OCCUPATIONAL STRESS AMONG RADIOGRAPHERS: A COMPARATIVE ANALYSIS BETWEEN PUBLIC AND PRIVATE CLINICAL SETTINGS

BY

ELUOJERIO STACY OMOAFEBA

(BMS2005187)

DEPARTMENT OF MEDICAL RADIOGRAPHY

SCHOOL OF BASIC MEDICAL SCIENCES

UNIVERSITY OF BENIN

BENIN CITY

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RESEARCH PROJECT

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DEPARTMENT OF MEDICAL RADIOGRAPHY

SCHOOL OF BASIC MEDICAL SCIENCES

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SUPERVISOR: MR UGBAGBE EBUTE JOHNSON

OCTOBER 2025

DECLARATION

I Eluojerio Stacy Omoafeba hereby declare that this research is my original research work, carried out under the supervision of Mr Ugbagbe Ebute Johnson and the work has not been submitted to the academic institution for the award of degree or used for any other academic purpose.

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Student's signature. Date

CERTIFICATION

We certify that Eluojerio Stacy Omoafeba carried out this research work titled; "OCCUPATIONAL STRESS AMONG RADIOGRAPHERS: A COMPARATIVE STUDY BETWEEN PUBLIC AND PRIVATE CLINICAL SETTINGS " under our supervision. It has been submitted and accepted by the department of medical radiography, faculty of basic medical sciences , University of Benin, Edo state in partial fulfillment of the requirements for the awards of bachelor degree in Medical Radiography..

Mr J.E Ugbabe. (Lead Supervisor)	Date
Dr. Mrs F.O. Igbinedion. (Head of Department)	Date
External Examiner 1	Date

EXAMINER'S PAGE

This research project has been read and approved as meeting the requirements for the award of B.RAD (Hons) MEDICAL RADIOGRAPHY, from University of Benin, Edo state, Nigeria.

Mr J.E Ugbabe. (Lead Supervisor)	Date
Dr. Mrs F.O. Igbinedion. (Head of Department)	Date
External Examiner 1	Date

PLAGIARISM DECLARATION

I ELUOJERIO STACY OMOAFEBA declare that this research project is my own original work, compiled without assistance. All sources used or quoted have been indicated and acknowledged by means of using the APA 7th edition system of in-text and end-of text referencing, i.e. I have NOT PRACTICED ANY FORM OF PLAGIARISM.

DEDICATION

This research project is dedicated to God almighty whom by his love and Mercy has brought me thus far in this academic journey.

I'll also love to dedicate this work to my wonderful parents for their constant love and support Your belief in me gives me the drive to strife for greatness, I love you always. To my entire family, thank you for your constant love and support. I am grateful.

AKNOWLEDGEMENTS

It is with utmost joy that I return all Glory to my Heavenly Father for his never-ending love and support towards me in the course of this Academic Journey for it has pleased him to bring me thus far.

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I must give my heart-felt thanks to my wonderful parents, Mr and Mrs Eluojerio for their constant love and support and to my beloved brother as well, Thank you for all you do.

I'm immensely grateful for the gifts of good friends (Daniel, Lareina, Erica), their impact in this journey has been tremendous. I love and appreciate y'all so much.

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To my coursemate, it was really nice going through this journey with you all.

Thanks are due to any other person who were instrumental in the course of this research study. May God bless y'all accordingly.

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ABSTRACT

Topic: *Occupational Stress Among Radiographers: A Comparative Analysis between Public and Private Clinical Settings.*

Background of the Study*: Occupational Stress is a critical issue affecting healthcare professionals including radiographers which has high tendencies of impacting their wellbeing as well overall working efficiency. While stress is prevalent among radiographers, it is imperative to determine which specific setting it remains prevalent in as well as steps to mitigate it.*

Objective of the Study: *This study is aimed at analyzing the stress levels between radiographers working in the private and public clinical settings.*

Methods/Materials: A cross-sectional survey design was adopted involving sixty (60) radiographers in various public and private centers in Benin City. Data was collected using a well-structured self-administered questionnaire and analyzed with the Statistical Package for Social Sciences version 25.

Results/Findings: *The results revealed that there was a significantly higher stress levels among radiographers in the private setting than in the public setting.*

Conclusion*: From this study, it can be concluded that the type of clinical setting is a determinant factor for measuring occupational stress among radiographers in Benin City, Edo state.*

Occupational Stress, Radiographers, Comparative Analysis, Public Clinical Settings, Private Clinical setting Settings.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Occupational stress in health professions has emerged as a persistent global concern with important consequences for worker well-being, service quality and patient safety. Health-care environments are high-demand, high-responsibility workplaces where staff routinely balance time pressure, emotional labour, technical precision and the consequences of clinical errors. Within the radiology workforce, radiographers occupy a critical role that requires technical accuracy, patient handling, rapid throughput, and frequent collaboration with physicians conditions that expose them to multiple sources of chronic work stress (Arif et al., 2024).

Radiographers' work stress is multi-dimensional. Commonly reported stressors include excessive workload (rising imaging volumes and extended shifts), inadequate staffing, time pressure to meet imaging and reporting targets, exposure to traumatic patient situations, role conflict, limited career progression, and administrative/organizational factors such as poor communication with management and unfair distribution of tasks (Bailey, 2022; Lemon et al., 2023). These stressors create vulnerability to burnout a syndrome characterized by emotional exhaustion, depersonalization and reduced personal accomplishment which in turn is linked to decreased job satisfaction, higher turnover intent, medical errors, and lowered quality of patient care (Bailey, 2022; Ji et al., 2024).

The prevalence of stress and burnout among radiology personnel reported in the literature is wide but concerning. Systematized reviews and empirical studies conducted since 2021 have documented burnout and/or elevated stress in significant proportions of radiology staff, with estimates varying by setting, measurement tools and the local effects of the COVID-19 pandemic and post-pandemic workload surges (Arif et al., 2024; Sipos et al., 2024; systematized reviews 2024). This heterogeneity underscores both the ubiquity of the problem and the influence of contextual factors (institutional supports, staffing, leadership, country health system pressures) on measured prevalence.

Comparing occupational stress across clinical settings especially public versus private facilities is important because organizational structure, resource allocation, patient load, employment conditions, and institutional culture often differ markedly between sectors. Studies in related health professions (for example nursing and wider allied-health groups) have reported sectoral differences: some research finds higher perceived work stress in

private-sector clinicians where job insecurity, productivity quotas, and fee-for-service incentives increase pressure; other studies report higher stress in public-sector workers due to heavier patient loads, bureaucratic constraints, limited resources and workplace violence risk (Tsegaw et al., 2022; comparative studies 2022–2025). These mixed findings point to the need to investigate radiographers specifically, because extrapolation from other professions risks masking profession-specific exposures such as imaging workload dynamics, radiation safety responsibilities, and modality-specific staffing patterns.

Organizational determinants of occupational stress include staffing levels, shift patterns (night and weekend work), leadership and supervisory support, access to professional development, recognition or reward systems, and workplace psychosocial climate (trust, fairness, communication). Radiography departments that operate under intense throughput targets without commensurate staffing or supportive management structures are especially vulnerable to sustained staff stress and burnout (Arif et al., 2024; Ji et al., 2024). Conversely, private clinics sometimes invest in faster equipment and higher staff-to-patient ratios which may reduce certain stressors but may introduce commercial pressures (targeted productivity, performance-linked pay) that create different stress pathways (Ji et al., 2024; Sipos et al., 2024).

The COVID-19 pandemic amplified stressors for radiology services globally. Radiographers were required to adapt rapidly to infection-control protocols, to manage imaging for infectious patients, and to cope with fluctuating patient volumes elective imaging fell sharply in some windows and surged in others. The pandemic's operational shocks exposed systemic vulnerabilities (staff shortages, supply chain issues, and inconsistent organizational communication), which in many settings produced protracted increases in stress and burnout that persisted into the recovery years (2021–2024) (Lemon et al., 2023; Arif et al., 2024). Understanding post-pandemic patterns is therefore essential to any contemporary study of radiographers' occupational stress.

Contextual and socio-demographic factors (age, years of experience, level of training, and multiple employment ties) also shape stress experiences. Research in allied health suggests younger and less-experienced clinicians or those working multiple jobs to make ends meet report higher perceived stress; similarly, poor distributive justice (perceived inequity in workload and rewards) and weak manager support correlate with higher occupational stress (Zhong et al., 2025; Pereira dos Santos et al., 2025). These individual and contextual

moderators may operate differently across public and private settings: for instance, public institutions may show more pronounced effects of resource constraints on stress while private settings may show stronger links to performance-driven stressors. Hence, comparative analyses can reveal which determinants are universal and which are sector-specific.

The consequences of unaddressed occupational stress among radiographers are multi-layered. For individuals, chronic stress increases risk for mental health problems (depression, anxiety), sleep disturbance, cardiovascular risk and impaired cognitive performance. For organizations, stress-related absenteeism, reduced work performance and higher turnover increase operational costs and reduce service continuity. For patients, stressed staff are more likely to commit errors, have reduced patient-centered communication, and contribute to longer waiting times and dissatisfaction (Research syntheses 2024; Ji et al., 2024). These downstream effects make stress reduction a quality and safety priority, not only an employee welfare issue.

Existing interventions to mitigate radiographer stress cover individual, team and organizational levels. Individual approaches include resilience training, stress-management workshops and access to employee assistance programmed. Team-level interventions emphasize peer support and debriefing after difficult clinical events. Organizational strategies (which evidence suggests are most effective when implemented and sustained) include workload redesign, adequate staffing, flexible rostering, leadership development, clear communication channels, and systems for recognizing and rewarding staff contributions (systematized reviews 2024; Ji et al., 2024). Yet, the adoption and effectiveness of these interventions differ between public and private settings due to differing budgetary priorities, governance structures, and accountability mechanisms a further rationale for comparative research.

Despite growing attention to well-being in radiology, gaps remain. Many studies are cross-sectional and use heterogeneous instruments (e.g., Maslach Burnout Inventory, Perceived Stress Scale), making comparisons difficult. Further, there is limited literature that explicitly compares radiographers' occupational stress across public and private clinical settings while controlling for confounders such as workload intensity, shift patterns, and access to organizational support. Sectoral comparisons are especially scarce in low- and middle-income country contexts where public and private health sectors differ widely in financing,

infrastructure, and labour market conditions conditions that can markedly influence stress exposure and coping capacity (Shidolo, 2025; region-specific studies).

1.2 Statement of the Problems

Occupational stress has become a pervasive issue in healthcare professions, particularly in the field of medical imaging where radiographers play a vital role in diagnostic and therapeutic procedures. Despite advances in imaging technology and workflow management systems, radiographers continue to experience increasing work demands, long hours, staff shortages, and complex role expectations that heighten their susceptibility to stress and burnout (Arif et al., 2024; Ji et al., 2024). Persistent exposure to occupational stress not only impairs radiographers' mental and physical well-being but also undermines job satisfaction, productivity, and the quality of patient care (Sipos et al., 2024).

In both public and private clinical settings, radiographers face distinct yet interrelated stressors. Public healthcare institutions are often characterized by excessive patient loads, limited equipment, and inadequate human resources, which lead to fatigue and emotional exhaustion. Conversely, radiographers in private facilities may encounter stress from performance-based targets, job insecurity, and the commercial pressures of profit-driven service delivery (Tsegaw et al., 2022). While several studies have examined occupational stress among healthcare professionals generally, there remains a paucity of empirical evidence comparing stress levels and sources among radiographers across public and private sectors, particularly within developing healthcare systems such as Nigeria's.

Moreover, most existing research in radiography has focused on individual coping mechanisms or burnout prevalence without adequately exploring the organizational and contextual factors that differentiate stress experiences between healthcare settings (Lemon et al., 2023; Shidolo, 2025). This gap in knowledge limits the ability of policymakers and hospital administrators to design effective, sector-specific interventions that promote radiographers' well-being and sustain workforce retention.

Therefore, it becomes imperative to conduct a comparative analysis of occupational stress among radiographers working in public and private clinical environments. Understanding how stressors vary across these settings will provide evidence-based insights for developing targeted strategies to mitigate stress, enhance job satisfaction, and improve the overall efficiency and quality of radiology services.

1.3 Aim of the Study

The study aims to analyze the stress levels of radiographers working in both the public and private clinical settings and to determine which clinical settings is less stressful for radiographers to duly work efficiently and effectively.

1.4 Objective of the Study

This study seeks to achieve the following:

1. To identify and analyze the specific stressors contributing to occupational stress among radiographers in both clinical settings.

2. To identify factors such as workload, work environment, and patient interaction leading to the occupational stress of radiographers in both clinical settings.

3. To explore and compare the coping mechanisms employed by radiographers in public and private establishments to manage occupational stress.

1.5 Research Questions

This study or proposal seeks to answer the following questions:

1. What are the specific stressors contributing to occupational stress among radiographers in both clinical settings?

2. How can the assessment of the impact of workload, work environment, and patient interaction result in occupational stress of radiographers in both clinical settings?

