclusion criteria was stratified based on relevant variables such as age group, gender, and type of CT scan (e.g., head, chest, abdomen). Within each stratum, participants were randomly selected to ensure proportional representation and to enhance the generalisability of the findings.

Within each stratum, participants were selected using simple random sampling. Eligible patients who met the inclusion criteria and consented to participate were assigned numbers, and random selection was performed to choose respondents for questionnaire administration. This process ensured that every eligible patient had an equal chance of being selected while maintaining representativeness across strata.

The quantitative sample size was determined using Cochran's formula for sample size calculation in large or unknown populations. However, due to resource constraints and the exploratory nature of the study, a minimum of 100 respondents will be targeted. This ensures adequate statistical power for descriptive analysis and basic inferential statistics.

Quantitative Sampling Technique and Size

For the quantitative component, a stratified random sampling technique was used. Patients who meet the inclusion criteria were stratified based on relevant variables such as age group, gender, and type of CT scan (e.g., head, chest, abdomen). Within each stratum, participants will be randomly selected to ensure proportional representation and to enhance the generalisability of the findings.

The sample size was initially considered using Cochran's formula for unknown populations:

$n_0 = (Z^2 \times p \times (1 - p)) / e^2$

Where:

Z = 1.96 (for 95% confidence level)

p = 0.5 (maximum variability)

e = 0.05 (margin of error)

$n_0 = (1.96^2 \times 0.5 \times 0.5) / (0.05^2) = (3.8416 \times 0.25) / 0.0025 = 384.16$

However, given the exploratory nature of this study and logistical constraints, a reduced sample size of **100 participants** was targeted. This is deemed sufficient for identifying trends, estimating proportions, and generating preliminary insights. This approach aligns with best practices in exploratory health research conducted in resource-limited settings. While Cochran's formula suggests a larger sample size for full generalisability, 100 is considered adequate for identifying trends, estimating proportions, and generating preliminary data. This approach aligns with exploratory research standards in resource-constrained environments and provides a foundation for future, larger-scale studies.

This sampling strategy ensures that the study gathers broad quantitative data, allowing for a comprehensive understanding of patient comfort and anxiety during CT procedures. It also

enhances the credibility and transferability of the findings by incorporating multiple perspectives and data sources.

3.5 Instrument of Data Collection

The study used a structured questionnaire for the quantitative component.

The structured questionnaire includes closed-ended questions using Likert scales to measure perceived levels of comfort and anxiety, along with demographic variables. Items will be adapted from established tools such as the State-Trait Anxiety Inventory (STAI) and reviewed for contextual appropriateness.

The questionnaire comprised four sections:

Section A: Socio-demographic characteristics of respondents

Section B: Patients' psychological responses and anxiety-related feelings before and during the CT procedure

Section C: Environmental and procedural factors influencing comfort

Section D: Radiographer communication and interpersonal care

The instrument was subjected to expert review and pilot testing to ensure clarity, relevance, and validity.

Sample Questionnaire Items

Examples of questionnaire items included:

"I felt anxious before entering the CT scan room."

"The CT environment (lighting, cleanliness, temperature) made me feel comfortable."

"The radiographer clearly explained the procedure before the scan."

"The communication from the radiographer helped reduce my anxiety."

3.6 Validity of Instrument

Content validity of the instruments was ensured through expert review by professionals in radiology and medical psychology. Feedback from pilot testing will be incorporated to refine the tools for clarity, relevance, and cultural sensitivity.

3.7 Reliability of Instrument

To ensure reliability, a pilot test will be conducted involving 5 participants who meet the inclusion criteria but are not part of the main study. This will help identify ambiguous questions and assess internal consistency using Cronbach's alpha for the quantitative instrument.

3.8 Method of Data Collection

Data was collected through structured self-administered or interviewer-assisted questionnaires, depending on the literacy level of the participants.

3.9 Method of Data Analysis

Quantitative data was analysed using SPSS software. Descriptive statistics (mean, frequency, standard deviation) will be used to summarise the data, and inferential statistics (e.g., chi-square test, t-test) will be used to explore relationships between variables such as patient characteristics and levels of anxiety.

3.10 Ethical Considerations

Ethical approval was obtained from the Research Ethics Committees of the participating hospitals. Confidentiality and anonymity was strictly upheld by assigning codes to participants and securing all data in password-protected devices. Participation was entirely voluntary, with the right to withdraw at any stage without penalty.

CHAPTER FOUR

PRESENTATION AND DISCUSSION

This chapter discusses the representation of data collected from respondents on Patient's Perception of Comfort and Anxiety Levels During a Computed Tomography (CT) Procedure, And The major findings of the research compared with the literature reviewed, the implication for radiography, and summary.

4.1: Presentation

A total of 100 questionnaires were distributed to the patient at the clinic, of which 97 were properly filled and valid for data analysis, resulting in a response rate of 97%.

