

**ASSESSMENT OF THE KNOWLEDGE, ATTITUDES AND  
PRACTICES OF RESUSCITATION OF PATIENTS AMONG  
RADIOGRAPHERS DURING RADIOLOGICAL EMERGENCIES  
IN BENIN METROPLIS**

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**DEPARTMENT OF RADIOGRAPHY  
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BENIN CITY**

**OCTOBER, 2025**

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**A PROJECT WORK**

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**UNIVERSITY OF BENIN, BENIN CITY**

**SUPERVISOR: MRS OKEH E.O.**

**OCTOBER, 2025**

**CERTIFICATION**

We certify that this project work “**ASSESSMENT OF THE KNOWLEDGE, ATTITUDES AND PRACTICES OF RESUSCITATION OF PATIENTS AMONG RADIOGRAPHERS DURING RADIOLOGICAL EMERGENCIES IN EDO STATE**” was carried out by Obodo, Chinonso Emmanuel, with matriculation number: BMS1806160 of the Department of Radiography and that the work was done under my supervision.

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**PROJECT SUPERVISOR**

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DATE

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**MRS F. O. IGBINEDION**  
**(HEAD OF DEPARTMENT)**

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DATE

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**EXTERNAL EXAMINER**

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DATE

## **DEDICATION**

This work is dedicated to God, my loving father and mother, whose support, guidance, and prayers have been my greatest source of strength and motivation.

## **ACKNOWLEDGEMENT**

First and foremost I want to give God the Glory for getting me to this point in my life, I also want to appreciate my parents Mr and Mrs Obodo for their undying love, I also want to give a special thanks to my Big Mummy, Mrs Ogbebor who was there for me from the beginning of this journey up until now, and finally I want to give special thanks to my supervisor, Mrs Okeh E.O for her support through out my Journey, may God bless you all.

## ABSTRACT

**Background:** Radiological crises happen quite suddenly, which means that radiographers are likely to be the first medical workers present in the area, and therefore the resuscitation must be made as a priority. The research evaluated knowledge, attitudes, and practices of radiographers on patient resuscitation in case of radiological emergencies in Benin Metropolis.

**Method:** The type used was a descriptive cross-sectional design that involved the use of a structured questionnaire that was administered to 61 registered radiographers in selected health facilities. The tool examined the knowledge, attitudes and practices of the respondents in regard to cardiopulmonary resuscitation (CPR) and other emergency procedures. Descriptive statistics and the correlation of knowledge and practice were used to analyze the data by using Spearman's Correlation test.

**Results:** It was found that there was moderate awareness of resuscitation measures, and many of the respondents had no knowledge of AED usage and age-specific methods of CPR. The willingness to train and take part in emergency drills has been shown as the attitudes towards resuscitation were very positive. But there were few practices that were being reported especially in CPR and simulation activities. Knowledge and practice were found to have a significant positive relationship (spearman's rho = 0.569, p = 0.000).

**Conclusion:** In Benin Metropolis, radiographers demonstrate a high level of motivation and low readiness to resuscitation in the case of radiological emergencies. To improve competence and emergency preparedness it is suggested to provide continuous CPR training, improve role definition, and conduct simulation exercises frequently.

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# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the study**

Cardiopulmonary resuscitation (CPR) is an important medical procedure that tries to maintain the functions of the brain until relevant steps can be taken to rescue breathing and blood circulation to normal levels. It entails chest compressions and artificial ventilation that is provided to those people who are suspected to be in cardiac arrest (Parajulee & Selvaraj, 2011).

The World Health Organization (WHO) reports that road accidents kill somewhere around 1.2 million people each year with an estimated 50 million people injured in road accidents all over the world. Unless more effort is put into prevention, these figures are expected to be almost 65 % higher in the next 20 years (Peden, 2004). It is reported that Iran occupies the fifth position in the world in terms of road accidents (Naghavi et al, 2009).

Some of the injured end up with serious trauma and critical conditions, whereas some of them have minor injuries (Saadat et al., 2011; Sass and Stang, 2013; Olajumoke et al., 2014). Almost all the victims of road accidents need to be taken to hospitals, no matter the extent of the injury (Tuckel et al., 2014). Patients with multiple trauma injuries are usually taken to the emergency hospital departments. It has been brought to light that the use of X-ray imaging is crucial in modern medicine as a diagnostic tool to assess injury caused by road accidents (Hall and Brenner, 2008; Adiotomre et al., 2014; Whiley et al., 2013).

As per the line of operation, the high-tech imaging equipment like digital radiographies and Computed Tomography (CT) scanners is positioned in the

emergency sectors to meet the requirements of the critically ill patients (Lee et al., 2010). Nevertheless, there are cases of accident victims who need to be transported to imaging departments that are not within the same distance as the emergency unit to undergo further radiological examinations. The patients are normally transported with a skilled nurse and a general practitioner who is to observe their condition and treat any possible medical emergency. Sadly, this protocol is not given due seriousness in the case of mass casualties because of lack of sufficient well-trained personnel to address such an incident (Moghaddam et al., 2014; Hogan and Brown, 2014).

In addition to patients attending the emergency department, other patients who are expected to get transferred to the imaging departments would be the critically ill patients at the intensive care unit to get follow-up tests (Olajumoke et al., 2014). Also, the administration of contrast media during imaging processes is associated with the risk of cardiac arrest, which is why Cardiopulmonary Resuscitation (CPR) skills are of essential importance in imaging departments (Palmiere & Reggiani Bonetti, 2014; Kalaiselvan et al., 2014; Saito et al., 2014).

Cardiac arrest is a major health concern among the population with thousands of people being affected in and out of hospitals every year. It causes about 15-20% of world mortalities (Sutton et al., 2012; Pepera et al., 2019; Owaid Alsharari et al., 2018). This is a condition where the heart suddenly stops beating and breathing and interrupts blood flow and gaseous exchange. It is usually characterized by unconsciousness, the absence of pulse and breathing (Osiemo et al., 2020; Lee, 1981). The protocols in the hospital state that when the need arises, CPR teams are called up. In other instances however, the vital signs of a patient may worsen during imaging leading to death before the CPR team can reach there. In these cases, where the radiologist is not around then the radiographer is first to commend CPR.