3. What are the coping mechanisms employed by radiographers in public and private establishments to manage occupational stress?

1.6 Hypothesis of the Study

The following are the hypothesis for this research study:-

Null hypothesis (Ho): There is no significant difference in the level of occupational stress experienced by Radiographers working in public clinical settings and those working in private clinical settings.

Alternative Hypothesis (H1): There is a significant difference in the level of occupational stress experienced by Radiographers working in public clinical settings and those working in private clinical settings.

1.7 Significance of the Study

This study is significant as it seeks to provide valuable insights into the nature and extent of occupational stress experienced by radiographers in both public and private clinical settings within Edo State. Understanding the stressors affecting radiographers is essential because these professionals play a crucial role in patient diagnosis and treatment planning. High levels of occupational stress can compromise their job performance, lead to burnout, reduce work satisfaction, and ultimately affect the quality of healthcare delivery (Ji et al., 2024).

The findings from this research will help hospital administrators, policymakers, and government authorities identify the major stress-inducing factors within radiology departments and design targeted interventions to promote a healthier and more supportive work environment. By comparing stress levels and coping strategies between public and private sectors, the study will provide evidence-based recommendations for organizational and governmental reforms tailored to the specific needs of each setting.

For radiographers, the study will raise awareness about personal and workplace stressors and encourage the adoption of effective coping mechanisms that can enhance job satisfaction and professional well-being. It will also contribute to fostering open discussions on mental health and occupational wellness in the radiography profession, which is often underrepresented in research and policy discourse.

For the government, the study will provide vital information to support the formulation and implementation of occupational health and safety policies aimed at improving working conditions, staffing adequacy, and employee welfare within healthcare institutions. Such insights can guide the allocation of resources and the development of national strategies to reduce work-related stress among healthcare workers. For the academic community, the research will enrich existing literature on occupational stress in healthcare, particularly within the Nigerian context where comparative studies among radiographers are limited. The results will serve as a valuable reference for future researchers interested in occupational health, workplace psychology, and radiography practice.

The study's outcomes are expected to guide government, hospital management, and other stakeholders in developing institutional and policy frameworks that promote staff welfare, improve productivity, reduce turnover rates, and ensure sustainable, high-quality radiology services in both public and private healthcare systems

1.8 Scope of the Study

The research will be limited to practicing diagnostic radiographers currently employed in selected public hospitals, private clinics, and diagnostic centers within Edo State. Other healthcare professionals such as nurses, laboratory scientists, and radiologists will be excluded. The study will not extend to radiographers working outside Edo State or to students undergoing radiography training. Data collection will take place over a three-month period, from July 2025 to October 2025, to allow adequate coverage of both public and private institutions within the study area.

1.9 Operational Definition of Terms

Stress: In this study Stress refers to the physiological or psychological response to internal /external demands or threats.

Occupational Stress : This is defined as Work-related stress is typically an occupational-related psychological disorder. It is referred to as the psychological, physiological and emotional strain that occurs when the demands of a job exceed an individual's capacity or resources to cope with them.

Radiographer: A healthcare professional trained and licensed to perform diagnostic imaging examinations such as X-rays and interpret radiographic images where permitted.

Clinical This refers to the direct observation and treatment of patients within a medical or health care context.

Private Settings: This is defined as physical locations or environment where individuals has a reasonable expectation of privacy, limited access and control over who is present and what information are shared or observed.

Public Settings : This refers to the physical location or environment that is opened and accessible to the general public usually with minimal or no restrictions

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews extant literatures as it relates to the present study. It will be discussed under the following headings: conceptual review, empirical review and theoretical framework and. The literature reviewed was discussed under the following sub-headings:

2.1 Conceptual Framework

2.1.1 The Concept Stress

Stress is a natural and universal human experience that occurs when an individual perceives internal or external demands as exceeding their ability to cope effectively. It is an adaptive response that prepares the body to face challenges, often referred to as the "fight or flight" reaction (Lazarus & Folkman, 1984). Stress is not inherently negative; in moderate amounts, it can enhance motivation, alertness, and performance. However, when stress becomes excessive, prolonged, or poorly managed, it can lead to significant psychological, physical, and behavioral problems (Schneiderman et al., 2023).

The term stress is derived from the Latin word stringere, meaning "to draw tight," and was first popularized in a biological context by Hans Selye in 1936. Selye defined stress as “the nonspecific response of the body to any demand made upon it,” emphasizing that stress is a physiological process that can arise from both positive and negative situations (Selye, 1976). He proposed the concept of the General Adaptation Syndrome (GAS), which describes the body’s three stages of response to stress — alarm, resistance, and exhaustion. This theory laid the foundation for understanding how prolonged stress can lead to physical and emotional exhaustion.

Psychologically, stress can be viewed as the individual’s perception and interpretation of an event as threatening or demanding, combined with their evaluation of available coping resources. This perspective is highlighted in the Transactional Model of Stress and Coping by

Lazarus and Folkman (1984), which emphasizes that stress results from the interaction between a person and their environment. The model suggests that people experience stress when they appraise a situation as challenging or harmful and believe they lack sufficient resources to manage it effectively.

Stress can stem from various sources, including environmental pressures, social conflicts, personal expectations, or occupational demands. It affects individuals differently depending on personality traits, resilience, life experiences, and social support systems (Ji et al., 2024). Physiologically, stress triggers the release of hormones such as adrenaline and cortisol, which increase heart rate, blood pressure, and alertness to prepare the body for action. While this reaction is essential for short-term survival, prolonged exposure to stress hormones can lead to health issues such as hypertension, anxiety disorders, depression, and weakened immune function (World Health Organization [WHO], 2023).

In everyday life, stress may arise from financial challenges, academic pressure, interpersonal relationships, or work responsibilities. The modern lifestyle, characterized by constant technological engagement, high performance expectations, and limited rest, has further increased the prevalence of stress-related conditions. Managing stress effectively has therefore become an essential component of maintaining overall health and well-being (Schneiderman et al., 2023).

In essence, stress is a complex, multidimensional phenomenon that encompasses emotional, cognitive, and physiological responses to perceived challenges or threats. While short-term stress can be beneficial by enhancing focus and performance, chronic or unmanaged stress can have detrimental effects on both mental and physical health. Understanding the nature of stress provides a necessary foundation for examining more specific types of stress, such as

occupational stress, which is particularly relevant in demanding professional environments like healthcare.

2.1.2 Type of Stress

Workplace stress is a complex phenomenon that arises when job demands and pressures are not matched to the worker's knowledge, abilities, or available resources, thereby challenging their ability to cope effectively. It can manifest in various forms depending on the intensity, duration, and source of the stressors within the work environment (World Health Organization [WHO], 2023). Understanding the different types of stress in the workplace is essential for identifying appropriate interventions and promoting employee well-being, particularly in high-demand professions such as healthcare and radiography.

i. Acute Stress

Acute stress is the most common form of workplace stress and is typically short-term in nature. It arises from immediate pressures, unexpected challenges, or specific job-related demands, such as handling an emergency situation or meeting tight deadlines (Kyaw et al., 2023). For radiographers, this may occur during high patient volumes, equipment malfunction, or critical diagnostic situations that demand urgent attention. Although acute stress can temporarily enhance focus and productivity, frequent exposure without adequate recovery can lead to emotional exhaustion and physical strain.

ii. Episodic Acute Stress

Episodic acute stress occurs when individuals experience repeated bouts of acute stress due to ongoing or recurrent workplace pressures. Employees who work in disorganized environments or have demanding supervisors often face this type of stress (Kumar et al., 2022). In radiology departments, this may be seen among professionals working with

unpredictable workloads, multiple imaging requests, or conflicting task priorities. Over time, episodic acute stress can lead to irritability, poor concentration, and reduced job satisfaction.

iii. Chronic Stress

Chronic stress is long-term and results from persistent exposure to stressful work conditions without sufficient relief or coping mechanisms. It is often linked to structural and organizational issues such as understaffing, inadequate resources, lack of support, or poor management practices (Abdullahi et al., 2022). Radiographers in public institutions, for instance, may experience chronic stress due to excessive patient loads, limited equipment, and insufficient remuneration, while those in private facilities may face pressure from performance targets and administrative demands. Chronic stress has been associated with burnout, depression, cardiovascular disorders, and reduced job performance (Ji et al., 2024).

iv. Physical Stress

Physical stress occurs when the body is subjected to demanding working conditions, such as long hours, awkward postures, repetitive movements, or exposure to radiation and noise (Adebayo & Akinola, 2023). In the radiography profession, prolonged standing, operating heavy imaging equipment, and maintaining uncomfortable positions during patient imaging can lead to musculoskeletal disorders and fatigue. Over time, these physical demands compound emotional stress, increasing overall occupational strain

v. Psychological and Emotional Stress

Psychological and emotional stress in the workplace often stems from interpersonal conflicts, role ambiguity, excessive workloads, or lack of recognition. In healthcare, emotional stress is intensified by patient suffering, ethical dilemmas, and the constant need for precision (Kumar et al., 2022). Radiographers frequently face the pressure of maintaining accuracy in image interpretation and dealing with anxious or uncooperative patients. Persistent psychological

stress can impair concentration, decision-making, and emotional stability, leading to burnout and decreased quality of care.

vi. Organizational Stress

Organizational stress refers to stressors embedded within the structural and cultural aspects of an institution. Factors such as poor communication, lack of managerial support, unfair promotion policies, and limited career advancement opportunities contribute to this form of stress (Abdullahi et al., 2022). In both public and private clinical settings, radiographers may experience organizational stress when leadership fails to address workload imbalances, provide adequate safety measures, or recognize employee contributions.

vii. Technological Stress (Technostress)

With the increasing integration of digital technologies and artificial intelligence (AI) in medical imaging, radiographers are now experiencing a growing form of workplace stress known as "technostress." This arises from the constant adaptation to new technologies, software updates, and digital reporting systems (Ji et al., 2024). While technological advancements improve efficiency, they may also induce anxiety, job insecurity, and fear of technological obsolescence, especially among older professionals or those with limited digital proficiency.

2.1.3 Symptoms of Stress

Stress affects people in different ways, showing through the body, mind, and behavior. It is important to identify these signs early because long-term stress can harm both health and work performance.

i. Physical Symptoms:

When a person is stressed, the body reacts in several ways. Common signs include headaches, tiredness, trouble sleeping, muscle pain, and stomach upset. Some radiographers also experience back pain or body aches from standing for long hours and handling heavy equipment (Chukwu & Hassan, 2021). These physical changes happen because the body releases stress hormones like adrenaline and cortisol too often.

ii. Emotional Symptoms:

Stress can cause strong emotional reactions. People may feel anxious, sad, moody, or easily irritated. In the workplace, radiographers who are stressed may feel frustrated, tired, or unmotivated (Okafor & Danjuma, 2023). Over time, these feelings can lead to emotional exhaustion or burnout.

iii. Cognitive Symptoms:

Stress affects how people think and make decisions. It can cause forgetfulness, poor concentration, and confusion. Afolayan & Ojo (2022) noted that stressed radiographers sometimes find it hard to focus during imaging or make quick decisions, which can affect the quality of their work.

iv. Behavioral Symptoms:

People under stress may change their normal habits. They might eat too much or too little, have trouble sleeping, or withdraw from others. Some may start avoiding work or depend on caffeine or alcohol to cope (Bassey & Lawal, 2023). These changes can affect teamwork and performance at work.

v. Psychological Symptoms:

Stress can also affect the mind deeply. It may cause feelings of hopelessness, worry, or loss of interest in work. If stress continues, it can lead to depression or burnout. Adeyemi & Musa

(2024) found that radiographers who face constant work pressure often feel mentally drained and less productive.