Table 4.1.1: Socio-demographic characteristics of respondents[1]

Variable	Frequency (n = 120)	Percent (%)
Age		
18–29	12	12.4
30–39	18	18.6
40–49	20	20.6
50–59	23	23.7
60 and above	24	24.7
Gender		
Male	48	49.5
Female	49	50.5
Marital status		
Single	21	21.6
Married	58	59.8
Widowed	9	9.3
Divorced/seperated	9	9.3
Level of Education		
No formal education	7	7.2
Primary	15	15.5
Secondary	28	28.9
Tertiary	32	33.0
Postgraduate	15	22.7
Occupation		
Employed	30	30.9
Self-employed	22	22.7
Unemployed	15	15.5

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Retired	18	18.6
Student	12	12.4
Previous Experience with CT scan		
Yes	35	36.1
No	62	63.9
Reason for Current CT scan		
Diagnostic investigation	68	70.1
Follow-up examination	20	20.6
Other	9	9.3
Accompanied by a Family Member or Friend Today?		
Yes	54	55.7
No	43	44.3

Presents the socio-demographic characteristics of the respondents. The study involved 97 respondents who underwent CT procedures. The majority were middle-aged and older adults, with 23.7% aged 50–59 years and 24.7% aged 60 years and above. Younger age groups were less represented, with only 12.4% aged 18–29 years. Gender distribution was nearly equal, comprising 49.5% males and 50.5% females. Most participants were married (59.8%), while 21.6% were single, and smaller proportions were widowed (9.3%) or divorced/separated (9.3%). In terms of educational attainment, 33% had tertiary education and 28.9% had completed secondary or high school, while only 7.2% had no formal education. Employment status varied: 30.9% were employed, 22.7% self-employed, 18.6% retired, 15.5% unemployed, and 12.4% were students. More than half (63.9%) had no prior experience with CT scans, while 36.1% had undergone the procedure before. The main reason for undergoing CT was diagnostic investigation (70.1%), followed by follow-up examinations (20.6%) and other reasons (9.3%). Slightly more than half (55.7%) of the respondents were accompanied by a family member or friend, while 44.3% attended alone.

Research question 1: Emotional response

Table 4.1.2: Emotional Responses of Patients Before, During, and after CT Imaging

Items	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Remark
I felt anxious before entering the CT room.	38 (39.2)	32 (33.0)	17 (17.5)	10 (10.3)	3.0	Positive
I had concerns about the procedure (noise, radiation, results).	41 (42.3)	29 (29.9)	19 (19.6)	8 (8.2)	3.1	Positive
I felt well-prepared for what to expect during the scan.	25 (25.8)	42 (43.3)	21 (21.6)	9 (9.3)	2.9	Positive
I felt calm while lying inside the CT scanner.	19 (19.6)	31 (32.0)	30 (30.9)	17 (17.5)	2.5	Positive
I felt anxious because of the noise/machine movement.	28 (28.9)	27 (27.8)	25 (25.8)	17 (17.5)	2.7	Positive
I was physically comfortable during the procedure.	31 (32.0)	39 (40.2)	18 (18.6)	9 (9.3)	3.0	Positive
I felt reassured by the presence of the radiographer.	34 (35.1)	40 (41.2)	15 (15.5)	8 (8.2)	3.0	Positive
I felt relieved once the procedure was completed.	46 (47.4)	30 (30.9)	15 (15.5)	6 (6.2)	3.3	Positive
I still feel anxious while waiting for the results.	36 (37.1)	28 (28.9)	24 (24.7)	5 (5.2)	2.8	Positive
Overall, I felt comfortable throughout the procedure.	29 (29.9)	37 (38.1)	21 (21.6)	10 (10.3)	2.9	Positive
				Grand mean	**2.9**	**Positive**

Mean cut of =2.5

Table 4.2 shows the psychological responses of patients before, during, and after CT imaging. The result indicates that patients generally experienced positive psychological responses across all assessed items. Patients expressed the highest positive response in feeling relieved once the procedure was completed (mean = 3.3), indicating that the end of

the scan brought significant emotional comfort. This was followed by concerns about the procedure (mean = 3.1) and feelings of being physically comfortable (mean = 3.0), as well as reassurance from the presence of the radiographer (mean = 3.0). These findings suggest that patients valued professional support and physical comfort during the scan. Moderate positive responses were also observed in pre-procedure anxiety (mean = 3.0) and a sense of being well-prepared for the scan (mean = 2.9). However, relatively lower mean scores were recorded for calmness while lying inside the CT scanner (mean = 2.5) and anxiety due to machine noise and movement (mean = 2.7), reflecting mild discomfort during the actual scanning phase. A mean of 2.8 was observed for anxiety while waiting for results, indicating lingering concern after the procedure. Overall, the grand mean of 2.9, which is above the mean cut-off of 2.5, indicates that patients demonstrated positive psychological adaptation before, during, and after the CT imaging procedure.

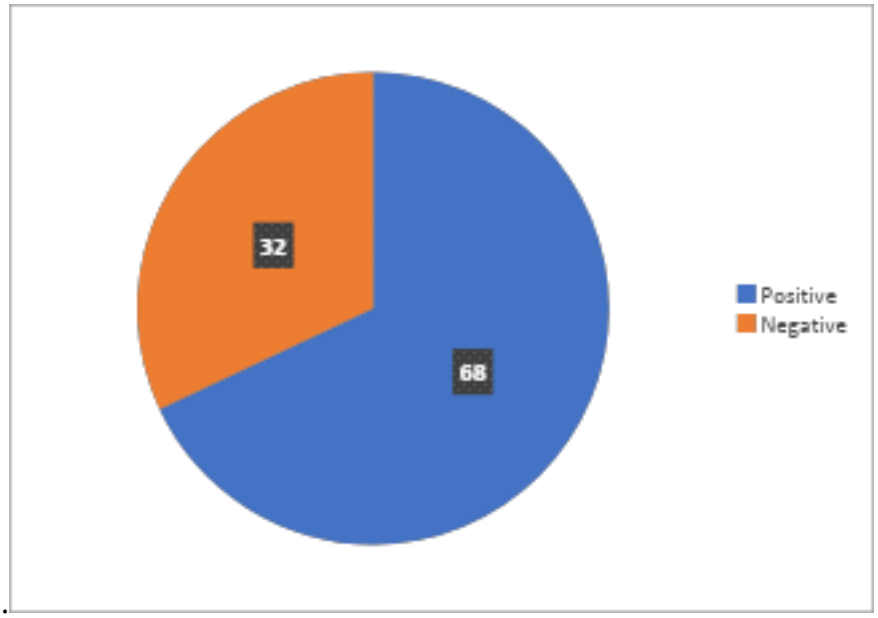

Figure 4.1.2: Emotional Responses of Patients Before, During, and after CT Imaging