Radiographers, therefore, should be trained well in CPR to assist in saving the lives of patients and enhance the healthcare practices in hospitals (Rania et al., 2018). Previous studies have tried to evaluate the level of knowledge, attitude and practices in other healthcare workers, some have tried to assess the awareness and practices among clinical radiography students but there has not been enough research done to assess the knowledge, attitude and practices among radiographers in a developing country like Nigeria, this highlights a gap which this study aims to fill up to provide practical solutions and improved methodologies (Oteir et al., 2025; Owaid Alsharari et al., 2018; Mersha et al., 2020).

### **1.2 Statement of the problem**

Pitman et al. (2008) stated that Emergencies like contrast reactions, anaphylaxis and other common medical emergencies are expected to arise and Radiographers may find themselves as the first medical practitioner on-site, but the readiness of the Radiographers to perform resuscitation during such emergencies is questionable. It is known that medical emergencies are likely to happen in the Radiology department, but insufficient research has been carried out on the knowledge, attitude and practice of Radiographers in developing countries like Nigeria concerning CPR. This uncharted field brings out the necessity of this research to capture knowledge, attitude and practice of Radiographers in respect to Cardiopulmonary resuscitation.

### **1.3 Research Questions**

This study proposes the following questions;

1. What is the proportion of radiographers in Benin metropolis who display acceptable knowledge of resuscitation procedures?

2. What is the overall attitude of radiographers in Benin metropolis towards resuscitation procedures?
3. Which is the practice level of resuscitation procedures among radiographers in Benin metropolis?

#### **1.4 Hypotheses**

1. Null Hypothesis  $H_0$ : There is no significant relationship between Radiographers knowledge of resuscitation procedures during radiological emergencies and their practices of Resuscitation.
2. Alternative Hypothesis  $H_1$ : There is a significant relationship between Radiographers knowledge of resuscitation procedures during radiological emergencies and their practices of Resuscitation.

#### **1.5 Aim of the study**

This study aims to evaluate the knowledge, attitudes, and practices of radiographers in Benin metropolis regarding patient resuscitation during radiological emergencies.

#### **1.6 Objectives of the study**

The objectives of this study are;

1. To Assess radiographers' knowledge of resuscitation procedures.
2. To Evaluate their attitudes towards resuscitation during radiological emergencies.
3. To Examine their practices in responding to such emergencies.

#### **1.7 Significance of the study**

The research is also important because the findings can be applied by radiographers, radiologists, emergency care team, and healthcare policymakers. It pays attention to

the knowledge, attitudes, and practices of radiographers when it comes to resuscitation of patients in case of a radiological emergency. The findings of this research will be useful in helping to find the gaps in the knowledge and skills of radiographers, as well as to find the necessity of the training or education programs and enhance patient care and outcomes in the radiology emergency situations.

### **1.8 Scope of study**

This study aims at evaluating knowledge, attitudes and practices of radiographers in Benin Metropolis on resuscitation in radiological emergencies. The research is restricted to radiographers who are actively involved in both the public and the private health institutions of the Edo State, Nigeria.

### **1.9 Operational definition of terms**

**Assessment:** This is a process of determining or establishing the quantity, worth, quality, or significance of something or the decision or judgment that is arrived at.

**Knowledge:** This is the knowledge or information on a topic that is received through experience or research, of either an individual or of the people in general.

**Attitude:** How an individual think and feel about someone or something, and the behavior that shows the thoughts and feelings of an individual is the attitude.

**Practices:** This is the action of acting in a certain manner on a regular basis or on a repeated basis to enhance your ability at the act.

**Radiological Emergency:** This is an unforeseen health emergency that arises during radiology procedures that requires urgent course of action to counter in a radiology department.

**Anaphylaxis:** A life-threatening and immediate allergic response to a particular substance as the body has become highly sensitive to that substance..

**Cardiac Arrest:** Cardiac arrest refers to a condition that is life threatening where the heart ceases to beat effectively and hence the blood flow to the brain and other vital organs ceases resulting in the person losing consciousness and in the process, death may occur unless urgent treatment is administered.

**Defibrillation:** The electric shock passed to the heart when it is in cardiac arrest to produce normal rhythm in ventricular fibrillation.

**Resuscitation:** This is the act, or process of restoring to consciousness, some one who is unconscious, or who has died.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Conceptual review**

The procedure of Radiography where resuscitation is an important aspect of patient care is important in reviving patients who suffer radiological emergencies such as cardiac arrest. This chapter is a literature review on the existence of relevant literature on this study in terms of conceptual and empirical.

##### **2.1.1 Basic anatomy and physiology of the respiratory system**

Oxygenation is very critical to life because an average human being can last about three minutes without oxygen. The reason is that every cell of the body depends on oxygen in order to live and to function. Oxygen and carbon dioxide are inhaled and exhaled respectively through the respiratory system. It is a process that requires the involvement of muscles, which assist in bringing the air in and out of the lungs, passages that enable the air to flow, and tiny structures on which gas exchange occurs (Peate, 2018).

The main organs of the respiratory system have the primary mechanism of delivering oxygen to body tissues enabling cellular respiration, removing carbon dioxide as a waste product, and maintaining acid-base balance in the body. Also, some of the respiratory system is present in secondary activities such as smell sense and speech (Peate, 2018).

The respiratory system has been classified into two major components the upper respiratory system and the lower respiratory system. The respiratory system has six significant structures; Lungs, Pleura, Trachea, Bronchi, Bronchioles and Alveoli (Peate, 2018).

## **Upper Respiratory tract**

The pharynx, the larynx, the mouth (oral cavity) and the nose (nasal cavity) comprise the upper respiratory tract. The respiratory tract has a number of significant purposes: it helps sense the smell and speak, as well as prepares the air to reach the lower respiratory tract by warming, moistening, and filtering it. The nostrils are lined with rough hairs that hold big dusts particles hence they do not get into the airways. The surface is lined with a mucus membrane that has capillaries and goblet cells in abundance, which is located inside the nasal cavity. The blood of the capillaries warms the air entering, and the mucus moistens it and traps dust particles. Such particles become trapped and then transported by adolescent hair-like extensions known as cilia to the pharynx where they may be swallowed or expelled (Peate, 2018).