2.1.4 Factor contributing to stress

Stress in the workplace is influenced by a complex interaction of personal, environmental, and organizational factors. These stressors vary across professions, but in healthcare particularly among radiographers they often stem from workload pressure, inadequate resources, job insecurity, and interpersonal conflicts. Understanding these contributing factors is essential in developing targeted interventions to reduce occupational stress and promote mental well-being among healthcare professionals (World Health Organization [WHO], 2023).

i. Workload and Time Pressure

Heavy workload and insufficient time to complete assigned tasks are among the most common stressors in any occupational setting. In radiography, professionals often work under pressure to meet increasing patient demands, maintain image quality, and ensure timely reporting (Kyaw et al., 2023). Public healthcare settings tend to have higher patient volumes and limited staffing, which heightens work intensity and fatigue. Conversely, radiographers in private institutions may face stress from meeting strict performance targets and maintaining client satisfaction (Adebayo & Akinola, 2023). Excessive workload and time pressure can lead to burnout, reduced efficiency, and emotional exhaustion.

ii. Role Ambiguity and Role Conflict

Role ambiguity occurs when job responsibilities are not clearly defined, while role conflict arises when an employee faces incompatible demands from different supervisors or departments. In radiology units, radiographers may experience uncertainty regarding administrative duties, imaging protocols, or their professional boundaries with radiologists

and physicians. Such unclear job roles can create confusion, frustration, and stress (Abdullahi et al., 2022). Consistent communication and well-structured job descriptions are crucial in mitigating these stressors.

iii. Work Environment and Physical Conditions

Poor working conditions such as inadequate lighting, high noise levels, cramped spaces, or outdated equipment contribute significantly to stress in healthcare environments (Ji et al., 2024). Radiographers, in particular, face additional stress due to constant exposure to radiation, long periods of standing, and repetitive movements required for imaging procedures. Lack of ergonomic design in imaging rooms further increases the risk of musculoskeletal disorders, fatigue, and physical strain, thereby compounding psychological stress.

iv. Interpersonal Relationships and Communication Challenges

Interpersonal conflicts with colleagues, supervisors, or patients are significant contributors to workplace stress. Poor communication, lack of teamwork, and unsupportive leadership can create a hostile environment that lowers morale and job satisfaction (Kumar et al., 2022). Radiographers often work closely with physicians, nurses, and patients, making effective communication essential. Miscommunication during imaging procedures can result in errors or tension, further elevating stress levels.

v. Organizational and Administrative Factors

Institutional factors such as inadequate staffing, lack of management support, limited career advancement opportunities, and unfair reward systems are major contributors to occupational stress (Abdullahi et al., 2022). In public institutions, bureaucratic procedures and delayed salaries may exacerbate frustration, while private clinics may impose strict performance

standards and job insecurity. These organizational stressors directly impact motivation, performance, and overall job satisfaction among radiographers.

vi. Technological Advancements and Job Insecurity

The integration of new technologies, including Artificial Intelligence (AI) and digital imaging systems, has introduced a new category of stress known as technostress. Radiographers may experience anxiety about learning new systems, adapting to automation, or the fear of being replaced by technology (Ji et al., 2024). While technology enhances efficiency and accuracy, the constant need to upgrade skills and adapt to changing procedures can lead to psychological strain.

vii. Emotional and Psychological Factors

Stress is not solely influenced by external conditions; internal emotional factors also play a vital role. Personal expectations, perfectionism, low resilience, or lack of coping mechanisms can make individuals more vulnerable to stress (Schneiderman et al., 2023). In healthcare, radiographers often deal with anxious or critically ill patients, which can lead to emotional exhaustion and compassion fatigue over time.

viii. Work-Life Imbalance

An imbalance between professional and personal life contributes significantly to chronic stress. Long working hours, shift duties, and overtime affect social relationships and limit recovery time (Adebayo & Akinola, 2023). Radiographers often struggle to balance the demands of patient care with family responsibilities, leading to fatigue and reduced well-being.

2.1.5 Strategies to cope with stress

Coping with stress refers to the conscious and unconscious efforts individuals make to manage internal and external demands that are perceived as exceeding their resources or endangering their well-being. Effective stress management improves emotional stability, mental focus, and physical health, allowing individuals to function productively in both personal and professional life (American Psychological Association [APA], 2023).

i. Time Management

One of the most effective strategies for coping with stress is proper time management. Inadequate time control often leads to feelings of being overwhelmed and results in psychological distress. Effective time management enables individuals to set clear priorities, plan tasks ahead, and allocate adequate time to high-value activities, thereby reducing the sense of pressure associated with deadlines. According to Rahman et al. (2022), individuals who effectively plan their daily schedules experience lower levels of occupational stress and improved productivity. Creating a to-do list, setting realistic goals, and avoiding procrastination are practical ways of reducing time-related stress. Furthermore, time management enhances work-life balance, preventing burnout and promoting general well-being (Gao & Lin, 2021).

ii. Relaxation Techniques

Relaxation methods, such as meditation, deep breathing, yoga, and progressive muscle relaxation, are essential in reducing physiological arousal caused by stress. These techniques calm the body by lowering heart rate, blood pressure, and cortisol levels, thereby enhancing mental clarity and emotional balance. Zhu et al. (2023) found that regular mindfulness meditation significantly decreases anxiety and improves overall psychological resilience among healthcare workers. Relaxation techniques help to redirect attention away from

stressors and foster a sense of inner peace. Incorporating such practices into daily routines promotes both short-term and long-term stress relief (Kim & Lee, 2020).

iii. Physical Exercise

Regular physical activity is a proven natural remedy for stress management. Exercise stimulates the release of endorphins brain chemicals that serve as natural mood elevators and helps reduce the body's stress hormones, including adrenaline and cortisol. Huang and Chen (2021) noted that engaging in moderate physical activity, such as brisk walking, jogging, or swimming, enhances mood, increases self-esteem, and provides a distraction from daily worries. Physical exercise also contributes to better sleep quality and energy levels, both of which are essential for coping with everyday stressors. Therefore, maintaining an active lifestyle can serve as a preventive and therapeutic measure against stress.

iv. Healthy Lifestyle Choices

Adopting healthy living habits such as eating balanced meals, maintaining adequate sleep, and avoiding harmful substances contributes to overall stress reduction. Poor nutrition, lack of rest, and substance misuse can heighten anxiety and impair the body's ability to manage stress. World Health Organization (WHO, 2022) recommends at least seven hours of sleep per night, regular hydration, and reduced consumption of caffeine and alcohol to support physical and emotional health. Adequate rest restores the body's energy and enhances concentration, while nutritious meals provide the nutrients necessary for optimal brain functioning. Hence, a healthy lifestyle fosters resilience and prevents stress-related illnesses (Oduor et al., 2020).

v. Social Support

Building and maintaining supportive relationships is a cornerstone of stress management. Sharing thoughts and emotions with trusted family members, friends, or colleagues can offer

comfort, advice, and new perspectives. Social support reduces feelings of isolation and promotes emotional healing. According to Adeyemi and Ogunleye (2021), individuals with strong social networks experience lower psychological distress and improved coping capacity. Social connection acts as a protective factor that buffers against the negative impacts of stress and enhances overall well-being. Participating in community or support groups can further strengthen one's resilience during challenging times (Smith & Thomas, 2023).

vi. Positive Thinking and Cognitive Restructuring

Developing a positive mindset and reframing negative thoughts are powerful ways to cope with stress. Cognitive restructuring involves identifying irrational beliefs or distorted thinking patterns and replacing them with realistic and optimistic alternatives. Nguyen et al. (2020) assert that individuals who maintain positive thought patterns show higher emotional stability and problem-solving skills. Practicing gratitude, affirmations, and focusing on solutions rather than problems encourages optimism and reduces the perceived intensity of stressors. Over time, this mental reprogramming improves self-confidence and fosters a more balanced perspective toward life's challenges

vii. Seeking Professional Help

When stress becomes chronic or overwhelming, seeking guidance from mental health professionals such as psychologists, counselors, or therapists—can be beneficial. These professionals assist individuals in identifying stress triggers, developing personalized coping mechanisms, and managing associated mental health issues like anxiety or depression. Johnson and Miller (2022) found that counseling interventions such as cognitive behavioral therapy (CBT) effectively reduce stress and enhance coping ability among healthcare workers. Professional help provides structured emotional support, enabling individuals to build resilience and regain control over their mental health (WHO, 2022).

viii. Engaging in Hobbies and Recreational Activities

Engaging in pleasurable activities provides a natural and effective means of relieving stress. Hobbies such as reading, painting, listening to music, or gardening create a mental diversion from daily pressures and promote relaxation. Leisure activities enhance creativity, increase happiness, and restore mental energy. Oluwole and Eze (2021) observed that individuals who engage in recreational activities regularly experience lower levels of perceived stress and improved life satisfaction. Scheduling time for hobbies helps maintain a sense of fulfillment and balance between work and personal life, thus reducing burnout risk.

2.2 Theoretical Framework

The Job Demand-Control (JDC) Model

The Job Demand-Control (JDC) Model, developed by Robert Karasek (1979), is a popular theory used to explain how work conditions can cause stress among employees. The model suggests that stress at work does not come only from having too many tasks or responsibilities, but from the combination of high job demands and low control over how the work is done. When workers face too many demands but have little say in how to manage them, they experience high levels of pressure, fatigue, and frustration. Over time, this can lead to burnout, poor health, and low job satisfaction. The model was later expanded by Johnson and Hall (1988) to include a third factor social support which refers to help and encouragement from colleagues and supervisors. Together, these three factors form what is now called the Job Demand-Control-Support (JDCS) Model, which explains that having strong social support can reduce the harmful effects of work stress. Overall, this model helps us understand how work environments influence stress, motivation, and well-being, especially in demanding professions like healthcare.

The following are concept of the Job Demand-Control (JDC) Model

i. Job Demands

Job demands refer to the physical, emotional, and mental efforts required to perform work tasks. These include workload, time pressure, job complexity, and dealing with difficult or emotional situations. While some level of demand can make work interesting and encourage growth, too much demand can lead to stress, especially if there is not enough time, rest, or resources to cope. For example, radiographers often work under intense pressure, handling many patients, dealing with emergency cases, and ensuring that imaging results are accurate. When these demands become excessive, they can cause tiredness, worry, and loss of focus. High job demands that are not balanced with support or control can make workers feel overwhelmed and lead to long-term stress. Therefore, managing workload and providing adequate resources are key to maintaining a healthy and productive work environment.

ii. Job Control (Decision Latitude)

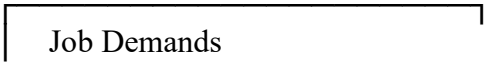
Job control, also known as decision latitude, refers to how much freedom or autonomy workers have in carrying out their jobs. It includes the ability to make decisions, plan tasks, and use personal skills to complete work. When employees have high control, they can organize their duties in a way that reduces pressure and makes them feel responsible and valued. However, when control is low—such as when strict rules, tight supervision, or lack of input from staff limit decision-making stress levels tend to rise. In healthcare, radiographers in public hospitals may experience low job control due to rigid procedures and large patient loads, while those in private hospitals may have more autonomy but face other challenges like management pressure. Having control over one's work allows employees to manage demands better and reduces feelings of helplessness and burnout.

iii. Job Strain

Job strain occurs when workers face high job demands but have little or no control over how to meet them. This imbalance between what is expected and what can be managed creates tension, frustration, and stress. According to Karasek (1979), there are four main job situations: high-strain jobs (high demands and low control), low-strain jobs (low demands and high control), active jobs (high demands and high control), and passive jobs (low demands and low control). High-strain jobs are the most stressful and can lead to burnout and health issues. For instance, radiographers in public hospitals may experience high strain because of high patient numbers, limited resources, and less control over work decisions. Meanwhile, those in private hospitals may have active jobs where high demands are balanced by more decision-making power. The goal in any workplace should be to create conditions where demands and control are balanced to reduce strain and improve job satisfaction.

iv. Social Support

Social support was added to the JDC model by Johnson and Hall (1988) to form the Job Demand-Control-Support (JDCS) Model. It highlights the importance of supportive relationships at work in helping employees cope with stress. Social support can come from colleagues, supervisors, or even the organization itself, and includes emotional help, guidance, and teamwork. When employees feel supported, they are better able to handle pressure and are less likely to suffer from burnout or frustration. On the other hand, a lack of support can make workers feel isolated and overwhelmed. In healthcare settings, social support is very important because teamwork, communication, and understanding among staff can make a big difference in managing stress. For radiographers, having supportive colleagues and supervisors can help them cope with heavy workloads and emotional demands, leading to better performance and overall well-being.



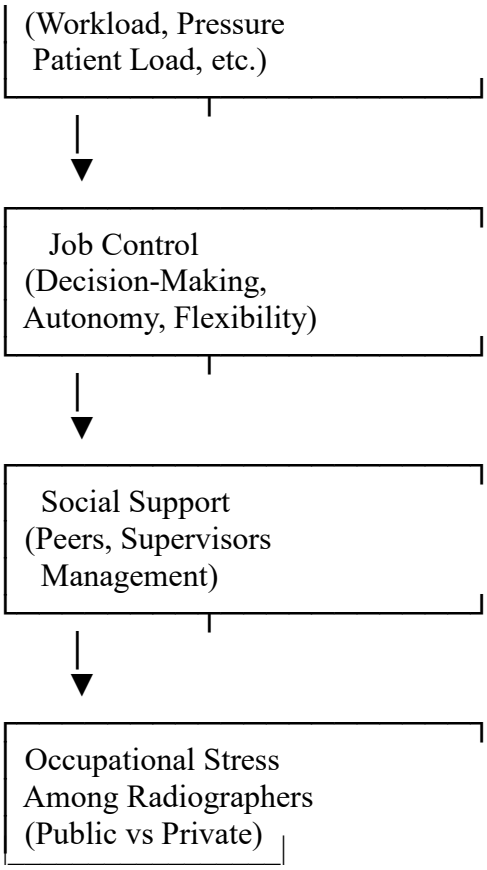


Fig 2.1 The diagram shows how job demands, job control, and social support interact to influence the level of occupational stress among radiographers. High job demands with low control and poor support lead to high stress, while balanced demands, strong control, and good support lead to lower stress and better job satisfaction.

Application of the Job Demand-Control Model to the Study

The Job Demand-Control (JDC) Model is very useful in understanding occupational stress among radiographers, particularly in comparing those working in public and private hospitals. This study uses the model to explain how differences in job demands, job control, and social support influence the level of stress radiographers experience in their workplaces.