The pie chart indicates that 66 (68%) possess Positive response towards CT Imaging, while 31 (32%) have Negative response.

Research Question 2: Factors influencing comfort and anxiety

What are environmental, procedural, and interpersonal factors contributing to comfort or anxiety?

Table 4.1.3: Factors Contributing to Comfort or Anxiety

Items	Strongly agree	Agree	Disagree	Strongly disagree	Mean	Remark
The waiting area was comfortable and reduced my stress.	27 (27.8)	39 (40.2)	21 (21.6)	10 (10.3)	2.86	Influencing
The CT room environment (lighting, cleanliness, temperature) helped me feel at ease.	35 (36.1)	38 (39.2)	15 (15.5)	9 (9.3)	3.02	Influencing
The noise from the machine increased my anxiety.	29 (29.9)	26 (26.8)	24 (24.7)	18 (18.6)	2.68	Influencing
The length of the scan affected my comfort.	22 (22.7)	28 (28.9)	30 (30.9)	17 (17.5)	2.57	Influencing
The positioning required for the scan caused discomfort.	25 (25.8)	27 (27.8)	28 (28.9)	17 (17.5)	2.62	Influencing
I felt restrained or confined during the procedure.	21 (21.6)	23 (23.7)	31 (32.0)	22 (22.7)	2.44	Non-influencing
The radiographer was approachable and supportive.	37 (38.1)	40 (41.2)	12 (12.4)	8 (8.2)	3.09	Influencing
I felt respected and treated with dignity.	39 (40.2)	41 (42.3)	10 (10.3)	7 (7.2)	3.15	Influencing
Overall, I felt comfortable throughout the procedure.	30 (30.9)	38 (39.2)	19 (19.6)	10 (10.3)	2.91	Influencing
				Grand Mean =2.82		Influencing

Mean cutoff = 2.5

Table 4.1.3 presents the factors contributing to patients' comfort or anxiety during CT imaging. The results indicate that patients generally reported positive influencing factors across the assessed items. The strongest positive response was observed in feeling respected and treated with dignity (mean = 3.15), highlighting the importance of patient-centered care. This was followed by the perception that the radiographer was approachable and supportive (mean = 3.09) and that the CT room environment, including lighting, cleanliness, and temperature, helped patients feel at ease (mean = 3.02). Other notable contributors included an overall sense of comfort throughout the procedure (mean = 2.91) and the waiting area being conducive to reducing stress (mean = 2.86). On the other hand, factors that increased anxiety or reduced comfort were machine noise (mean = 2.68), discomfort from scan positioning (mean = 2.62), and the duration of the scan (mean = 2.57). The lowest mean score was recorded for the feeling of being restrained or confined during the procedure (mean = 2.44), suggesting this was the least common source of discomfort. Overall, the grand mean of 2.82, which is above the mean cut-off of 2.5, indicates that patients experienced notable influencing factors related to comfort and anxiety, with professional respect, supportive interaction, and environmental conditions playing the most significant positive roles.