To provide further coverage, the upper respiratory tract has irritant receptors, which cause sneezing in reaction to the presence of such substances as dust or pollen to help expel it through the nose or mouth (Peate, 2018).

The pharynx and the larynx are pathways of air and food. Five tonsils are also located in the pharynx and consist of lymphatic tissue and help the body to respond to the immune defense (Peate, 2018).

The voice box or larynx is located between the throat and the trachea and is where the lower respiratory tract starts. The epiglottis is a flapsiform structure at the top of the larynx that then prevents food and liquids from entering the airway when swallowing by pushing them towards the oesophagus (Waugh and Grant, 2014).

## **Lower Respiratory tract**

The lower respiratory system comprises trachea, the right and left main bronchi as well as lungs. The trachea or windpipe is a pipe like organ that receives the air in the larynx and takes it to the lungs. It is covered by pseudostratified ciliated columnar

epithelium that traps debris that gets inhaled, sweeps it upwards towards the oesophagus and the pharynx to be either swallowed or spit (Peate, 2018).

The trachea and bronchi contain irritant receptors that cause a cough reflex and assist in getting out greater amounts of particles. 16 to 20 rings of cartilage rings in C-shape are used to support the outer wall of the trachea to ensure that it does not collapse or over-expand with the breathing process (Peate, 2018).

The carina divides at the trachea into the left and right main bronchi which further divide into smaller bronchioles. This is a divaricating network known as the bronchial tree (Peate, 2018).

### **The Lungs**

The lungs are two and are cone-shaped organs that almost occupy the thoracic cavity. The ribs, sternum and vertebrae protect them. The upper end, or highest point of both lungs, sticks a bit higher than the clavicle (collarbone), whereas the lower point of each lung is just above the diaphragm, the breathing muscle (Peate, 2018).

On the right lung, it has three lobes as compared to the left lung whose lobes are two. Two thin protective membranes (the parietal pleura and the visceral pleura) enclose each lung and cover the chest wall and the surface of the lung respectively. In between these membranes lies the pleural space which is filled with a thin layer of lubricating fluid. This fluid lessens friction as the two layers slide smoothly against each other when the lungs get bigger and contract during inhalation and exhalation (Peate, 2018).

The bronchi further subdivide into secondary bronchi in the lungs, and each of them serves a lobe, three on the right and two on the left. These secondary bronchi further subdivide into tertiary bronchi which further subdivide into smaller bronchioles, and finally culminate to terminal bronchioles (Peate, 2018).

Every terminal bronchiole serves a portion of the lung termed a lobule. Each lobule has its arteries and lymphatics. The bronchial tree further divides into terminal bronchioles, which further develop into respiratory bronchioles. They in turn result in several alveolar ducts, which terminate in groups of small round-looking structures termed alveoli (Peate, 2018). These alveoli get together and create alveolar sacs and the lungs have about 490 million alveoli (Ochs et al., 2004).

## **Breathing**

The method of breathing or pulmonary ventilation is a complicated process. When inhaling (inspiration) the thoracic cavity increases, and the pressure in the lungs becomes lower than that in the atmosphere. Consequently, the air enters the airways until the pressure in the lungs aligns with the pressure outside (Peate, 2018).

During the process of inspiration, several respiratory muscles are used to enlarge the thoracic cavity. Intercostal and diaphragm muscles are interdependent as they act as a pump, pushing air in and out of the lungs. The outer muscles of the intercostal pulls the rib cage outward and upwards and the diaphragm contracts and pulls downwards. The movement of the diaphragm downwards assists in pulling the lungs along with it and air flows into the lungs (Peate, 2018).

The process of expiration is more passive. In this stage the external intercostal muscles and the diaphragm relax and the elastic recoil of the lung tissue is used to give the diaphragm and the lung tissue back to their original shape and expel the air out of the lungs. Also, the other respiratory muscles, including muscles of the abdominal wall and internal intercostal muscles, are able to contribute actively to the expulsions of air that are more than a normal breath (Peate, 2018). To achieve a profound, powerful breathing, the scalenes, pectoralis, and sternal cleavage muscles

can be used. These auxiliary muscles are not normally used in normal silent breathing (Simpson, 2006).

Exchange of gases outside the respiratory membrane between the alveoli and the blood in the pulmonary capillaries is known as external respiration. In the process, oxygen is transported out of the alveoli to the blood and carbon dioxide is transported out of the blood to the alveoli to be exhaled. Consequently, the pulmonary capillary blood becomes oxygenated and deoxygenated (Peate, 2018).

The process of internal respiration is a process of exchanging oxygen and carbon dioxide between the blood and the tissue cells. Blood supplies oxygen within the lungs to the tissue cells and removes carbon dioxide, a waste product of the cellular metabolism, to the lungs. The oxygen and carbon dioxide exchange as blood is pumped through the capillaries, and they constantly diffuse through the blood and the tissue cells depending on the pressure gradients (Peate, 2018).

Respiratory centers of the medulla oblongata and pons of the brain regulate the rate and depth of breathing. In the medulla oblongata, there are the chemoreceptors detecting carbon dioxide in the cerebral fluid. It signals a when the level of carbon dioxide increases.

A nerve is transmitted to the diaphragm and intercostal muscles which contract as a result of the nerve (Peate, 2018). Moreover, aortic and carotid arteries have chemoreceptors that monitor the levels of oxygen and carbon dioxide. When the oxygen levels become lower or the carbon dioxide levels become higher, these receptors communicate with the respiratory centers, and the breathing is adjusted by an increase in the strength of contractions (Peate, 2018).

The breathing process is generally automatic but can be learnt consciously like when you hold your breath when swimming in the water. Nevertheless, it is not as

possible to have voluntary control over the breathing process, as respiratory centers provided in the brain are always prepared to take control when needed (Peate, 2018). Breathing can also be affected by the emotional condition or mental state of a person. Indicatively, emotions of fear, nervousness, or the expectation of stress are capable of creating an involuntary acceleration and intensification of the speed and dimensions of breathing (Peate, 2018).

### **2.1.2 Assessment**

Assessment is a process that is applied to measuring the condition or status of learning. To determine the learning process, instructors observe and measure the performance of students to have a more profound insight into their progress and understanding in a course. An evaluation can also be an assessment. These are the three major types of assessment and they include: formative, summative and interim.