In public hospitals, radiographers often face high job demands such as large patient numbers, emergency cases, inadequate equipment, and long working hours. These conditions increase

pressure and mental strain. At the same time, they usually have limited job control because of strict administrative structures, rigid work procedures, and limited involvement in decision-making. This imbalance between high demands and low control fits the high-strain job category described in the JDC model. As a result, radiographers in public hospitals may experience higher stress levels, fatigue, and lower job satisfaction.

In contrast, radiographers in private hospitals may experience moderate to high job demands, but they often have more decision-making freedom and better working conditions. For example, they may have more say in scheduling patients, using modern equipment, and managing their workload. This higher level of control helps balance the effects of job demands, leading to an active job situation, where employees face challenges but remain motivated and satisfied. Hence, radiographers in private hospitals may experience less job strain compared to their counterparts in public hospitals.

The third element of the expanded model social support is also relevant to this study. Support from supervisors, colleagues, and management plays an important role in reducing stress. In many public hospitals, limited teamwork, poor communication, and lack of managerial support can make radiographers feel isolated and overwhelmed. On the other hand, in private hospitals, closer supervision and teamwork may offer more emotional and professional support, which helps reduce stress and improve performance.

Applying this model to the present study, it can be said that occupational stress among radiographers is largely influenced by the interaction between job demands, job control, and social support. When radiographers face high demands without enough control or support, they experience greater strain and are more likely to feel exhausted or dissatisfied. However, when they have more control over their work and receive adequate support, they can manage their responsibilities better, remain motivated, and maintain good mental health.

The Job Demand-Control Model provides a clear explanation for the differences in stress levels between radiographers in public and private hospitals. It helps to identify areas that need improvement, such as reducing excessive workload, increasing staff participation in decision-making, and strengthening social support systems. By applying this model, hospital administrators and policymakers can design better strategies to promote a healthier work environment, reduce occupational stress, and improve job satisfaction among radiographers.

2.3 EMPIRICAL REVIEW

2.3.1. Specific stressors contributing to occupational stress among radiographers

Okaro et al., 2022 conducted a descriptive cross-sectional study to assess the impact of workload and time pressure on occupational stress among radiographers in Enugu State, Nigeria. A simple random sampling technique was employed to select 120 radiographers working in both public and private diagnostic centers. Data were collected using a structured and pre-validated self-administered questionnaire, which was designed to measure workload intensity, time constraints, and perceived stress levels. The questionnaires were distributed during work hours and retrieved immediately after completion to ensure a high response rate. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25, employing descriptive statistics such as frequencies, percentages, and mean scores. The results revealed that 72.5% of the respondents reported experiencing frequent work overload, with 65.8% stating that they often had to handle more patients than recommended per shift. Additionally, 68.3% indicated that tight deadlines and insufficient rest periods contributed significantly to their stress levels. The study concluded that excessive workload and inadequate time allocation were key stressors leading to burnout and reduced job satisfaction among radiographers. It recommended that management should implement flexible scheduling and recruit additional staff to reduce the workload burden.

Mensah & Adjei 2021 carried out a descriptive cross-sectional study to investigate how equipment deficiency and technological challenges contribute to occupational stress among radiographers in Ghanaian hospitals. The study utilized a purposive sampling technique to recruit 150 radiographers from tertiary and secondary healthcare facilities across Accra and Kumasi. Data were collected through a structured, self-administered questionnaire that assessed the availability of functional imaging equipment, frequency of equipment breakdown, and the perceived effect of these challenges on stress levels. Data were analyzed using SPSS version 22, applying descriptive and inferential statistics such as mean scores and chi-square tests. The findings indicated that 80.7% of respondents identified frequent equipment malfunction as a major stressor, while 69.2% reported that delays caused by faulty machines increased patient complaints and job pressure. Furthermore, 61.5% stated that obsolete imaging equipment made diagnostic work more tedious and mentally exhausting. The study concluded that technological inadequacies and frequent equipment breakdowns are significant contributors to occupational stress among radiographers, negatively affecting service delivery. It recommended that health authorities should prioritize regular equipment maintenance, upgrade imaging technologies, and provide technical support to minimize stress caused by operational inefficiencies.

Egbeyem et al., 2022 conducted a descriptive cross-sectional study to assess occupational stress and its associated factors among intern radiographers in Anambra State, Nigeria. A convenience sampling technique was used to select 30 intern radiographers from various teaching hospitals in the state. Data were collected using a structured questionnaire developed to evaluate the influence of staff shortage, role overload, and work pressure on stress levels. The instrument was distributed during clinical practice hours, and responses were collected on the same day. The data were analyzed using SPSS version 20, applying descriptive statistics such as frequencies and percentages. The results revealed that all participants (100%)

experienced some form of occupational stress, with 86.7% attributing it to inadequate staffing and excessive workloads. More than half of the respondents (56.7%) reported feeling overwhelmed by the number of patients they handled daily, while 53.3% indicated pressure to increase service delivery within limited time frames. The study concluded that staff shortage and role overload are major stressors among radiographers, particularly interns, leading to fatigue and decreased efficiency. It recommended that hospitals should employ more radiographers, adopt fair task allocation policies, and organize stress management programs to improve staff well-being.

Gam et al., 2025 conducted a descriptive quantitative study to explore occupational stressors among diagnostic radiographers working in public health facilities in the eThekwini District of KwaZulu-Natal, South Africa. The study used a purposive sampling technique to select 101 radiographers, of which 43 returned valid questionnaires, representing a 43% response rate. Data were collected using a structured questionnaire based on the United Kingdom's Health and Safety Executive (HSE) stress management standards. The questionnaire examined domains such as workload, managerial support, interpersonal relationships, and organizational climate. Data were analyzed using descriptive statistics, including frequencies and percentages. The findings revealed that the three most common sources of stress were heavy workload (78%), lack of managerial support (65%), and inadequate communication within departments (61%). Additional stressors identified included bullying, limited career advancement opportunities, and role ambiguity. The study concluded that poor managerial support and weak organizational communication contribute significantly to occupational stress among radiographers, affecting both morale and productivity. It recommended that hospital management should implement supportive supervision, create open communication channels, and foster positive work environments to reduce stress and improve job satisfaction.

Arif et al., 2024 conducted a descriptive cross-sectional study to examine the relationship between workload, burnout, and perceived stress among radiographers in Saudi Arabia. The study adopted a voluntary sampling technique and involved 322 radiographers from various hospitals across the country. Data were collected using a self-administered online questionnaire that incorporated the Maslach Burnout Inventory (MBI) and the Perceived Stress Scale (PSS). The instruments measured emotional exhaustion, depersonalization, and personal accomplishment as indicators of stress and burnout. The data were analyzed using SPSS version 27, employing descriptive and inferential statistics such as t-tests and ANOVA to explore relationships between variables. The findings showed that the mean emotional exhaustion score was 26.01, indicating a moderate level of burnout, while depersonalization and perceived stress scores were also elevated. Younger radiographers and those with fewer years of experience reported higher stress levels compared to their older counterparts. The study concluded that high workload demands and prolonged exposure to emotionally draining work conditions significantly contribute to burnout and occupational stress among radiographers. It recommended that hospital administrators develop stress intervention programs, provide psychological counseling, and establish workload management systems to enhance radiographers' well-being and job performance.

2.3.2. factors such as workload, work environment, and patient interaction leading to the occupational stress of radiographers in both private and public settings.

In a descriptive cross-sectional study, Yusuf & Eze, 2022 investigated the influence of the work environment on the occupational stress of radiographers working in selected public and private health facilities in Enugu State, Nigeria. A purposive sampling technique was used to recruit 150 participants. Data were collected using a structured questionnaire adapted from the Health and Safety Executive (HSE) work environment module, focusing on lighting, ventilation, equipment adequacy, and safety protocols. Data were analyzed using SPSS

version 25, applying descriptive statistics and chi-square tests. The results showed that 70% of respondents identified poor ventilation, frequent power outages, and inadequate diagnostic tools as key contributors to workplace stress. Additionally, 64% of radiographers in public hospitals reported that faulty equipment and lack of maintenance made their work more physically and mentally demanding, compared to 48% in private settings. The study concluded that poor work environment conditions, particularly equipment inadequacy and infrastructure limitations, are significant stressors affecting radiographers' productivity. It recommended that hospital management prioritize facility upgrades and provide safer, more conducive work environments.

Olatunde & Ibrahim, 2023 conducted a descriptive cross-sectional study to assess how workload and time pressure contribute to occupational stress among radiographers in both private and public hospitals in Lagos State, Nigeria. A stratified random sampling technique was used to select 200 radiographers from teaching hospitals, general hospitals, and private diagnostic centers. Data were collected through a structured, pre-validated self-administered questionnaire containing sections on workload intensity, working hours, and perceived stress levels. Data analysis was done using the Statistical Package for the Social Sciences (SPSS) version 26, employing descriptive and inferential statistics. The findings revealed that 76% of respondents reported working beyond standard hours, while 69% indicated that attending to a high number of patients per day increased their stress levels. Public hospital radiographers reported greater workload-induced stress than their private counterparts due to limited staff and high patient inflow. The study concluded that excessive workload and time pressure significantly contribute to occupational stress among radiographers, reducing efficiency and job satisfaction. It recommended better staff-to-patient ratios and the introduction of flexible work schedules to alleviate stress.

Abubakar & Johnson, 2021 conducted a descriptive cross-sectional study to evaluate how patient interaction and emotional demands contribute to occupational stress among radiographers in both public and private diagnostic centers in Abuja, Nigeria. A simple random sampling technique was used to select 180 practicing radiographers across 10 major hospitals. A self-administered structured questionnaire designed to assess patient-related stress factors—such as dealing with uncooperative patients, patient complaints, and emotionally charged cases was used for data collection. Data were analyzed using SPSS version 24 with descriptive and correlational statistics. Findings revealed that 66% of respondents experienced high stress levels when dealing with anxious or aggressive patients, while 58% reported emotional fatigue after attending to terminally ill individuals. Furthermore, radiographers in private facilities experienced higher stress due to pressure to maintain patient satisfaction and service speed. The study concluded that frequent emotional interactions with patients contribute significantly to stress among radiographers, particularly in high-pressure private centers. It recommended that hospitals provide stress management training focused on emotional resilience and communication skills to improve coping mechanisms.

In a descriptive cross-sectional study, Nwankwo & Bello, 2022 explored the relationship between organizational structure, managerial support, and occupational stress among radiographers in private and public diagnostic centers in Port Harcourt, Nigeria. A total of 120 radiographers were selected using convenience sampling. Data were gathered using a structured questionnaire that examined workload management, supervision, communication patterns, and institutional support. Analysis was conducted using SPSS version 25, applying frequencies, means, and Pearson correlation. The study found that 71% of respondents in public hospitals reported inadequate managerial support and poor communication as key stressors, compared to 54% in private institutions. Radiographers who perceived their

supervisors as unsupportive were more likely to report higher stress levels. The study concluded that ineffective communication and lack of administrative support amplify the effects of workload and environmental stressors. It recommended that management promote open communication, mentorship, and staff welfare initiatives to mitigate occupational stress.

A descriptive cross-sectional study by Adeyemi & Musa, 2024 examined the combined influence of workload, work environment, and patient relations on the occupational stress of radiographers in selected public and private hospitals in Ibadan, Oyo State. The researchers used a multi-stage sampling technique to select 250 radiographers from different healthcare levels. Data were collected using a structured self-administered questionnaire divided into three sections addressing workload intensity, environmental challenges, and patient interaction. The data were analyzed using SPSS version 27 with descriptive statistics and regression analysis to determine predictive factors of stress. The results revealed that workload ($\beta = 0.42$, $p < 0.01$), poor work environment ($\beta = 0.35$, $p < 0.05$), and patient interaction ($\beta = 0.28$, $p < 0.05$) were all significant predictors of occupational stress. Radiographers in public hospitals reported higher stress levels overall. The study concluded that these three factors jointly account for a substantial portion of occupational stress among radiographers, emphasizing the need for holistic interventions. It recommended improved staffing, facility enhancement, and interpersonal communication training to promote occupational well-being.

2.3.3 Coping Mechanisms Employed By Radiographers In Public And Private Establishments To Manage Occupational Stress.

Okafor & Danjuma, 2023 carried out a descriptive cross-sectional study to assess the coping mechanisms adopted by radiographers in both public and private health institutions in Abuja, Nigeria. The study sampled 220 radiographers using a stratified random sampling technique

across tertiary hospitals, secondary facilities, and private diagnostic centers. Data were obtained through a structured and validated self-administered questionnaire, which included items adapted from the Brief COPE Inventory focusing on emotional, behavioral, and problem-focused coping approaches. The data were analyzed using SPSS version 27 with descriptive and inferential statistics. Findings revealed that 68% of radiographers used problem solving techniques such as effective time management, prioritizing daily tasks, and peer collaboration to manage work pressure. In addition, 61% adopted emotional coping strategies including prayer, relaxation, and meditation to relieve stress. The study concluded that a combination of individual and organizational coping mechanisms such as workload rotation, staff motivation, and access to recreational activities helped radiographers maintain work efficiency and reduce burnout.