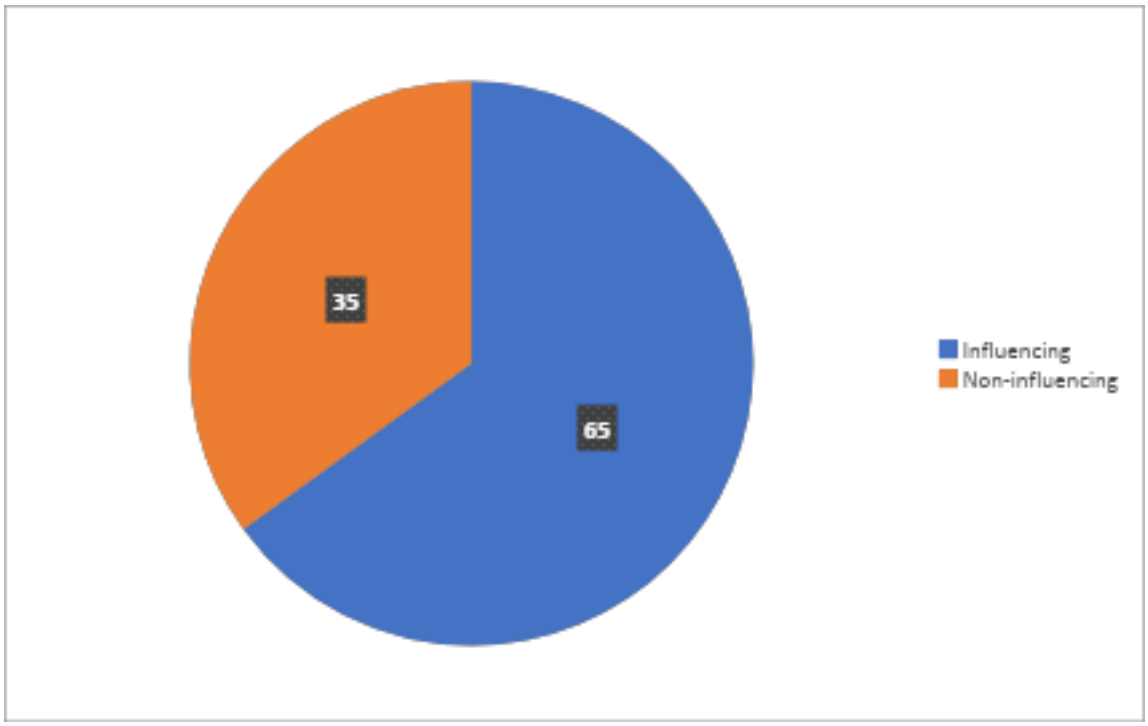

Figure 4.1.3: Factors Contributing to Comfort or Anxiety

The pie chart indicates that 63 (65%) possess Influencing factors towards comfort or anxiety, while 34 (35%) have non-influencing factor.

Research Question 3

What is the role of radiographer communication in managing patient anxiety?

Table 4.1.4: Role of Radiographer Communication in Managing Patient Anxiety.

Items	Strongly agree	Agree	Disagree	Strongly disagree	Mean	Remark
The radiographer explained the procedure clearly.	37 (38.1)	40 (41.2)	12 (12.4%)	8 (8.2%)	3.09	Positive
The instructions given during the scan were easy to follow.	35 (36.1)	39 (40.2)	14 (14.4%)	9 (9.3%)	3.03	Positive
The radiographer's communication reduced my anxiety.	30 (30.9)	32 (33.0)	20 (20.6%)	15 (15.5%)	2.75	Positive
I felt reassured because the radiographer kept me informed.	28 (28.9)	31 (32.0)	23 (23.7%)	15 (15.5%)	2.72	Positive
I would feel comfortable undergoing another CT scan if needed.	26 (26.8)	28 (28.9)	25 (25.8%)	18 (18.6%)	2.64	Positive
				Grand Mean =2.85		**Positive**

Mean cutoff = 2.5

Table 4.4 illustrates the role of radiographer communication in managing patient anxiety during CT imaging. The findings reveal that patients generally reported positive attitudes across all assessed items. The highest mean score was recorded for the item stating that the radiographer explained the procedure clearly (mean = 3.09), emphasizing the importance of clear pre-scan communication. This was followed by patients agreeing that the instructions provided during the scan were easy to follow (mean = 3.03), which likely contributed to a smoother experience. Moderate positive attitudes were observed in items related to the radiographer's communication helping to reduce anxiety (mean = 2.75) and providing

reassurance by keeping patients informed throughout the procedure (mean = 2.72). The lowest mean score was noted for willingness to undergo another CT scan if needed (mean = 2.64), suggesting some lingering hesitation despite the overall supportive communication. Overall, the grand mean of 2.85, which is above the mean cut-off of 2.5, indicates that patients demonstrated positive psychological adaptation supported by effective radiographer communication, underscoring its role in managing anxiety before and during CT imaging.

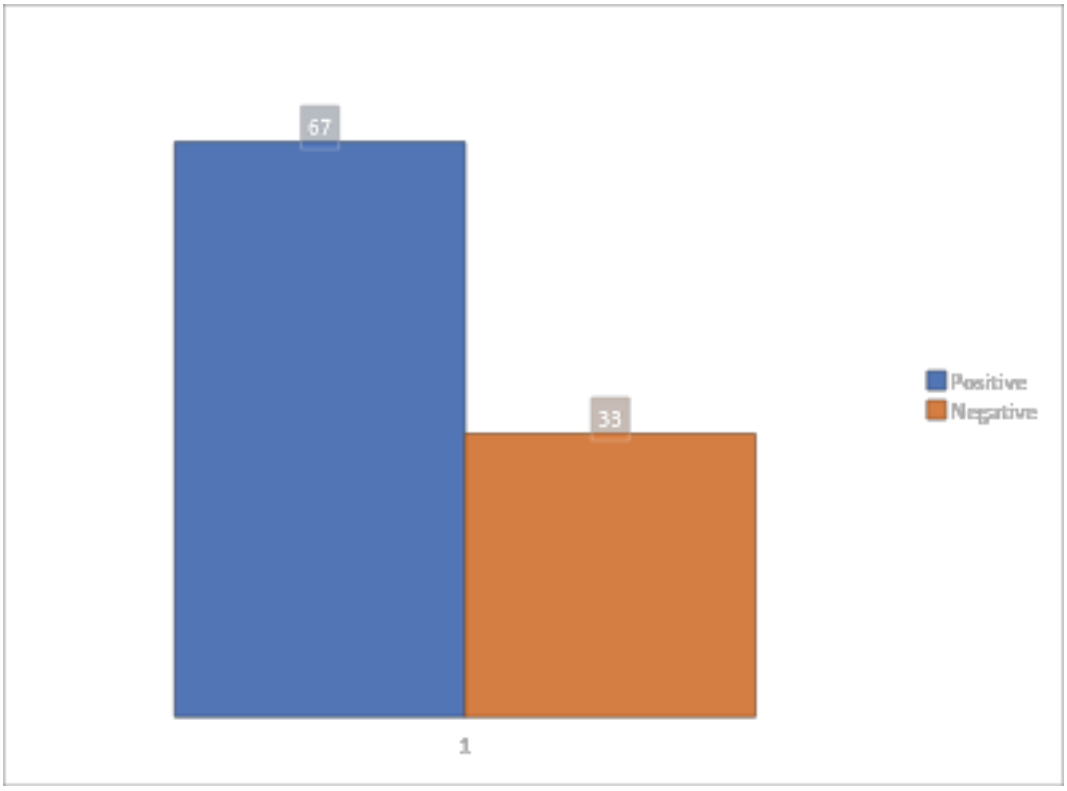

Figure 4.4: Role of Radiographer Communication in Managing Patient Anxiety.