Formative assessment is any activity or any task that gives feedback to the learner regarding his or her progress in a course. It does not normally impact on the course grade (Irons, 2008) and is commonly referred to as assessment for learning. Formative assessment majorly focuses on student learning. Through these activities, the students can test their knowledge in concepts, judge based on what they have learned, and develop areas that they might need additional explanation or enhancement across the course.

Summative assessment is any activity or task that leads to a mark or a grade to measure performance of a student (Irons, 2008). This is commonly referred to as assessment of learning. Summative assessment is aimed at measuring and reporting the performance of students usually in the form of a grade that may be conveyed to other parties. They are activities that give a picture of what students have understood

during the period of the assessment and are usually used to review whether the students have achieved the course goals.

Interim assessment is the act of evaluating the intellectual achievement of students at different intervals of a course or an academic year. These tests are aimed at measuring improvements in a manner that is meaningful, significant and relevant to the learning goals. Interim assessments can be used to determine areas of strength and areas in need of further consideration prior to final assessments.

### **Why is assessment important?**

Evaluation is an important aspect of learning. Assessment is also effective in assisting in identifying the extent to which the students have achieved the desired results of a course or program. It also helps in focusing the attention of the students and instructors on the most important issues during a learning process (Hounsell, 2007). Indeed, it is commonly believed that learners actually study contents of courses only when they have exams (Bloxham and Boyd, 2007). Evaluation offers useful information on what has been learnt and this is helpful both to the teachers and the learners. In tertiary education, tests are applied to incorporate students into the learning process and provide evidence of their knowledge.

### **2.1.3 Attitudes**

This refers to a set of emotions, beliefs, and behaviors toward a particular object, person, thing, or event. Attitude can also be described as the way we evaluate something or someone. For example, we tend to respond positively or negatively about certain subjects. Four major components of attitude are

1. **Affective:** emotions or feelings constitute the affective component of an attitude.

When someone attaches their emotions to an opinion formed about a person, object,

or situation, the affective component is activated. It reflects how we feel about something, influencing our attitudes and behaviors toward it.

2. **Cognitive:** opinions or beliefs held consciously make up the cognitive component of an attitude. This aspect represents the belief segment of an attitude, where an individual forms an opinion or perception about a person, object, or situation. The opinion formed can be either favorable or unfavorable, positive or negative, and influences how the individual thinks about that particular subject.

3. **Conative:** The behavioral component of an attitude refers to the inclination for action. As the term suggests, it is the action or behavior segment of an attitude. When a person feels a desire to behave or act in a certain way based on the emotions they have attached to their opinion about a person, object, or situation, the behavioral component is activated. This component reflects how the individual intends to act in response to their attitudes.

4. **Evaluative:** refers to a person's positive or negative assessment of an object, person, event, or issue. It involves forming judgments based on beliefs, emotions, or past experiences. This attitude influences behavior and decision-making.

#### **2.1.4 Practices**

“Practice is the act of rehearsing a behavior over and over, or engaging in an activity again and again, for the purpose of improving or mastering it, as in the phrase "practice makes perfect". How well one improves with practice depends on several factors, such as the frequency it is engaged in, and the type of feedback that is available for improvement. If feedback is not appropriate (either from an instructor or from self-reference to an information source), then the practice tends to be ineffective or even detrimental to learning. If a student does not practice often enough,

reinforcement fades, and he or she is likely to forget what was learned. Therefore, practice is often scheduled, to ensure enough of it is performed to reach one's training objectives. How much practice is required depends upon the nature of the activity, and upon each individual” (Okafor, 2013).

### **2.1.5 Cardiopulmonary Resuscitation (CPR)**

Cardiopulmonary resuscitation comprises of a series of procedures which are used to give the body oxygen and blood flow during cardiac arrest. The American Heart Association (AHA) publishes the most widely accepted guidelines for cardiopulmonary resuscitation in North America. After every 5 years the International Liaison Committee on Resuscitation (ILCOR) meetings are held and these guidelines are published thereafter. This exercise explains how to assess and treat patients who might need cardiopulmonary resuscitation and emphasizes how the interprofessional team can help affected individuals receive better care. The work of a few doctors in the 1950s has led to our current, contemporary approach to the process of cardiopulmonary resuscitation, which has since developed into the procedure that will be covered in more detail below (Truong et al., 2015).

Approximately 70% of cardiac arrests that take place outside of hospital settings happen at home, with half of these incidents going unwitnessed. Even with progress in emergency medical services, survival rates remain relatively low. Among adults who suffer non-traumatic cardiac arrest and receive resuscitation from emergency responders, only 10.8% survive to hospital discharge. In contrast, adult patients who experience cardiac arrest within hospitals have a significantly higher survival rate of up to 25.5% (Giacoppo, 2019).

The primary treatment for ventricular fibrillation is electrical defibrillation, typically carried out using an automated external defibrillator (AED). In situations where an AED is not immediately accessible, brain death may occur within 10 minutes due to lack of oxygenated blood flow. Cardiopulmonary resuscitation (CPR) helps maintain temporary circulation and ventilation until defibrillation can take place. When correctly performed, manual CPR which includes chest compressions and rescue breathing can generate up to 33% of the heart's normal output and oxygen delivery (Perkins et al., 2015).

### **Technique**

Early identification of cardiac arrest is vital to promptly activate emergency medical services (EMS) and initiate CPR. With the widespread use of mobile phones, individuals can now dial national emergency medical services number without leaving the victim's side. After ensuring the environment is safe, immediately seek help. At the same time, begin CPR using the CAB approach, starting with chest compressions (C), followed by airway opening (A) and breaths (B) which replaces the older ABC method.

Hands should be positioned on the lower portion of the sternum, delivering compressions at a rate of 100 to 120 per minute. The chest should be compressed to a minimum depth of two inches, taking care not to go too deep, and allowing complete recoil after each compression to sustain coronary artery perfusion pressure (Vadeboncoeur et al., 2014). Perform 30 compressions, then pause briefly to deliver two rescue breaths. Since continuous chest compressions are key to effective circulation, any pauses should be avoided when possible, and kept as short as necessary (Marsch et al., 2013; Bobrow et al., 2008).