Eze & Adamu, 2021 examined the role of social support and teamwork as coping mechanisms among radiographers experiencing occupational stress in public and private diagnostic centers in Enugu State, Nigeria. The researchers employed a descriptive cross-sectional design and used a simple random sampling technique to select 150 radiographers. A validated questionnaire measured the level of stress and social support received from colleagues, supervisors, and family. Data were analyzed using SPSS version 24 with descriptive and Pearson correlation analysis. Findings indicated that 66% of radiographers relied heavily on social interaction and team collaboration to manage stress, while 58% sought emotional reassurance from family and friends outside the workplace. Radiographers in private institutions reported more organizational encouragement and interpersonal cohesion than those in public hospitals. The study concluded that peer support groups, mentorship, and teamwork significantly reduce emotional strain and improve work performance among radiographers. It recommended that management in both sectors should

promote a culture of mutual support and mentorship to strengthen interpersonal coping capacity.

Afolayan & Ojo , 2022 conducted a descriptive cross-sectional study to explore the types of coping strategies radiographers use in responding to occupational stress in selected hospitals across Lagos State, Nigeria. The study involved 200 respondents selected using purposive sampling from both government and privately owned hospitals. A structured questionnaire was designed based on Lazarus and Folkman's (1984) coping model to measure problem-focused and emotion-focused coping responses. Data were analyzed using SPSS version 25 with descriptive and chi-square statistics. The results revealed that 72% of respondents preferred problem-focused coping methods such as seeking support from colleagues, delegation of tasks, and setting achievable goals. Meanwhile, 64% reported relying on emotion-focused methods such as humor, optimism, and social interaction to deal with work strain. The study found that radiographers in private facilities displayed higher emotional resilience due to better work-life balance and support systems, while those in public hospitals adopted problem-solving behaviors to cope with high workloads. It concluded that promoting structured problem-solving workshops and emotional support systems is vital for improving job satisfaction and mental health among radiographers.

Bassey & Lawal, 2023 conducted a descriptive survey to identify emotional and spiritual coping mechanisms employed by radiographers in both public and private hospitals in Cross River State, Nigeria. The study targeted 180 radiographers, of which 160 responded fully to the distributed questionnaires. Data collection focused on the use of relaxation techniques, religious faith, and emotional self-regulation strategies. Analysis using SPSS version 26 revealed that 70% of respondents practiced religious-based coping methods, including prayer and faith-based reflection, while 62% used relaxation activities such as listening to music, deep breathing, and meditation to manage work stress. The study also observed that

radiographers in private establishments practiced more flexible self-care routines compared to those in public facilities. It concluded that faith and relaxation significantly enhance emotional stability, reduce anxiety, and promote resilience among radiographers dealing with high-pressure work environments.

Adeyemi & Musa, 2024 carried out a descriptive cross-sectional study to assess institutional coping support systems for radiographers in selected tertiary and private hospitals in Ibadan, Nigeria. The study employed a multistage sampling method to select 210 participants and used a structured questionnaire focusing on workload policies, supervision, training, and staff welfare as institutional coping mechanisms. Data were analyzed using SPSS version 27 and regression analysis. The results showed that 74% of respondents from public hospitals lacked adequate institutional support such as counseling services and regular staff rotations, while 68% from private facilities reported management-initiated programs like mental health seminars and team-building exercises. The study found a strong positive correlation between institutional coping support and employee job satisfaction ($r = 0.61$, $p < 0.01$). It concluded that effective organizational interventions such as staff recognition, adequate staffing, and continuous professional development serve as essential coping frameworks that reduce occupational stress among radiographers.

2.4 Summary of Literature Review

The reviewed literature consistently highlights that occupational stress among radiographers arises from multiple interacting factors, including workload, work environment, patient interaction, and the coping mechanisms employed to manage these stressors. Occupational stress in radiography is influenced by both individual and organizational variables that affect job satisfaction, mental well-being, and professional efficiency. This study is guided by the Job Demand-Control (JDC) Model, which explains that stress results from the imbalance between job demands (such as workload and emotional strain) and the level of control or

support available to employees. The model is applicable in this context because radiographers' stress experiences are shaped by their ability to manage work pressures, the resources provided by their organizations, and their personal coping skills.

Empirical studies have emphasized several dimensions of occupational stress among radiographers. Olatunde and Ibrahim (2023) found that excessive workload and time pressure in both public and private hospitals significantly contributed to stress and burnout, particularly where radiographer-to-patient ratios were poor. Yusuf and Eze (2022) reported that unfavorable work environments characterized by poor ventilation, obsolete equipment, and inadequate safety measures intensified physical and psychological strain. Abubakar and Johnson (2021) identified patient interaction challenges, especially with uncooperative or critically ill individuals, as a major emotional stressor. Nwankwo and Bello (2022) further noted that the absence of organizational support, lack of clear communication, and uneven task distribution worsened stress levels among radiographers in public facilities.

Regarding coping mechanisms, studies reveal a mix of individual and institutional strategies. Okafor and Danjuma (2023) found that radiographers relied heavily on problem-focused and emotion-focused coping strategies such as time management, relaxation, and prayer to manage stress. Afolayan and Ojo (2022) emphasized that emotional resilience, teamwork, and social support significantly reduced occupational tension, particularly in private facilities with supportive management structures. Adeyemi and Musa (2024) reported that institutional interventions such as workload regulation, staff counseling, and welfare programs enhanced coping outcomes and reduced burnout rates among radiographers.

The reviewed evidence suggests that while stress is a prevalent issue among radiographers, the extent and nature of stressors vary between public and private healthcare settings due to differences in workload intensity, environmental conditions, and management practices.

However, limited empirical studies have specifically examined how these factors interact within the Nigerian radiography context, especially in Edo State. Therefore, this study seeks to bridge this gap by exploring the specific stressors contributing to occupational stress and the coping mechanisms radiographers employ to manage these challenges in both public and private establishment.

CHAPTER THREE: RESEARCH METHODOLOGY

This chapter outlines the methodology that was adopted in the course of the study. It details the research design, study location, target population, sample size calculation, sampling method, inclusion and exclusion criteria, instrument for data gathering, validation and reliability procedures, data collection process, data analysis methods, and ethical guidelines for the study.

3.1 Research Settings

The Research Setting for this study encompassed the actual workplaces where radiographers are employed to work and offer their services in Benin City, Nigeria. The study included all selected Public and Private health establishments/clinical settings. Hence, the settings provided an appropriate platforms for engaging practicing radiographers actively involved in diagnostic imaging.

3.2. Research Design

A descriptive cross-sectional survey design was adopted for this study. This design was suitable because it enabled the researcher to collect data from radiographers at a single point in time to assess and compare the level of occupational stress experienced in both public and private clinical settings. The design is appropriate for identifying specific stressors, coping mechanisms, and variations in work-related experiences without manipulating any variables.This approach provided a comprehensive understanding of the relationship between job demands, job control, and social support as they influence stress levels among radiographers. Similar studies, such as that of Adebayo et al. (2021), utilized a descriptive cross-sectional design to explore workplace stress and its effects among healthcare professionals. Therefore, this design helped to objectively describe existing conditions,

analyze differences between the two settings, and generate data useful for improving radiographers' work environments.

3.3 Target Population

The target population for this research included all practicing radiographers working in various Public and Private Health Establishments/Clinical Settings in Benin city, Edo State.

3.4 Sampling Techniques/Sampling Size

The sampling technique that was adopted for this research study is a purposive sampling technique This sampling technique ensured that radiographers in both clinical settings were appropriately represented in the sample thereby allowing for meaningful comparison. Also the risk of selection bias was also limited with this sample.

The sample size was determined with the use of the Taro Yamane formula.

The sampling size is the numbers of subjects or participant required and to which the study findings will be generalized. The size was estimated from a population of sixty-four(64) using Taro Yamane (1967) formula

$$n = \frac{N}{1 + Nd^2}$$

Where n = sampl

N= population size

D= level of precision (confidence interval)

N= 64

D= 0.05

Thus;

$$n = \frac{64}{1+64\ (0.05)^2}$$

$$\frac{64}{1+\ 64(0.0025)}$$

$$\frac{64}{1+0.16}$$

$$\frac{64}{1.16}$$

Therefore, n = 55.2

10% attrition = 5.52

Therefore, the minimum sample size is 60

Aprox 60

Therefore n = 60

3.5 Instrument for Data Collection

Creswell stated that self-completed questionnaires are the best data collection tools for a survey as regards a population's attitude, beliefs, opinions and knowledge (Creswell JW, 2009).

A well structured, self-administered questionnaire was adopted in the course of this study and it was developed based off on literature and previous studies on occupational stress among radiographers. The Questionnaire contained various relevant sections that is relevant such as:

SECTION A: Demographics Data of participants (Age, Gender, Ethnicity etc.)

SECTION B: To identify and analyze the specific stressors contributing to occupational stress among radiographers in both clinical settings.

SECTION C: To identify factors such as workload, work environment, and patient interaction leading to the occupational stress of radiographers in both clinical settings.

SECTION D: To explore and compare the coping mechanisms employed by radiographers in public and private establishments to manage occupational stress.

The questionnaire will be generally closed ended and will contain other multiple choice questions.

3.6 Validity of the Instrument

The content and face validity of the instrument adopted was reviewed by experts in radiography as well as my supervisor. The feedbacks gotten from the review was used to refine the questions for clarity, relevance and comprehensiveness.

3.7 Reliability of the Instrument

The reliability of the questionnaire was tested using the Cronbach's Alpha Coefficient which assesses the internal consistency of the instrument. A coefficient value of 0.7 was acceptable, indicating that the items in the questionnaire are sufficiently correlated and reliable for the main study.

3.8 Method of Data Collection

Data was collected over a one month period, visitation was made to the selected hospitals and diagnostic centers to distribute printed copies of the questionnaire. The questionnaires were also made available in soft copies which was distributed via WhatsApp groups and E-mail platforms to enhance participation. Participation was solely voluntary and informed consent was be obtained before commencement. Respondents(Radiographers) were also given some minutes to complete the questionnaires which were eventually retrieved after a mutually stipulated time frame.

3.9 Method of Data Analysis

Collected data with the aid of questionnaire was analyzed using the Statistical Package for Social Sciences version 25. A descriptive statistics such as frequencies and percentages was used to summarize the demographic variables (age, gender, years of experience) and categorical data(High Stress, Moderate Stress and Low Stress) for the stress levels.

3.10 Ethical Considerations

Ethical issues are important considerations to ensure that respondents rights are protected thereby ensuring anonymity, confidentiality and that participants are protected in the course of the study. Approval was requested from the Ethics and Research Committee of all the Public and Private Establishments that was used in the course of this research study.The study also adhered strictly to the following ethical principles:

Voluntary Participation: Radiographer participated freely without coercion.

Informed Consent: Verbal informed consent was obtained before administering the questionnaire.

Confidentiality: All responses was anonymous and data were treated with strict confidentiality.

Non-maleficence: No physical or emotional harm was inflicted; participants' dignity and rights will be upheld

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.0 Introduction

Sixty (60) respondents of radiographers in public and private clinical settings in Benin City, participated in the study and were administered the questionnaires, out of which data for this analysis was obtained from thirty radiographers each from each clinical settings. The respondents were asked questions concerning their socio demographic profile, specific stressors contributing to occupational stress, factors leading to occupational stress and coping mechanisms for occupational stress. The results are presented in the following tables.