The pie chart indicates that 65 (67%) possess Positive attitude towards the role of a radiographer, while 32 (33%) have Negative attitude.

4.1.5 Hypothesis Testing

There is no significant difference between the Role of Radiographer Communication and patients' psychological responses of comfort and anxiety during CT procedures

Table 4.1.5: Chi-square Test of association between Role of Radiographer Communication and patients' psychological responses of comfort and anxiety during CT procedures

Role of Radiographer Communication	Patients' psychological responses		Test Statistics (χ^2)	df	P value	Decision
	Positive	**Negative**				
Positive	43 (44.3%)	15 (15.5%)	9.394	1	0.659	Fail to reject H_0
Negative	25 (25.8%)	14 (14.4%)				

Table 4.5 presents the Chi-square test of association between the role of radiographer communication and patients' psychological responses of comfort and anxiety during CT procedures. Out of the 97 participants, 43 (44.3%) who experienced positive communication from radiographers also reported positive psychological responses, while 15 (15.5%) indicated negative responses. Similarly, among patients who perceived negative communication, 25 (25.8%) still reported positive psychological responses, whereas 14 (14.4%) reported negative responses. The Chi-square statistic yielded a value of $\chi^2 = 9.394$ with 1 degree of freedom and a p-value of 0.659. Since the p-value is greater than the 0.05 level of significance, the null hypothesis was not rejected. This result suggests that there is no statistically significant association between radiographer communication and patients' psychological responses of comfort and anxiety during CT procedures.

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4.2 Discussion of Major Findings

4.2.1 Socio-demographic

The study assessed Patient's Perception of Comfort and Anxiety Levels During a Computed Tomography (CT) Procedure in University of Benin Teaching Hospital, Benin City. The socio-demographic profile of the 97 respondents reveals several noteworthy patterns that align with established literature on healthcare utilization and medical imaging access. The age distribution demonstrates a clear trend toward older populations accessing CT scan services, with participants aged 50 and above comprising nearly half (48.4%) of the sample. This finding is consistent with epidemiological studies showing increased healthcare needs and diagnostic imaging utilization among older adults due to higher prevalence of chronic conditions and age-related pathologies.

The gender distribution was remarkably balanced, with females representing 50.5% and males 49.5% of the sample, suggesting equitable access to CT imaging services across gender lines. This balanced representation contrasts with some healthcare studies that have documented gender disparities in medical imaging access, particularly in resource-limited settings. The current findings may reflect improved healthcare equity or could be specific to the study setting and population characteristics.

Regarding marital status, married individuals constituted the majority (59.8%), which is consistent with demographic patterns in many populations and may reflect the supportive role of spouses in healthcare decision-making and treatment adherence. The presence of social support, as evidenced by 55.7% of respondents being accompanied by family members or friends, underscores the importance of social networks in healthcare experiences, a factor frequently highlighted in patient experience research.

Educational attainment showed a relatively high level, with 55.7% having tertiary or postgraduate education. This finding differs from some studies conducted in similar healthcare settings where lower educational levels are more prevalent. The higher educational profile may influence health literacy, treatment compliance, and overall healthcare experiences, as supported by numerous studies linking education to health outcomes and healthcare utilization patterns.

The employment status distribution, with 53.6% being employed or self-employed, indicates a predominantly active working population accessing these services. This has implications for scheduling, wait times, and service delivery preferences, as working individuals may prioritize efficiency and convenience in healthcare encounters.

Perhaps most significantly, 63.9% of respondents had no previous CT scan experience, indicating a substantial proportion of first-time users. This finding has important implications for patient education, anxiety management, and service delivery protocols. Research consistently shows that first-time medical imaging patients experience higher anxiety levels and require more comprehensive information and support compared to those with previous experience.

The predominance of diagnostic investigations (70.1%) over follow-up examinations (20.6%) reflects the primary role of CT scanning in initial diagnostic workups rather than routine monitoring. This pattern aligns with clinical practice guidelines and healthcare resource allocation strategies that emphasize the diagnostic value of advanced imaging technologies.

These demographic characteristics collectively suggest a diverse patient population with varying needs, experiences, and expectations regarding CT scan services. The findings provide important context for understanding subsequent results related to patient experiences, satisfaction levels, and factors influencing healthcare outcomes in this setting.