After completing 30 chest compressions, the rescuer should open the airway using the head tilt/chin lift method, provided there is no concern about a cervical spine injury. If a spinal injury is suspected, the jaw-thrust technique should be used instead, without tilting the head. Two rescue breaths are then given—each using a normal breath, not overly deep, and lasting about one second, just enough to make the chest rise. This step is repeated once more before resuming chest compressions.

Ideally, medical practitioners who provide care outside the hospital must have a barrier device such as a rescue mask. This is however not always the case. Mouth-to-mouth breathing can be also an alternative in such circumstances, but not all unskilled people are willing to apply that, especially on strangers. The healthcare provider has to make a judgment on this one. CPR that involves compression is also acceptable to untrained bystanders. In the case of an out-of-hospital setting, in case of the inability of a provider to safely provide the rescue breaths because of the absence of a barrier device, compression-only CPR should be maintained until emergency agencies appear (Liao et al., 2018; Svensson et al., 2010).

The 30 chest compressions and two rescue breaths should be repeated until an AED is available or trained personnel showed up. Even with an AED on hand, the electrode pads must be immediately attached to the chest of the patient either to the front or to the back and the chest compressions should not be lifted in the meantime, but they only need to be short. Majority of the contemporary AEDs have voice prompts where they give step-by-step instructions. Once getting in contact the device will examine the heart rhythm of the patient and see whether a shock is required or not. Provided that defibrillation is suggested, chest compressions are to be discontinued, and no one should be in touch with the patient during defibrillation. Once the shock has been administered or the device recommends not to administer the shock, CPR must be

initiated once again and the compressions and rescue breathing cycles should proceed using CAB sequence until professional emergency personnel arrives. Short physical examination that includes palpation of pulses and check of the consciousness level of the patient is needed as some conditions can have symptoms of cardiac arrest, like overdoses of drugs or severe alcohol intoxication.

Another point to mention is that in the case of cardiac arrest of a person, there is a need to inform the family of a patient, legal surrogate, or the assigned power of attorney. The code status of the patient should also be determined and any advance directives of the patient observed as long as there is proper documentation that adheres to the applicable laws in the jurisdiction in question.

### **Paediatric CPR**

Infant CPR is considered in cases of patients less than one year old, and child CPR in cases between the age of one year to the start of puberty. At the age of puberty, the adult CPR guidelines are observed. Modifications are made to the infants and children, although the main principles are similar to adult CPR, with the use of the CAB (Compression-Airway-Breathing) sequence and a suggested compression rate of 100-120 per minute. In the case of infants and children, the depth of the chest compressions is to be about one-third of the anterior-posterior diameter of the chest sternum, or about two inches in children and 1.5 inches in infants (Maconochie et al., 2015).

### **Child CPR Modifications**

Chest compressions are administered in children with the heel of one or both hands (depending on the size of the child) on the lower half of the sternum. Compressions are to go down to an approximate of two inches and at a rate of 100 to 120 per minute.

Breaths Two rescue breaths after 30 compressions. This process goes on until emergency assistance is received.

### **Infant CPR Modifications**

In the case of infants, it is done with two fingers, just below the nipple line on the sternum. Compression of the chest should be done at a depth of approximately 1.5 inches at the same rate of 100 to 120 compressions per minute. Continue with compressions after two gentle breaths after 30 compressions. Repeat this process until one gets the help of a professional.

### **Barriers of Cardiopulmonary Resuscitation**

Other factors that may prevent bystanders to perform CPR aside the fear of disease transmission include. Mouth-to-mouth ventilation is one that is deemed an intimate act, and it can affect the action of a rescuer. The desire to carry out CPR is usually associated with the proximity of the rescuer to the victim. In a 1995 survey of respondents 68 % reported only to do chest compressions on a stranger. The unwillingness to provide CPR to the cardiac arrest victim has also been linked to other unforeseen conditions, including the presence of vomit, dentures, blood, body odor, or the smell of alcohol (Vaillancourt et al., 2009).

The fear of being infected, especially with HIV, may lead to the delay in the timely use of mouth-to-mouth ventilation. Although pathogens may be present in the saliva of infected people, blood-borne viruses are not common in saliva, and only 15 cases of the infection were reported. Neisseria meningitidis was the bacteria responsible in most of the cases. No cases of hepatitis B virus, hepatitis C virus and cytomegalovirus transmission have been reported in CPR. The three HIV transmissions which had happened during the resuscitation process were as a result of the high risk cutaneous exposure rather than mouth-to-mouth contact. Also, there are no reported CPR

training infections. Simple infection-control precautions, such as wearing barrier devices, can play an important role in minimizing the risk of being infected with an infectious disease during CPR and training on the CPR (Mejicano and Maki, 1998).

Potential adverse effects of Cardiopulmonary Resuscitation.

Cardiac arrest is linked to low prognosis since a majority of patients do not survive. In those who survive, the course of treatment in hospital may be complicated by the presence of different levels of neurological impairments caused by hypoxic encephalopathy. All organ systems may be exposed to ischemic damage. Besides, chest compressions done in an appropriate manner can result in rib fractures, which are further complicated by pneumothorax.

### **2.1.6 Patients**

A patient is any individual that is provided with healthcare services, usually because of some illness or injury, and he is attended by such professionals as physicians, physician assistants, advanced practice registered nurses, veterinarians, or other healthcare professionals. An outpatient is a person who is provided with medical care, evaluation, or treatment but is not required to spend 24 hours or more in the hospital. This is so-called ambulatory care. Contrary to this, an inpatient is an individual who has been formally admitted to a hospital and who may be overnight or even spending more than a few days or even more so a few weeks and so on in the complicated cases; in cases involving coma. The services provided here are known as inpatient care (Okafor, 2013).

### **2.1.7 Radiological Emergency**

Radiology departments need to be in a position to respond to unforeseen and immediate emergencies although such cases are not common in the course of normal

radiology. With the scarcity of personal experience of radiologists to be trained in the sphere of emergency management, the preparedness becomes essential, particularly, the radiological process is becoming more complicated and the frequency of such incidents is on the rise. Emergencies are unpredictable and can easily result in life-threatening in case they are not handled in time. Usually, contrast agents, local anesthetics, or other triggers are the cause but firstly the treatment should be directed on stabilizing any life-threatening symptoms.