4.1 Analysis of Socio-Demographic Characteristics of the Respondents

Table 4.1: Socio-Demographic Characteristics of the Respondents

Variables	**Frequency (n=30) Public setting**	**Frequency (n=30) Private setting**	**Total Percent (%)**
Age			
Under 25	7	9	26.7
25-34	14	18	53.3
35-44	5	3	13.3
45-54	4	0	6.7
Above 55	0	0	-
Gender			
Male	14	12	43.3
Female	16	18	56.7
Prefer not to say	0	0	-
Years of Experience as a Radiographer			
Less than 1 yr	10	12	36.7
1-5 years	11	13	40.0

6-10 yrs	9	5	23.3
More than 10 years	0	0	-
Type of Clinical Setting			
Public hospital/clinic	30	-	50.0
Private hospital/clinic	-	30	50.0
Average number of working hours per week			
Less than 30	5	5	16.7
30-40	10	10	33.3
41-50	13	11	40.0
More than 50	2	4	10.0

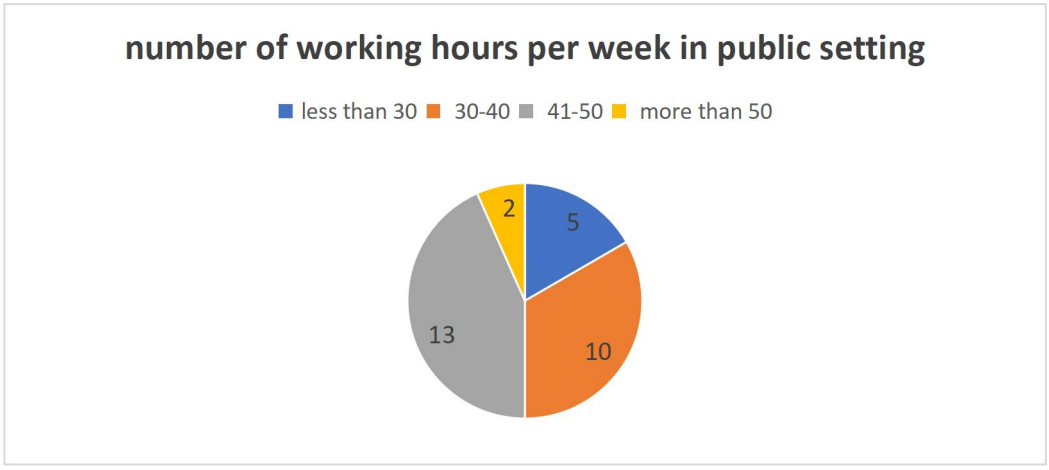


Fig4.1

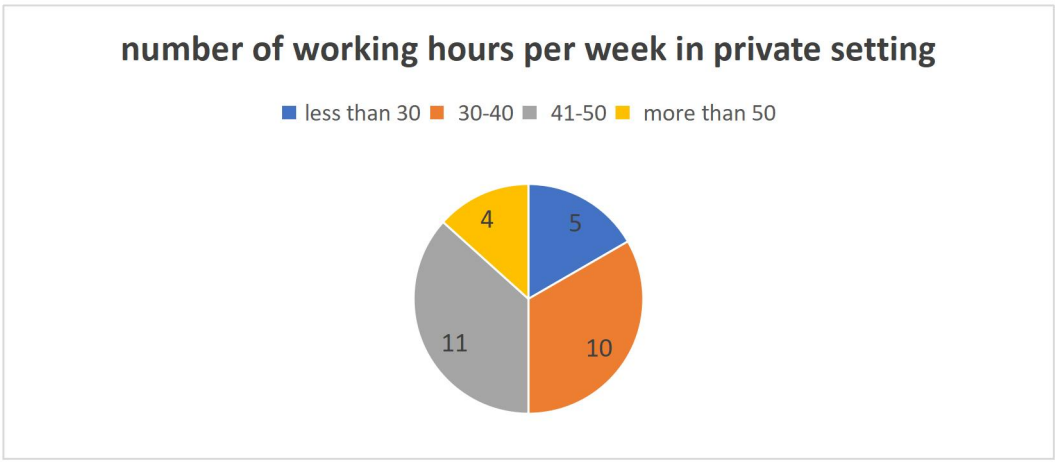


Fig 4.2

4.2 Analysis of Research Questions

Table 4.2: Analysis of Specific Stressors Contributing to Occupational Stress in Public Settings.

S/N	QUESTIONS	SD	D	N	A	SA
		F(%)	F(%)	F(%)	F(%)	F(%)
1.	Heavy workload	0 (0)	6 (20.0)	4 (13.3)	12 (40.0)	8 (26.7)
2.	Frequent overtime	0 (0)	8 (26.7)	5 (16.7)	10 (33.3)	7 (23.3)
3.	Lack of adequate staffing	0 (0)	14 (46.7)	6 (20.0)	8 (26.7)	2 (6.7)
4.	Exposure to radiation hazards	0 (0)	8 (26.7)	8 (26.7)	8 (26.7)	6 (20.0)
5.	High patient volume	0 (0)	5 (16.7)	2 (6.7)	10 (33.3)	13 (43.3)
6.	Difficult or demanding patients	0 (0)	4 (13.3)	4 (13.3)	12 (20.0)	10 (33.3)
7.	Limited career advancement opportunities	0 (0)	8 (26.7)	10 (33.3)	12 (40.0)	0 (0)
8.	Inadequate equipment or technology	0 (0)	9 (30.0)	6 (20.0)	10 (33.3)	5 (16.7)
9.	Poor management or supervision	0 (0)	6 (20.0)	10 (33.3)	8 (26.7)	6 (20.0)
10.	Job insecurity	0 (0)	6 (20.0)	12 (40.0)	10 (33.3)	2 (6.7)

S/A &A=High Stress, N=Moderate Stress, S/D &D=Low Stress

Table 4.3: Analysis of Specific Stressors Contributing to Occupational Stress in Private Clinical Settings

S/N	QUESTIONS	SD	D	N	A	SA

		F(%)	F(%)	F(%)	F(%)	F(%)
1.	Heavy workload	0 (0)	4 (13.3)	2 (6.7)	14 (46.7)	10 (33.3)
2.	Frequent overtime	0 (0	4 (13.3)	4 (13.3)	12 (40.0)	10 (33.3)
3.	Lack of adequate staffing	0 (0)	5 (16.7)	3 (10.0)	9 (30.0)	13 (43.3)
4.	Exposure to radiation hazards	0 (0)	8 (26.7)	8 (26.7)	10 (33.3)	4 (13.3)
5.	High patient volume	0 (0)	7 (23.3)	6 (20.0)	11 (36.7)	6 (20.0)
6.	Difficult or demanding patients	0 (0)	4 (13.3)	5 (16.7)	12 (40.0)	9 (30.0)
7.	Limited career advancement opportunities	0 (0)	6 (20.0)	10 (33.3)	14 (46.7)	0 (0)
8.	Inadequate equipment or technology	0 (0)	6 (20.0)	8 (26.7)	12 (40.0)	4 13.3)
9.	Poor management or supervision	0 (0)	4 (13.3)	10 (33.3)	10 (33.3)	6 (20.0)
10.	Job insecurity	0 (0)	6 (20.0)	12 (40.0)	8 (26.7)	4 (13.3)

S/A &A = High Stress, N= Moderate Stress, S/D &D= Low Stress

Table 4.4: Analysis of Factors Leading to Occupational Stress in Public Clinical Settings

S /N	**QUESTIONS**	**PUBLIC (F)**	**%**
1	How often do you experience stress due to **workload**? (Selec tone) ☐Never ☐Rarely ☐Sometimes	 0 0 9	 - - 30.0

	☐Often ☐Always	14 7	46.7 23.3
2	How would you rate your **work environment** in terms of contributing to your stress? (Select one) ☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Excellent	 0 6 10 12 2	 - 20.0 33.3 40.0 6.7
3	How often do **patient interactions** contribute to your stress? (Select one) ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always	 0 5 14 11 0	 - 16.7 46.7 36.7 -

Table 4.5: Analysis of Factors Leading to Occupational Stress in Private Clinical Settings

S /N	**QUESTIONS**	**PRIVATE (F)**	**%**
1	How often do you experience stress due to **workload**? (Select one) ☐ Never ☐ Rarely ☐ Sometimes	 0 0	 - -

	☐ Often ☐ Always	4 18 8	13.3 60.0 26.7
2	How would you rate your **work environment** in terms of contributing to your stress? (Select one) ☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Excellent	 0 2 10 16 2	 - 6.7 33.3 53.3 6.67
3	How often do **patient interactions** contribute to your stress? (Select one) ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always	 0 6 10 14 0	 - 20.0 33.3 46.7 -

Table 4.6 Analysis of the Coping Mechanisms for Occupational Stress in Public Sector

S /N	**QUESTIONS**	**Public (F)**	**%**

1	Which coping mechanisms do you frequently use to manage occupational stress? (Select all that apply) ☐ Talking to colleagues/friends ☐ Exercise or physical activity ☐ Meditation or relaxation techniques ☐ Professional counseling or therapy ☐ Taking breaks during work ☐ Use of hobbies or leisure activities ☐ Use of alcohol, tobacco, or other substance	 21 5 9 0 17 8 0	 70.0 16.7 30.0 - 56.7 26.7 -
2	How effective do you find these coping mechanisms? (Select one) ☐ Not effective ☐ Slightly effective ☐ Moderately effective ☐ Very effective ☐ Extremely effective	 0 3 7 14 6	 - 10.0 23.3 46.67 20.00
3	Does your workplace provide any formal support systems or programs for managing stress? (Select one) ☐ Yes ☐ No ☐ Not sure	 18 8 4	 60.00 26.7 33.0
4	If yes, how often do you make use of these support systems? (Select one) ☐Never ☐Rarely ☐Sometimes ☐Often ☐ Always	 0 6 12 0 0	 - 20.0 40.0 - -

Table 4.7: Analysis of the Coping Mechanisms for Occupational Stress in Private Sector

S /N	QUESTIONS	Private (F)	%
1	Which coping mechanisms do you frequently use to manage occupational stress? (Select all that apply)		
	☐Talking to colleagues/friends	24	80.0
	☐Exercise or physical activity	6	20.0
	☐Meditation or relaxation techniques	11	36.7
	☐Professional counseling or therapy	3	10.0
	☐Taking breaks during work	19	63.3
	☐Use of hobbies or leisure activities	6	20.0
	☐ Use of alcohol, tobacco, or other substances	0	-
2	How effective do you find these coping mechanisms? (Select one)		
	☐ Not effective	0	-
	☐ Slightly effective	2	6.7
	☐ Moderately effective	6	20.0
	☐ Very effective	16	53.3
	☐ Extremely effective	6	20.0
3	Does your workplace provide any formal support systems or programs for managing stress?		
	☐ Yes	23	76.7
	☐ No	3	10.0
	☐ Not sure	4	13.3

4	If yes, how often do you make use of these support systems? ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always	 0 3 16 4 0	 - 10.0 53.3 13.3 -

Test of Hypothesis

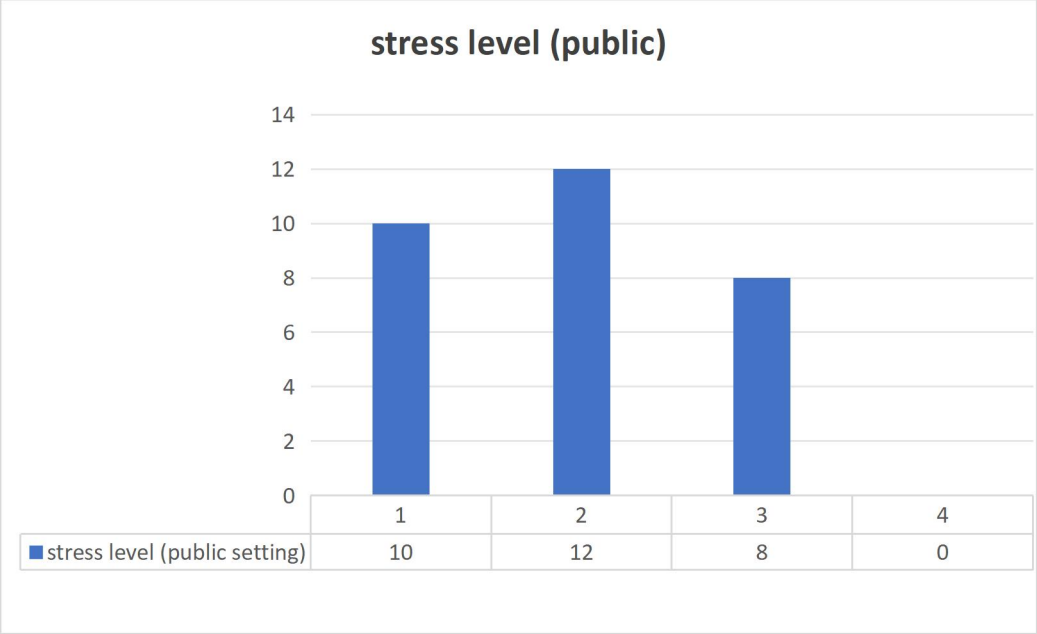
Hypothesis 1: There is no significant difference in the level of occupational stress experienced by Radiographers working in public clinical settings and those working in private clinical settings.