4.2.2 The Emotional Responses of Patients Before, During, and After CT Imaging.

The finding shows that 68% of respondents reported positive emotional responses, while 32% reported negative experiences before, during, and after CT imaging. This overall positive rate is higher than reported in several empirical studies, where anxiety prevalence tends to be greater. For instance, Forshaw et al. (2018) found that nearly 60% of patients experienced elevated pre-imaging anxiety, and Dewey and Dewey (2007) documented consistently high anxiety across diverse populations. The more optimistic results in the present study may reflect cultural and contextual differences, technological improvements, or the relatively high educational attainment of the respondents. The grand mean score of 2.90 (above the 2.5 cutoff) indicates generally favorable psychological outcomes, though important variations were observed across different stages of the CT process. Pre-procedural anxiety was pronounced, with 72.2% reporting nervousness before entering the CT room (mean = 3.01) and similar levels expressing concern over noise, radiation, and possible results (mean = 3.06). These findings align with Bailey (2012), who highlighted health beliefs and procedural uncertainty as major anxiety triggers, and with Hyde et al. (2018), who noted that inadequate preparation significantly heightened patient anxiety. In this study, only 69.1% felt well-prepared (mean = 2.86), suggesting the need for stronger patient education protocols.

During the scan, anxiety persisted. Just over half (51.6%) reported feeling calm inside the scanner (mean = 2.54), echoing Lo Re et al. (2016), who observed moderate anxiety during scanning, particularly when diagnostic stakes were perceived as high. Concerns about machine noise and movement scored moderately (mean = 2.68), supporting Quan et al. (2012), who argued that while environmental factors matter, they are not the sole determinants of patient experience. Physical comfort, however, scored positively (mean = 2.95), with 72.2% reporting comfort, reflecting advances in CT equipment and positioning

practices compared to earlier studies. The role of radiographer communication was especially noteworthy: 76.3% felt reassured by staff presence (mean = 3.03), corroborating Pollard et al. (2019), who emphasized empathetic communication as central to reducing anxiety, and Fatukasi et al. (2022), who identified staff-patient interactions as critical in Nigerian contexts. Post-procedural responses were largely positive, with relief scoring the highest (mean = 3.27), reported by 78.3% of patients. However, anxiety did not end with the scan—65.9% remained anxious while awaiting results (mean = 2.75). This finding supports Fakes et al. (2024), who observed that patient anxiety often extends beyond the procedure itself when result communication is delayed or unclear. The results indicate that while most patients experienced positive psychological responses, pre-procedural anxiety and post-scan result-related anxiety remain critical areas for improvement. The comparatively lower anxiety prevalence observed here may be partly explained by the study's demographic profile, particularly the older, more educated population, who may demonstrate greater resilience and acceptance of medical procedures than younger cohorts documented in other studies (Dewey & Dewey, 2007).

4.2.3 Environmental, Procedural, and Interpersonal Factors Contributing to Comfort or Anxiety.

The analysis revealed that 65% of respondents identified specific factors influencing their comfort or anxiety during CT imaging, while 35% reported no major influences. With a grand mean score of 2.82 (above the 2.5 cutoff), the results confirm that environmental, procedural, and interpersonal factors all play meaningful roles in shaping patient experiences. Environmental influences were prominent. The CT room environment was the strongest environmental factor, with 75.3% of patients noting that lighting, cleanliness, and temperature helped them feel at ease (mean = 3.02). This finding supports Quan, Joseph, and Ensign (2012), who demonstrated that calm, clean, and well-designed environments reduce

anxiety and improve satisfaction, positioning environmental design as a clinical tool for anxiety management. Waiting area comfort also had a moderate impact (mean = 2.86), endorsed by 68% of respondents, aligning with Flory and Lang (2011), who highlighted waiting room conditions as critical in shaping pre-procedural anxiety.

Acoustic and procedural elements had mixed effects. Machine noise provoked anxiety in 56.7% of patients (mean = 2.68), consistent with earlier studies that identified noise as a stressor, though the moderate score suggests technological improvements or effective pre-procedural counseling may have reduced its impact. Scan duration (mean = 2.57) and positioning discomfort (mean = 2.62) were also reported by around half of respondents, reinforcing research that procedural efficiency and positioning strategies can affect satisfaction. Feelings of confinement, however, scored below the cutoff (mean = 2.44), with only 45.3% reporting confinement-related distress—contrasting earlier studies on claustrophobia. This may reflect advances in scanner design and improved preparation protocols. Interpersonal factors emerged as the strongest positive influences. Radiographer approachability and supportiveness were endorsed by 79.3% of patients (mean = 3.09), confirming Pollard et al. (2019), who stressed that empathetic, clear communication lowers anxiety and enhances compliance. Even more striking, 82.5% of respondents reported feeling respected and treated with dignity (mean = 3.15), the highest score recorded. This aligns with Fatukasi et al. (2022), who identified staff-patient interaction and respectful treatment as critical for reducing anxiety in Nigerian healthcare contexts.

Notably, while Quan et al. (2012) emphasized the value of environmental interventions, the present findings suggest that interpersonal dynamics may exert even greater influence on patient experience. This supports Krupinski's (2011) argument that healthcare interactions shape perceptions as strongly as physical environments. Furthermore, the moderate role of acoustic stressors aligns with Smith and Brown (2014), who concluded that while

interventions like music therapy are beneficial, comprehensive strategies addressing multiple factors simultaneously are most effective. The results highlight the predominance of interpersonal communication and dignity in shaping positive experiences, while environmental and procedural factors—though relevant—play a secondary role. These findings suggest that enhancing staff-patient interactions may yield the greatest improvements in patient comfort and anxiety management during CT imaging.