Iodine-based compounds that are hypertonic to plasma are called contrast media. They are not dangerous, but may have unpredictable effects, resulting in mild symptoms, such as nausea and flushing, and serious, such as anaphylactic shock or even death. Red flags of negative adverse reactions to contrast media may be the occurrence of low blood pressure and irregular heart rates. There are more tolerable low-osmolality contrast agents, including Ioxaglate (Hexabrix), Iohexol (Omnipaque-310), Iopamidol (Isovue-300), and Iopromide (Ultravist) in comparison to older preparations. These agents are also capable of penetrating the blood-brain barrier with the amount of dose and can cause seizures.

Radiology departments must also be well equipped with essential drugs in order to deal with emergencies such as:

1. Buscopan (Hyoscine N-butylbromide): An anti-spasmodic agent that is applied to relax smooth muscles in the abdominal and pelvic areas.
2. Furosemide Injection: A diuretic of great strength that is applied in the quick removal of fluids.
3. Glyceryl Trinitrate: This is a rapid acting vasodilator that is taken to prevent and treat angina attacks.

4.Heparin: This is a natural anticoagulant which helps prevent blood clotting by preventing various factors of clotting, such as thrombin.

Other emergency drugs are hydrocortisone, lignocaine, adrenergic agonists, methylxanthines, anticholinergics, antihistamines, steroids, and intravenous fluids, which are essential in dealing with much of the emergency cases in the radiology environment.

## **2.2 Empirical Review**

### **2.2.1 Related Literature**

Evaluation of Knowledge, Attitude and Practice of Cardiopulmonary Resuscitation.

In a cross-sectional survey on the knowledge and attitude of radiographers about cardiopulmonary resuscitation (CPR) by Aljarrah et al. (2025). A convenience sampling method was used to collect the data with 359 radiographers working in governmental, university, military, and privately owned hospitals in the country. The study findings also indicated that the age of the respondents was 31.71 +- 8.22 years indicating that the percentage of males (55.2%) was slightly higher than the percentage of females (44.8%). Mean score in CPR knowledge was 5.74 +- 2.31/ 10, and the attitude towards CPR was 3.94 +- 0.46/ 5. It is also important to note that radiographers who received CPR training scored much higher in terms of knowledge (M = 6.51 +- 2.14) than their untrained counterparts (M = 4.73 +- 2.14),  $p = 0.001$ . Also, the level of knowledge about CPR was positively associated with age ( $r = 0.157$ ,  $p = 0.003$ ) and work experience ( $r = 0.177$ ,  $p < 0.001$ ). The knowledge and the attitude of CPR each had a moderate positive correlation ( $r = 0.326$ ,  $p < 0.001$ ). Nonetheless, the statistically significant differences between male and female respondents have not been detected in both knowledge and attitude toward CPR.

Another study conducted by Osiemo et al. (2020) on the Knowledge and practices of cardiopulmonary arrest and anaphylactic reactions in the radiology department states the same thing. The study was designed as a cross-sectional study carried out in Kenyatta National Hospital in the period between March 2016 and August 2016, Data was captured through a structured questionnaire, and a total of 80 participants were recruited which consisted of radiologists, residents and radiographers. The results showed that no respondent was able to respond to all the questions correctly. Radiologists, residents, and radiographers had significant knowledge deficits as only 55, 35, and 39, respectively, scored greater than 50. Although most of them (82%), revealed sufficient knowledge of the symptoms, signs, and the risk factors of adverse reactions to contrast media, only one-third of them knew that intravenous epinephrine is the preferred intervention in the case of severe anaphylactic reactions. In addition, the research has also shown the absence of sufficient training with the majority of the participants stating that they have not attended any life support courses over the last five years.

Mersha et al. (2020) used a cross-sectional study design that was conducted between 15 February 2018 and 15 March 2018, A total of 406 healthcare workers were used in the study: physicians, nurses, anesthetists, health officers, and midwives. The research found out that Among the participants, 25.1% (95% CI: 21.2-29.3) had sufficient knowledge and 60.8% (95% CI: 55.9-65.5) had positive attitude towards adult CPR. Variables that were found to be positively correlated with increased knowledge levels were years of work experience (Adjusted Odds Ratio [AOR]: 5.02, 95% CI: 1.25-20.20), working in more than one healthcare setting (AOR: 6.52, 95 % confidence interval, 2.76-15.41), previous CPR training (AOR: 2.76, 95% confidence interval, 1.40-5.42), exposure to cases of Similarly, positive attitude had a strong relationship

with CPR training ( AOR: 1.74, 95% CI: 1.42-1.53) and familiarity with CPR guidelines ( AOR: 2.74, 95% CI: 1.55-4.85).

Elsewhere in the cross-sectional research design, Akpaniwo et al. (2019) undertook a research on then Assessment of Cardiopulmonary Resuscitation Knowledge among Clinical Radiography Students at a Tertiary Institution in Nigeria. The data on the awareness and attitudes were gathered using a semi-structured, self-administered questionnaire, which was administered to 82 students in the 300-500 levels during the 2017/2018 academic year. Among the 75 respondents (91.5% response rate), most of them (68% of them) had not been trained to perform CPR, and only a very small proportion of them correctly (4% and 1.3% respectively) identified the recommended compression-to-ventilation ratio and the recommended amount of compressions per minute to perform on the patient. In spite of these knowledge gaps, 94.7% of the students stated overwhelmingly that CPR training is required in clinical radiography students. This indicates that effective CPR education into radiography programs is highly needed to make students effective in life-saving skills and enhance emergency preparedness.

A research by Edomwonyi and Egbagbe (2007) on the awareness level among Radiographers on Cardio-Pulmonary Resuscitation (CPR) in Nigeria. A questionnaire survey with eighty respondents was done on the Annual Conference of the Nigerian Radiographers in Benin City. The information obtained in the questionnaire can be described as demographics (age, gender and years of professional experience) and questions associated with resuscitation practices. Forty-five participants returned the survey out of the eighty that responded to the survey. Sixty nine percent (31) of them reported witnessing a cardiac arrest and 80% (36) of them identified the causes of cardiac arrest. Further, 87 % (39) were able to name different resuscitation drugs.