Using Tables 4.2 &4.3

Table 4.8: Chi square test Comparing Occupational Stress Levels Between Public and Private Clinical Settings

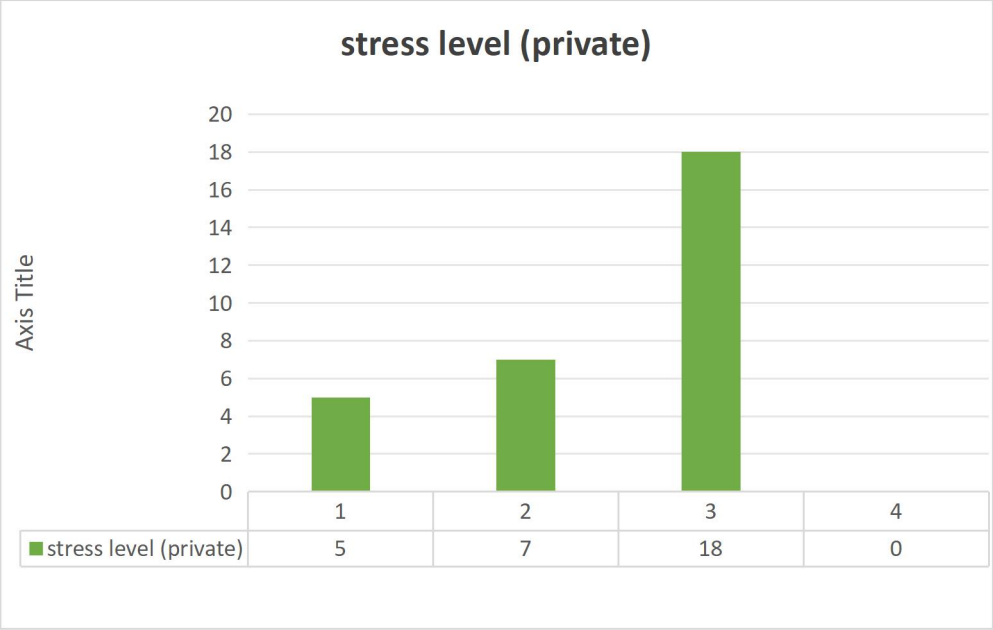
Response category	**Public(observed)**	Private (observed)	Public(expected)	**Private(expected)**
Low stress	10	5	7.5	7.5
Moderate stress	12	7	9.5	9.5
High stress	8	18	13.0	13.0
Total	30	30	60	30

$\chi^2 = 10.92$, df = 2, $p < 0.05$



1= Low Stress, 2 = Moderate Stress, 3 = High Stress

Fig. 4.3:



1 = Low Stress, 2 = Moderate Stress, 3 = High Stress

Fig. 4.4:

The chi square test demonstrated a significant association between the type of facility and the level of occupational stress experienced by radiographers. The calculated value (χ^2 = 10.92, df = 2, $p < 0.05$) was greater than the critical benchmark of 5.991, which confirms that the difference observed between both groups is not due to chance. Consequently, the null hypothesis was not upheld. The response trend shows that radiographers working in private centers experience slightly more stressful conditions than those in public centers (government-owned hospitals). This outcome implies that the private centers environment may expose radiographers to more pressure, possibly as a result of stricter work policies, heavier workloads, higher patient numbers, and limited staffing compared to public hospitals.

4.3 Discussion of Findings

4.3.1 Analysis of the specific stressors contributing to occupational stress among radiographers in both clinical settings.

As shown in Table 4.2 & 4.3, this general findings reveals that radiographers in the private clinical settings were affected by a higher number of stressors with a mean stressor frequency value of 18 (69.2%) compared to the public clinical settings with a mean stressor frequency of 8 (30.2%). The tables also highlights various stressors contributing to occupational stress in private and public clinical settings, it is revealed that radiographers in the private clinical settings experienced significantly higher occupational stress than their counterparts in the public settings and this can be seen based on stressors such as heavy workload with 80.0% of radiographers in the private settings reporting higher levels of stress compared with 66.7% from the public settings Also, 73.3% of radiographers from the private setting experienced higher stress from frequent overtime compared with 53.3% of their counterparts in the public settings. Based on adequacy of staffing in the private setting, 73.3% of radiographers from

the private setting suggested low staffing in their facility compared with their counterparts in the public setting. About 53.0% of radiographers in the private settings experienced more stress from inadequate equipment or technology compared with their counterparts in the public settings with a record of 50.0%.

This findings agrees with Okaro et al., 2022 who conducted a descriptive cross-sectional study to assess the impact of workload and time pressure on occupational stress among radiographers in Enugu State, Nigeria. A simple random sampling technique was employed to select 120 radiographers working in both public and private diagnostic centers. Data were collected using a structured and pre-validated self-administered questionnaire, which was designed to measure workload intensity, time constraints, and perceived stress levels. The results revealed that 72.5% of the respondents reported experiencing frequent work overload, with 65.8% stating that they often had to handle more patients than recommended per shift. Additionally, 68.3% indicated that tight deadlines and insufficient rest periods contributed significantly to their stress levels. The study concluded that excessive workload and inadequate time allocation were key stressors leading to burnout and reduced job satisfaction among radiographers. It recommended that management should implement flexible scheduling and recruit additional staff to reduce the workload burden.

It also agrees with Mensah & Adjei 2021 who carried out a descriptive cross-sectional study to investigate how equipment deficiency and technological challenges contribute to occupational stress among radiographers in Ghanaian hospitals. The study utilized a purposive sampling technique to recruit 150 radiographers from tertiary and secondary healthcare facilities across Accra and Kumasi. The findings indicated that 80.7% of respondents identified frequent equipment malfunction as a major stressor, while 69.2% reported that delays caused by faulty machines increased patient complaints and job pressure. Furthermore, 61.5% stated that obsolete imaging equipment made diagnostic work more

tedious and mentally exhausting. The study concluded that technological inadequacies and frequent equipment breakdowns are significant contributors to occupational stress among radiographers, negatively affecting service delivery. It recommended that health authorities should prioritize regular equipment maintenance, upgrade imaging technologies, and provide technical support to minimize stress caused by operational inefficiencies.

4.3.2 Analysis of factors leading to the occupational stress of radiographers in both clinical settings.

The analysis of factors leading to the occupational stress as seen in Table 4.3 & 4.4 reveals that the private clinical settings is affected by a significantly higher level of workload compared with the public settings. This shows that the private setting tho may have more workload, have a good working environment.

This findings does not align with the study carried out by Olatunde & Ibrahim, 2023 who conducted a descriptive cross-sectional study to assess how workload and time pressure contribute to occupational stress among radiographers in both private and public hospitals in Lagos State, Nigeria. A stratified random sampling technique was used to select 200 radiographers from teaching hospitals, general hospitals, and private diagnostic centers. The findings revealed that 76% of respondents reported working beyond standard hours, while 69% indicated that attending to a high number of patients per day increased their stress levels. Public hospital radiographers reported greater workload-induced stress than their private counterparts due to limited staff and high patient inflow. The study concluded that excessive workload and time pressure significantly contribute to occupational stress among radiographers, reducing efficiency and job satisfaction. It recommended better staff-to-patient ratios and the introduction of flexible work schedules to alleviate stress.

The analysis of how patient interactions contribute to stress in both clinical settings reveals that radiographers in private setting experience more stress from patient interactions that those in public setting.

This findings aligns with Abubakar & Johnson, 2021 who conducted a descriptive cross-sectional study to evaluate how patient interaction and emotional demands contribute to occupational stress among radiographers in both public and private diagnostic centers in Abuja, Nigeria. A simple random sampling technique was used to select 180 practicing radiographers across 10 major hospitals. Findings revealed that 66% of respondents experienced high stress levels when dealing with anxious or aggressive patients, while 58% reported emotional fatigue after attending to terminally ill individuals. Furthermore, radiographers in private facilities experienced higher stress due to pressure to maintain patient satisfaction and service speed. The study concluded that frequent emotional interactions with patients contribute significantly to stress among radiographers, particularly in high-pressure private centers. It recommended that hospitals provide stress management training focused on emotional resilience and communication skills to improve coping mechanisms.

It is also seen that the work environment affects radiographers in the private clinical settings compared with the public settings.

Again it aligns with a cross-sectional study by Adeyemi & Musa, 2024 examined the combined influence of workload, work environment, and patient relations on the occupational stress of radiographers in selected public and private hospitals in Ibadan, Oyo State. The researchers used a multi-stage sampling technique to select 250 radiographers from different

healthcare levels. The results revealed that workload ($\beta = 0.42$, $p < 0.01$), poor work environment ($\beta = 0.35$, $p < 0.05$), and patient interaction ($\beta = 0.28$, $p < 0.05$) were all significant predictors of occupational stress. Radiographers in public hospitals reported higher stress levels overall. The study concluded that these three factors jointly account for a substantial portion of occupational stress among radiographers, emphasizing the need for holistic interventions.

Radiographers in both clinical settings stated some other factors that contributed significantly to their stress and this includes, non-cooperative colleagues, language barriers, state and type of equipment used for examining patients, hunger, lack of adequate technology, and work hour.

4.3.3 Analysis of Coping Mechanisms for Occupational Stress

The analysis of Coping Mechanisms for Occupational Stress in Table 4.6 & 4.7 provides valuable insights into the various methods radiographers use in coping with stressful situations.. In summary, the most prevalent coping mechanisms employed by radiographers in both clinical settings was “Talking to colleagues or friends during work”. Based on the effectiveness of these coping mechanisms, radiographers in both clinical settings reached a conclusion that they were moderately effective. Radiographers in both clinical settings also confirmed that their hospitals provide support systems to mitigate stress. They also stated that some additional support or resources adopted to reduce occupational stress includes, state of the art machines for specific examinations, ,emotional support, financial support, reduced working hours, food lunch break, maintenance of equipment, employing more staffs, a good work support system and reduced workload.

This aligns with Okafor & Danjuma, 2023 who carried out a descriptive cross-sectional study to assess the coping mechanisms adopted by radiographers in both public and private health institutions in Abuja, Nigeria. The study sampled 220 radiographers using a stratified random sampling technique across tertiary hospitals, secondary facilities, and private diagnostic centers.

Findings revealed that 68% of radiographers used problem solving techniques such as effective time management, prioritizing daily tasks, and peer collaboration to manage work pressure. In addition, 61% adopted emotional coping strategies including prayer, relaxation, and meditation to relieve stress. The study concluded that a combination of individual and organizational coping mechanisms such as workload rotation, staff motivation, and access to recreational activities helped radiographers maintain work efficiency and reduce burnout.

It also agrees with Afolayan & Ojo , 2022 who conducted a descriptive cross-sectional study to explore the types of coping strategies radiographers use in responding to occupational stress in selected hospitals across Lagos State, Nigeria. The study involved 200 respondents selected using purposive sampling from both government and privately owned hospitals. The results revealed that 72% of respondents preferred problem-focused coping methods such as seeking support from colleagues, delegation of tasks, and setting achievable goals. Meanwhile, 64% reported relying on emotion-focused methods such as humor, optimism, and social interaction to deal with work strain. The study found that radiographers in private facilities displayed higher emotional resilience due to better work-life balance and support systems, while those in public hospitals adopted problem-solving behaviors to cope with high workloads. It concluded that promoting structured problem-solving workshops and emotional support systems is vital for improving job satisfaction and mental health among radiographers.

Again with Adeyemi & Musa, (2024), who carried out a descriptive cross-sectional study to assess institutional coping support systems for radiographers in selected tertiary and private

hospitals in Ibadan, Nigeria. The study employed a multistage sampling method to select 210 participants and used a structured questionnaire focusing on workload policies, supervision, training, and staff welfare as institutional coping mechanisms. The results showed that 74% of respondents from public hospitals lacked adequate institutional support such as counseling services and regular staff rotations, while 68% from private facilities reported management-initiated programs like mental health seminars and team-building exercises. The study found a strong positive correlation between institutional coping support and employee job satisfaction ($r = 0.61$, $p < 0.01$). It concluded that effective organizational interventions such as staff recognition, adequate staffing, and continuous professional development serve as essential coping frameworks that reduce occupational stress among radiographers.

4.4 Implication of Findings

The implications of the findings on stress levels of radiographers working in both the public and private clinical settings are significant and far-reaching.

i.**Awareness of Stress Factors**

Radiographers will gain a clearer understanding of: **Sources of stress** (e.g., workload, understaffing, administrative pressure, patient volume), and **Differences in stressors** between public and private settings (e.g., public may have more resource constraints, while private may have more performance or profit-driven stress).

Radiographers can better identify what aspects of their environment or workload are contributing to stress, making it easier to advocate for changes or adopt coping strategies.

i. **Informed Career Decisions**

Radiographers can re-evaluate their current work environment, Choose settings that align with their stress tolerance, values, or work-life balance needs. Radiographers can make more informed choices about where to work based on their personal and professional priorities.

ii. **Need for Coping Mechanisms and Support Systems**

Evidence of high stress levels highlights the need for: Stress management training, Psychological support (e.g., counseling, peer support), Institutional wellness programs. Radiographers may become more proactive in seeking or advocating for mental health and wellness resources in their workplace.

iii. **Professional Performance and Patient Care**

High stress has been shown to: Reduce focus and decision-making, Increase chances of error in image acquisition or analysis, Lead to burnout, affecting patient interaction. Radiographers become more aware of how stress not only affects their well-being but also patient safety and quality of care—potentially motivating action at both individual and institutional levels.

iv. **Advocacy for Systemic Change**

Raiographers can push for better staffing, equipment, or work conditions, join or support policy discussions in professional bodies or unions. Radiographers are better equipped to advocate for healthier work environments backed by evidence.

v. Influence on Training and Education

If stress is shown to be a major issue, academic institutions and professional bodies may: Integrate stress management into radiography training, Prepare future radiographers with

realistic expectations and resilience tools. New radiographers enter the workforce with better preparation for occupational stress.

CHAPTER FIVE

5.1 Summary

This study was designed to assess the occupational stress levels of radiographers working in both the public and private clinical settings To achieve this objective, the study was structured into five chapters.

Chapter one provided the background to the study, the statement of the research problem, the objectives of the study, the significance of the study, among other headings.

Chapter two dealt with a detailed review of related literature on the subject matter of the investigation which includes the conceptual, theoretical review and empirical of literature.