4.2.4 The Role of Radiographer Communication in Managing Patient Anxiety.

The evaluation of radiographer communication effectiveness revealed predominantly positive outcomes, with 67% of respondents reporting favorable experiences and 33% indicating negative ones. The grand mean of 2.85, above the 2.5 cutoff, suggests that radiographer communication generally functions as an effective anxiety management tool, though variations exist across communication dimensions. These findings contrast with Pollard et al. (2019) and Fatukasi et al. (2022), who highlighted frequent communication deficiencies in diagnostic imaging, indicating that improvements may have been achieved in this context. Procedural explanation emerged as the strongest dimension, with 79.3% of patients affirming that radiographers explained procedures clearly (mean = 3.09). This supports Bailey (2012), who emphasized structured explanations as essential in radiologic care, and aligns with Hyde et al. (2018), who identified poor preparatory guidance as a major predictor of heightened anxiety. The high score also reflects the effective application of Heyer et al.'s (2015) recommendations for comprehensive pre-procedural information delivery. Nonetheless, nearly one-fifth of patients still rated explanations as inadequate, suggesting the need for further standardization of communication protocols.

Intra-procedural instructions were similarly well-rated, with 76.3% of patients finding them clear and easy to follow (mean = 3.03). This result affirms Pollard et al.'s (2019) emphasis on empathetic, clear guidance during imaging procedures and contrasts with Antwi, Kyei, and

Quarcoopome (2014), who reported language and cultural barriers as sources of confusion in radiology. The findings suggest that communication strategies in this setting may be mitigating such challenges. The direct anxiety-reducing effect of radiographer communication received more moderate endorsement. While 63.9% of patients agreed that communication helped reduce their anxiety (mean = 2.75), this was the lowest score among communication items. This reflects Munn and Jordan's (2012) findings that effective anxiety reduction requires more than information transfer; emotional reassurance and environmental support are equally important. Similarly, only 60.9% felt continuously reassured throughout the scan (mean = 2.72), echoing Fakes et al. (2024), who demonstrated that patient anxiety often persists when communication lapses occur during procedural transitions.

The willingness to undergo future CT scans provided a further test of communication impact. Just 55.7% expressed comfort with future imaging (mean = 2.64), indicating that while communication is effective within the immediate procedural context, it does not fully address broader anxieties about diagnostic imaging. This supports Dewey and Dewey's (2007) review, which showed that prior healthcare experiences and intrinsic health beliefs significantly shape willingness for future imaging. Overall, radiographer communication was effective in conveying information and providing procedural clarity, but less effective in alleviating deeper psychological anxiety and shaping long-term attitudes toward imaging. This reflects Krupinski's (2011) holistic model, which argues that communication must be integrated with cultural sensitivity, emotional support, and patient-centered care strategies. Smith and Brown (2014) similarly argued that optimal outcomes require addressing both informational and emotional needs.

4.2.5 Implications of Findings to Radiography Practice

The study highlights important implications for radiography practice, emphasizing both clinical and educational priorities. A key finding is that many patients undergoing CT scans

experience heightened anxiety, particularly first-time users. This underscores the need for radiographers to move beyond technical explanations and adopt comprehensive patient preparation protocols that provide reassurance before, during, and after procedures.

While radiographers demonstrate strength in procedural communication, their ability to reduce anxiety is less consistent. This gap suggests that professional training must integrate psychological support skills, therapeutic communication, and emotional intelligence as core competencies in radiography education and continuing professional development.

The findings also reveal that interpersonal factors—such as respect, dignity, and supportive communication—play a more decisive role in shaping patient experience than environmental or technical conditions. Healthcare administrators should therefore prioritize investment in staff training and adequate staffing levels, recognizing that patient interactions directly influence satisfaction, compliance, and willingness to undergo future procedures.

Environmental improvements, such as patient-friendly CT rooms, remain important but should complement—not replace—the human aspects of care. Similarly, regulatory frameworks and accreditation standards should incorporate patient psychological welfare, ensuring that communication and anxiety management are recognized as measurable quality indicators.

For radiography education, the study indicates a need to embed behavioral health and communication training in curricula and professional development programs. Standardized approaches and competency assessments can help reduce variability in communication practices across practitioners.

From a systems perspective, the findings suggest that relatively low-cost interventions, such as staff communication training and patient-centered protocols, may yield greater benefits than purely technological investments. This has economic as well as clinical significance, as improved patient experiences encourage greater utilization of diagnostic services, which is

vital for early disease detection and public health outcomes. Finally, the study points to the need for further research, particularly longitudinal studies exploring how imaging experiences influence long-term healthcare engagement. Developing and implementing targeted interventions for anxiety reduction will help translate evidence into practice, ensuring measurable improvements in both patient well-being and healthcare system performance.

4.2.6 Limitations of the Study

This study acknowledges several methodological and contextual limitations that may affect the generalizability and interpretation of findings. The cross-sectional design captures patient experiences at a single point in time, limiting the ability to assess anxiety trajectories or long-term impacts of CT imaging experiences on healthcare utilization patterns. A longitudinal approach would have provided more comprehensive insights into how patient psychological responses evolve throughout the complete diagnostic journey and influence subsequent healthcare engagement.

The study's reliance on self-reported measures introduces potential response bias, as patients may have provided socially desirable answers or been influenced by recent positive interactions with healthcare staff. Additionally, patients who completed the questionnaire had successfully undergone the CT procedure, excluding those who may have discontinued or refused the examination due to severe anxiety. This survival bias potentially inflates the positive response rates and underestimates the prevalence of significant anxiety and distress among the broader population of patients referred for CT imaging.