Awareness of the adverse events that were caused by intravascular contrast media (ICM) was exhibited by all respondents. On the whole, the research reveals that the degree of CPR awareness is high among radiographers in Nigeria according to the results.

The study by Alam et al. (2014) aimed at exploring the competency of radiologists and radiology residents in handling the adult life support system during cardiopulmonary arrest and the acute anaphylactic reaction. One hundred and forty-four radiologists and residents in 6 postgraduate teaching hospitals spread over four major cities in Pakistan were recruited and incorporated in the study. Only a small fraction (44.85) of the 124 respondents (29 consultants and 95 residents) showed proper knowledge on basic life support (BLS). There was vast difference in the right response rate to certain BLS questions where only 29 % were able to recognize the correct proportion of adult CPR, and 88 % were aware that pulse should not be checked above 10 seconds, and 74 % recognized the maneuver to open the airway. Though 58 % had the correct response to the next step in the event of non-pulse, only 19.4 % gave the correct response on the occurrence of a pulse. There was fairly good knowledge on adverse contrast media reaction, but there was low confidence on the practice of BLS (20.2%), and even fewer (17.7%), thought that their colleagues could be helpful. On average, consultants and residents had a 3.41 and 3.64 score respectively. It was surprising to see that only 28.22% had taken a life support course since 2006, and those who had taken one more recently fared better overall.

Behroozi et al. (2015) conducted a cross-sectional study to assess the knowledge and attitude of radiology technologists on cardiopulmonary resuscitation that investigated the awareness of 95 radiologic technologists in four tertiary referral hospitals in Ahvaz, Iran. Among them, 87 participants agreed to participate. The researchers used

a structured questionnaire to collect data through interview. Out of the filled-out questionnaires (86 in total) none of the participants had been trained in CPR after the employment. Mean attitude score was 80 +- 8.9 whereas the mean score in technical knowledge was 8.8 +- 2.3. There were significant correlations between age and work experience, age and technical knowledge, work experience and technical knowledge and between attitude and technical knowledge. On the same note, attitude was strongly related to work experience. There was no statistically significant difference in the scores of technical knowledge or the attitude of the male or female participants.

### **2.3 Theoretical Framework**

The proposed study relies on the Knowledge, Attitude, and Practice (KAP) Model that is a widespread model used in the field of public health and behavior studies. According to the model, the behavior of an individual depends on the knowledge that he has about a subject and his attitude towards the same (Jimenez & Lewis, 2023). That is, the knowledge of some health-related problem will make people perceive the issue in a certain way, which consequently will impact their behavior (Abu Awwad et al., 2025). The model emphasizes the fact that behavioral change should begin with knowledge, which, in the absence of it, people might be forced to continue to practice something harmful without realizing it (World Health Organization, 2020). After being informed, individuals form positive or negative attitudes on the premise of what they believe and value and this affects the chances of embracing safe practices (Al-Omari et al., 2024). The visible actions which are the consequence of the interplay between knowledge and attitude are practices (Hill et al., 2023), and the model focuses on the fact that all the three components should agree to meet optimal health behaviors (Jimenez et al., 2024).

### **2.3.1 Application to the Study**

This research paper will use the theoretical framework of the Knowledge-Attitude-Practice (KAP) to determine the readiness of radiographers in saving lives of patients in radiological emergencies. KAP model assumes that knowledge on individuals affects the attitude, which in turn affects the practices (World Health Organization, 2008). In this context, the knowledge of the Basic Life Support (BLS) procedures by the radiographers, their confidence in executing the resuscitation process, and their real practice in relation to the emergency reactions are tightly integrated. Using this framework will help the study determine the reasons behind the constraints in emergency response, namely, the lack of knowledge, the presence of negative perception, or the lack of practical exposure (Launiala, 2009). The framework is also used to design research tools, which are used to measure what radiographers know, their feeling, and what they do in practice. Finally, the knowledge gained on the basis of this model can be used to develop specific interventions, e.g., simulation-based training, professional development, and institutional policy enforcement, to improve patient safety during radiological emergencies (Yadav, 2021; Ajzen, 1991).

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Research Settings**

This research was to be carried out in both state hospitals and federal hospitals and the personal facilities in Benin Metropolis, the capital city of Edo State, Nigeria. Such Hospitals and centers comprised the University of Benin Teaching Hospital (UBTH), Edo Specialist Hospital (ESH), Lilly Hospital etc.

University of Benin Teaching Hospital (UBTH): UBTH is a federal teaching hospital that is situated in Benin City in the Edo State. It is among the leading teaching hospitals in Nigeria; offering advanced diagnostic, therapeutic and emergency services. UBTH is one of the largest referral centres of complicated medical and surgical cases and is also linked with the University of Benin in training health workers.

Edo Specialist Hospital (ESH): ESH is a state-owned specialist medical centre in Benin City, which is aimed at providing high-quality secondary and tertiary medical care. It has the current radiological and emergency services equipped and is crucial in offering affordable and accessible healthcare to the Edo State residents.

Lilly hospital: the Lilly Hospital is a privately owned multi-specialist hospital in Benin city, which has a long history of providing quality care using the state of the art facilities and well-trained staff. It provides a broad spectrum of services, such as diagnostic imaging, emergency response, and intensive care, and serves the local and international patients.

In Benin City, there are a number of health facilities, both public and private, offering the patient the diagnostic imaging services such as X-rays, CT and MRI. These units

have the use of trained radiographers whose direct patient care is directly related and in most cases present throughout the radiological procedures which could result to medical emergencies necessitating resuscitation.

### **3.2 Study Design**

The research design used in this study involved a descriptive cross-sectional study design to determine the knowledge, attitudes and practices of resuscitation of the patients among the Radiographers during radiological emergencies in Benin metropolis.

### **3.3 Target Population**

The study population included registered radiographers who were currently working in hospitals and diagnostic centers in Edo state, Nigeria when conducting the study.

These are radiographers who are already in service in the tertiary, secondary, and privately administered health care centers in Edo state.