Chapter three described the methods and procedure that was adopted in the study. It covered the research design, population, sample and sampling technique, instrumentation, validity and reliability of the instrument, procedure for data collection, data analysis and ethical consideration.

Chapter four contained the data presentation, interpretation and discussions of findings based on the research questions and research hypotheses.

Chapter five contains, the summary, the conclusion reached and recommendations.

5.2 Conclusion

In conclusion, Occupational Stress is a global problem encountered by most sections in every part of the world today. Occupational stress occurs when there's a mismatch between what a job demands and what an employee can offer, leading to negative physical or emotional reactions. It can also be defined as the feeling that job demands exceeds one’s capabilities. This stressors can have negative effects on working efficiency and can lead to lack of productivity among radiographers. Various interventions and mechanisms can be adopted to prevent and limit occupational stress.

Radiography is a very significant field in the health care sector and radiographers play a very significant role in diagnostic imaging and their knowledge is very crucial to patient care. This is a problem as this shows the extent of damage, occupational stress is causing among radiographers such as mental and physical damages and this facts make it necessary for us to determine the effects of occupational stress as well as coping mechanisms employed by radiographers in order to duly discharge their services

5.3 Recommendations

i. Implement Workplace Wellness Programs: Introduce structured mental health and wellness initiatives in both public and private clinical settings. Regular stress management workshops and counseling services On-site or virtual mental health support (e.g., Employee Assistance Programs). Promotion of physical health activities like exercise or relaxation spaces.

ii. Optimize Staffing and Workload Distribution: Address workload-related stress by reviewing staffing levels and work schedules. Ensure adequate staffing to reduce burnout. Implement fair and flexible shift rotations. Use workload-balancing tools or software to allocate tasks equitably.

iii. Provide Professional Development and Support: Offer training in stress resilience, time management, and coping strategies.Include stress management in continuous professional development (CPD) programs. Provide mentoring and peer-support systems for radiographers.

iv. Promote a Positive Work Environment: Foster supportive leadership and open communication.Train managers to recognize signs of burnout and promote open dialogue.Encourage feedback from radiographers about workplace pressures and act on concerns.

v. Conduct Regular Stress Assessments: Periodically assess occupational stress levels among radiographers.Use validated tools (e.g., Perceived Stress Scale, Maslach Burnout Inventory). Track changes over time to inform interventions and resource planning.

vi.Tailor Interventions to Sector-Specific Needs: Customize strategies based on the unique stressors of public vs. private settings.In public settings, address issues like high patient loads and equipment shortages. In private settings, focus on performance pressure and work pace.

vii.Encourage Research and Policy Advocacy: Support further research and policy : development on occupational stress in radiography. Advocate for national guidelines or standards on managing occupational stress. Promote multi-site or longitudinal studies for broader insights.

5.4 Limitations of the Study

The number of respondents was a major constraint, as the number of radiographers in Benin are not many compared to other professions. Another limitation to this study is the self reported data of respondents, as stress is subjective and some may exaggerate their stress levels and some persons who have worked for a longer time might be so used to the work that they do not consider it stressful. For example a more experienced radiographer might manage stress better than a new graduate, regardless of the work setting. However, these limitations do not affect the reliability of the result of this study.

5.5 Suggestions for further Studies

Longitudinal Studies on Stress Over Time: Future research could track stress levels of radiographers over a longer period (e.g., 6 months to several years).This would help identify trends, long-term effects, and causal relationships between workplace changes and stress. It can also monitor the impact of interventions (e.g., wellness programs)

Qualitative Studies on Lived Experiences: Conduct interviews or focus groups to explore radiographers' personal experiences and coping strategies.Adds depth and context to the quantitative findings. May uncover hidden stressors or emotional impacts not captured in surveys.

i. Sector-Specific Stressor Analysis: Investigate the specific causes of stress unique to public vs private clinical settings.Helps develop targeted interventions for each sector. Could include factors like workload, administrative pressure, resource availability, or job security.

ii. Impact of Stress on Job Performance and Patient Care: Examine how occupational stress affects clinical performance, diagnostic accuracy, communication, and patient outcomes.Links stress to quality of care and patient safety. Could justify greater investment in stress-reduction programs.

iii. Effectiveness of Stress Management Interventions: Test the impact of specific interventions (e.g., mindfulness training, flexible shifts, counseling access) on reducing stress.Use experimental or quasi-experimental designs. Can provide evidence-based solutions for healthcare administrators.

iv. Technology and Stress: A Double-Edged Sword, Study how digital imaging systems, AI, and other technologies impact stress levels. Do these tools reduce workload, or add pressure to perform faster? Explores the evolving nature of the radiography profession.

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INSTRUMENT OF DATA COLLECTION (QUESTIONAIRRE)

My name is **ELUOJERIO STACY OMOAFEBA**, a final year student of the Department of Radiography, School of Basic Medical, College of Medical Sciences, University of Benin, Benin City, Edo State. I am carrying out a research study on the topic**, "OCCUPATIONAL STRESS AMONG RADIOGRAPHERS: A COMPARATIVE ANALYSIS BETWEEN PUBLIC AND PRIVATE CLINICAL SETTINGS IN BENIN CITY".** This research will be conducted as part of the requirements for the award of Bachelor of Radiography (B.RAD). Your participation is voluntary and you are free to ask question about the study and also withdraw at any time you wish. Your response will be strictly confidential and be used solely for the purpose of research. Please kindly include your signature and date if you are willing to participate.

Date/Signature

Section A: Demographic and Professional Information

1. **Age (Select one):**
   ☐ Under 25
   ☐ 25-34
   ☐ 35-44
   ☐ 45-54
   ☐ 55 and above
2. **Gender (Select one):**
   ☐ Male
   ☐ Female
   ☐ Prefer not to say
3. **Years of Experience as a Radiographer (Select one):**
   ☐ Less than 1 year
   ☐ 1-5 years
   ☐ 6-10 years
   ☐ More than 10 years
4. **Type of Clinical Setting (Select one):**
   ☐ Public hospital/clinic
   ☐ Private hospital/clinic
5. **Average number of working hours per week (Select one):**
   ☐ Less than 30
   ☐ 30-40
   ☐ 41-50
   ☐ More than 50

Section B: Specific Stressors Contributing to Occupational Stress

6. Please rate your agreement with the following statements about stressors in your work environment:
   (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

Stressor	1	2	3	4	5
Heavy workload	☐	☐	☐	☐	☐
Frequent overtime	☐	☐	☐	☐	☐
Lack of adequate staffing	☐	☐	☐	☐	☐
Exposure to radiation hazards	☐	☐	☐	☐	☐
High patient volume	☐	☐	☐	☐	☐
Difficult or demanding patients	☐	☐	☐	☐	☐
Limited career advancement opportunities	☐	☐	☐	☐	☐
Inadequate equipment or technology	☐	☐	☐	☐	☐
Poor management or supervision	☐	☐	☐	☐	☐
Job insecurity	☐	☐	☐	☐	☐

7. What is the **single biggest source of occupational stress** you experience?

Section C: Factors Leading to Occupational Stress

8. How often do you experience stress due to **workload**? (Select one)
   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always
9. How would you rate your **work environment** in terms of contributing to your stress? (Select one)
   ☐ Very poor
   ☐ Poor
   ☐ Fair
   ☐ Good
   ☐ Excellent
10. How often do **patient interactions** contribute to your stress? (Select one)
    ☐ Never
    ☐ Rarely
    ☐ Sometimes
    ☐ Often
    ☐ Always
11. Are there any other factors that contribute significantly to your occupational stress?

Section D: Coping Mechanisms for Occupational Stress

12. Which coping mechanisms do you frequently use to manage occupational stress? (Select all that apply)
    ☐ Talking to colleagues/friends
    ☐ Exercise or physical activity
    ☐ Meditation or relaxation techniques
    ☐ Professional counseling or therapy
    ☐ Taking breaks during work

☐ Use of hobbies or leisure activities
☐ Use of alcohol, tobacco, or other substances
☐ Other (please specify): _____

13. How effective do you find these coping mechanisms? (Select one)
☐ Not effective
☐ Slightly effective
☐ Moderately effective
☐ Very effective
☐ Extremely effective

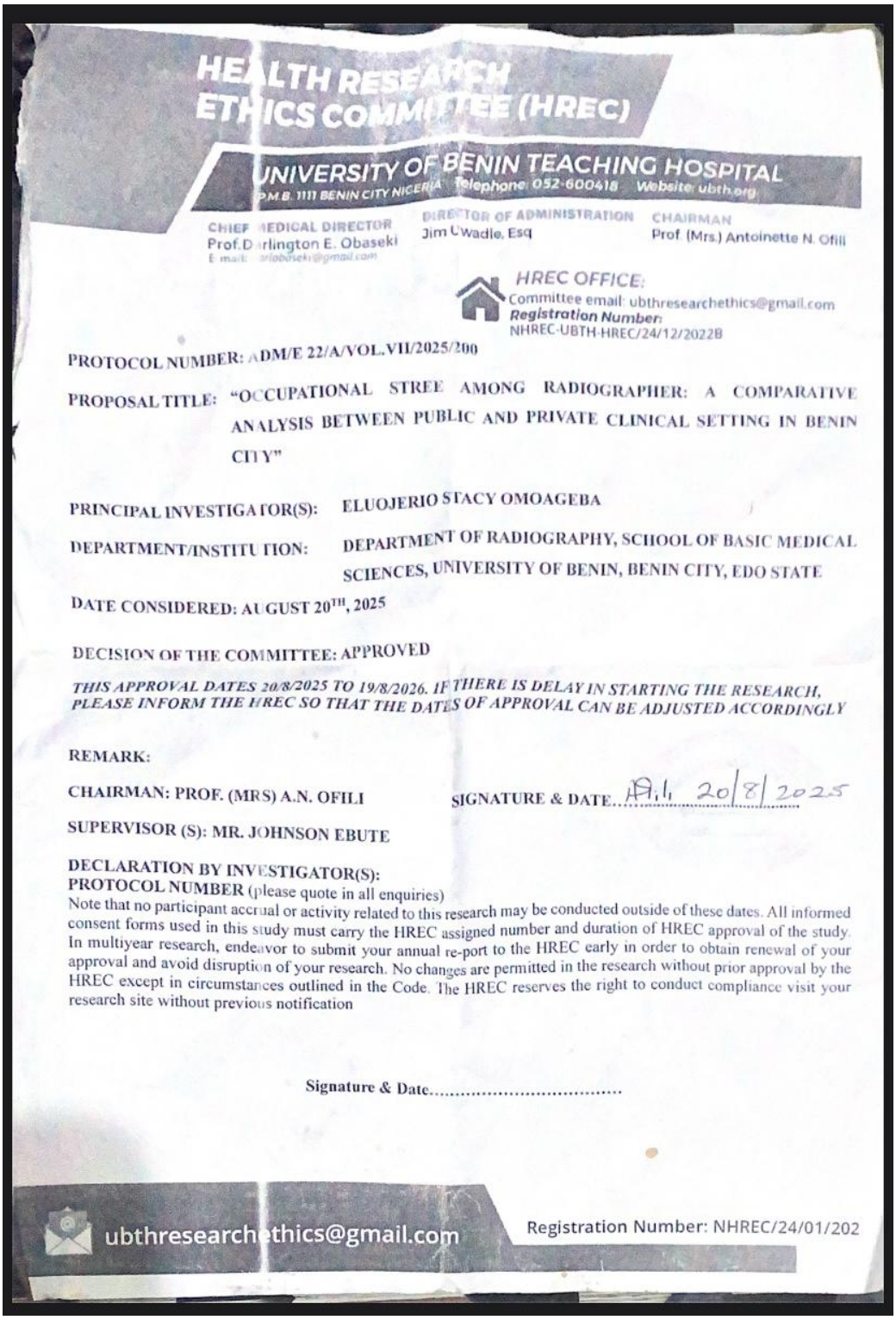
14. Does your workplace provide any formal support systems or programs for managing stress? (Select one)
☐ Yes
☐ No
☐ Not sure

15. If yes, how often do you make use of these support systems? (Select one)
☐ Never
☐ Rarely
☐ Sometimes
☐ Often
☐ Always

16. What additional support or resources would you find helpful to reduce occupational stress?

Thank you for your participation!

RESEARCH ETHICAL APPROVAL



HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL

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

CHIEF MEDICAL DIRECTOR
Prof. Darlington E. Obaseki
E-mail: drobaseki@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/2025/200

PROPOSAL TITLE: "OCCUPATIONAL STREE AMONG RADIOGRAPHER: A COMPARATIVE ANALYSIS BETWEEN PUBLIC AND PRIVATE CLINICAL SETTING IN BENIN CITY"

PRINCIPAL INVESTIGATOR(S): ELUOJERIO STACY OMOAGEBA

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

DATE CONSIDERED: AUGUST 20TH, 2025

DECISION OF THE COMMITTEE: APPROVED

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

REMARK:

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

SUPERVISOR (S): MR. JOHNSON EBUTE

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

Signature & Date.....

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