4.3 Summary

This study investigated patients’ experiences of comfort and anxiety during CT procedures, focusing on environmental, procedural, interpersonal, and communication-related factors. Conducted in two tertiary hospitals in Nigeria, the study engaged 100 patients who underwent

non-emergency CT scans using a mixed-methods approach. The demographic profile showed that 48.4% of respondents were 50 years and above, with a balanced gender distribution (50.5% female, 49.5% male). A majority (63.9%) were first-time CT users, and 55.7% had tertiary or postgraduate education, indicating that anxiety was especially marked among new and educated patients.

Environmental factors contributed significantly, with 75.3% of patients reporting comfort with CT room conditions, while 68% endorsed waiting area comfort. However, 56.7% were disturbed by machine noise, 51.6% by scan duration, and 53.6% by positioning requirements. Feelings of confinement were less reported (45.3%). Interpersonal factors were the strongest positive influence. Radiographer supportiveness was endorsed by 79.3%, while 82.5% felt respected and treated with dignity—the highest rating overall. Communication practices were also largely positive, with 79.3% confirming clear procedural explanations and 76.3% endorsing clarity of intra-procedural instructions. However, fewer patients reported direct anxiety reduction (63.9%) or being kept fully informed throughout (60.9%). Willingness to undergo future scans remained moderate at 55.7%. Overall, the findings suggest that while environmental and procedural conditions matter, interpersonal care—especially empathy, dignity, and communication—plays the most decisive role in shaping patient comfort and reducing anxiety

This study revealed that a considerable proportion of patients experienced anxiety before and during CT procedures, despite the majority reporting satisfactory radiographer communication. Environmental factors such as cleanliness, lighting, and general comfort of the CT suite were found to play a significant role in influencing patient comfort. Although radiographer communication was generally rated as good, statistical analysis showed no significant association between communication and reduction of anxiety levels.

4.4 Comparative Discussion with Previous Studies

The findings of this study are consistent with previous studies that reported anxiety as a common emotional response among patients undergoing advanced imaging procedures. Similar observations were reported by local Nigerian studies, which identified fear of radiation, unfamiliar equipment, and anticipation of results as major contributors to anxiety.

However, while some international studies reported a significant reduction in anxiety with effective communication, this study found no statistically significant association between radiographer communication and anxiety levels. This difference may be attributed to variations in cultural context, patient expectations, and healthcare environments. The result suggests that while communication is necessary, it may not be sufficient alone to address patient anxiety in CT settings.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

This chapter discusses the conclusion, Recommendations and Suggestions for further Studies.

5.1 Conclusion

This study concludes that patient experiences during CT imaging are shaped more by interpersonal and communicative factors than by technical or environmental conditions alone. While environmental improvements such as well-lit, clean, and comfortable CT rooms reduce anxiety, it is the quality of radiographer-patient interactions—marked by respect, supportiveness, and clarity—that has the greatest influence on comfort and willingness to undergo future procedures. The findings highlight a critical gap between technical communication (effective explanations and instructions) and its psychological impact (direct anxiety reduction). This suggests that radiographers require not only technical proficiency but also enhanced skills in therapeutic communication, empathy, and emotional support. By prioritizing interpersonal care, communication training, and culturally sensitive patient preparation protocols, healthcare facilities can strengthen patient trust, improve diagnostic compliance, and foster positive long-term attitudes toward medical imaging.

.5.2 Recommendations

Based on the findings of this study, the following recommendations are made to improve patient comfort and reduce anxiety during CT imaging procedures:

1. Hospitals should develop structured patient education protocols that go beyond basic explanations, ensuring patients—especially first-time users—are adequately informed about what to expect before, during, and after the scan.

2. Radiography training curricula and continuing professional development should incorporate modules on therapeutic communication, emotional intelligence, and psychological support to complement technical skills.
3. Since feelings of dignity and support were the strongest predictors of patient comfort, radiographers should consciously adopt empathetic, patient-centered approaches as a clinical priority, not just a professional courtesy.
4. Hospitals should maintain well-lit, clean, and temperature-controlled CT rooms and improve waiting areas to reduce pre-procedural anxiety. Although interpersonal factors outweigh environmental ones, physical comfort remains an important complementary factor.
5. Strategies such as patient reassurance, noise-minimizing technologies, and careful positioning practices should be employed to reduce discomfort associated with machine noise, scan duration, and positioning requirements.
6. Radiographers should maintain ongoing communication during scans, not just at the start. Simple updates and reassurance throughout the procedure can reduce anxiety and foster trust.
7. Hospital management and regulatory bodies should integrate patient psychological care into quality standards for imaging services. Performance indicators should include patient communication, dignity, and anxiety management alongside technical efficiency.

5.3 Suggestions for Further Studies

1. Future research should involve multiple hospitals across Nigeria or other sub-Saharan African countries to compare patient perceptions of comfort and anxiety during CT procedures in diverse healthcare settings. This would strengthen generalizability.

2. It is recommended that similar studies be conducted for other diagnostic procedures such as MRI, ultrasound, and X-ray to determine whether psychological responses differ by imaging modality.
3. Further studies should track patients over time to examine whether initial experiences with CT procedures influence long-term healthcare-seeking behaviors, compliance with follow-up imaging, and overall trust in radiological services.
4. Researchers should test specific interventions—such as communication training for radiographers, structured pre-procedure orientation, or anxiety-reduction programs—to measure their impact on patient comfort and anxiety reduction.
5. In-depth interviews or focus group discussions could provide richer insights into the lived experiences of patients, revealing subtle factors (cultural, social, or spiritual) that quantitative surveys might not fully capture.

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