#### **3.3.1 Inclusion Criteria**

- Should be a registered Radiographer of the Radiographers Registration Board of Nigeria (RRBN).
- The radiographers are required to be working in the hospitals or diagnostic centers in Edo state.
- The radiographers should have been working in the Hospital or the Diagnostic Center at least six months.
- Radiographers should be prepared to make consent and be involved.

### **3.3.2 Exclusion Criteria**

- Non-licensed Radiographers in healthcare.

### **3.4 Sampling techniques/Sampling size**

This study was carried out using census method due to the small number of radiographers in Benin metropolis as the total number of radiographers was relatively small and could be easily covered. It was found to be more convenient and scientifically wise to use all the population instead of choosing a sample as there were only 65 radiographers as per the total head count of radiographer in our study's geographical scope at the time of the study. This strategy ensured that the study has had a comprehensive and precise representation of knowledge, attitudes, and practices of all radiographers on resuscitation procedures. The census method was able to eliminate the chances of sampling bias, and the obtained results represented the real features of the whole population being investigated. It also improved the validity and generalization of the results, since all the views of radiographers in the field of study were factored into the research study.

The census method though has its limitations. The method is both laborious and logistically challenging because the researcher will have to contact all the participants, some of whom might be assigned to other hospitals or departments. Another risk is non-response, some of the radiographers might not be available or may not want to participate in the study which will leave gaps in the data coverage. Moreover, a census involves more resources in regards to time, effort, and cost especially in the distribution and collection of all the questionnaires and completeness of the data obtained. Irrespective of these shortcomings, however, census method was considered as the most suitable method to be used in this study since it offered a comprehensive

and all-encompassing evaluation of the whole population of radiographers in Benin metropolis.

### **3.5 Instrument of Data Collection**

A structured and self-administered questionnaire was the instrument or tool that was used to gather data in this research. Sections included in the questionnaire comprised of sections on socio-demographic section, sections on the knowledge of respondents, attitude and practices of Resuscitation etc.

### **3.6 Validity of Instrument**

In order to ensure that the questionnaire is actually able to measure the desired constructs, it underwent both face and content validity test.

### **3.7 Reliability of Instrument**

The validity of this instrument was determined using a pilot study that was done on a small sample of radiographers who did not form part of the study population. Cronbach Alpha was used to determine the internal consistency of the questionnaire. The obtained reliability coefficient was 0.88 and it was taken to be satisfactory, which means that the instrument under investigation can generate satisfactory and reliable scores in determining knowledge, attitudes, and practices of radiographers with regards to resuscitation in radiology emergencies. The required modifications will include making the questions clearer and making the items consistent.

### **3.8 Method of Data Collection**

This study was done using a structured and self-administered questionnaire that was given to radiographers working in the hospitals and Diagnostic centers of Edo state.

The data collection process:

- 1) Radiographers who fulfilled the inclusion criteria were given questionnaires in printed or digital copies through platforms like Google Forms.
- 2) All participants were asked to provide informed consent before the administering of the questionnaire.
- 3) The participants had a 7 days time margin to fill in the questionnaires and submit them to the researchers who collected the forms either through personal attendance or online.
- 4) The study was conducted with a sense of confidentiality. No names, emails or personal identifiers were collected in order to protect the privacy of participants as all the responses were anonymous.

### **3.9 Method of Data Analysis**

The quantitative information obtained during the research was subjected to descriptive and inferential statistics to adequately respond to the study's research questions and validate the hypothesis of the research. To summarize and present the data in a clear and meaningful way, descriptive statistics like frequencies, percentages, means and standard deviations were used to summarize the data. These descriptive statistics were used to depict the distribution of the responses in relation to the demographic factors, the degree of knowledge, attitudes and practices of radiographers in Benin metropolis on resuscitation procedures. The findings were given in tables so that they could be easily interpreted and compared. The decision-making on the inferential statistics was informed by the characteristics of the data and the purpose of the study. As the data were obtained through the ordinal scales, specifically, the Likert scale in evaluating the attitudes and practices, the Spearman rank-order correlation test was chosen as the

best statistical method to use. A non-parametric test is used to measure the strength and direction of the association between two ranked variables without making any assumptions on the normal distribution. It was applied to establish the existence of a statistically significant relationship between the knowledge, attitude, and practice of resuscitation among the radiographers. The Spearman correlation results were interpreted using the value of correlation coefficient ( $r$ ), and their p-values. The correlation coefficient was positive and this corresponded to a relationship of a positive coefficient such that an increase in one variable was coupled with an increase in the other and a negative coefficient corresponded to the opposite. To declare statistical significance, the p-value was set to be less than 0.05, which implies that any observed relationship that has p less than 0.05 was deemed to be significant and it could not have occurred by chance. All the analyses of data were done in the Statistical Package of the Social Sciences version 27 that provided accuracy, reliability and the ease of data analysis during the entire process.

### **3.10 Ethical Consideration**

All the information gathered on radiographers during this course of this study was retained in the highest level of confidentiality and anonymous nature. The University of Benin Health Research Ethical Committee gave out the approval before the research was conducted. The research also adhered to all the relevant data protection laws. The study ensured that every participant gave a verbal consent before attempting the questionnaires and anonymity was also achieved during the course of this study as individual identifiers such as names and emails were not recorded

**CHAPTER FOUR**  
**RESULTS AND DISCUSSION**

**4.1 Data Presentation**

**4.1.2 Demographic characteristics of Respondents**

**Table 4.1: Demographic Information of Respondents (N=61)**

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Sex	Male	43	70.5
	Female	18	29.5
Age	Below 20	0	0.0
	21-30	56	91.8
	31-40	5	8.2
	41 and above	0	0.0
Highest Degree	DCR/DIR	0	0.0
	B.Sc	58	95.1
	M.Sc	2	3.3
	PhD	1	1.6
Years of practice	Less than 5yrs	56	91.8
	5-10yrs	5	8.2
	10-20yrs	0	0.0
	Above 20yrs	0	0.0
Place of work	Private facility	36	59.0
	Specialist Hospital	23	37.7
	Teaching Hospital	2	3.3

Table 4.1 displays the demographic characteristics of the participants involved in this study, The findings reveal that majority of the respondents at the time of the study were male radiographers (43; 70.5%) and female radiographers were the minority with a sum total of 18 respondents. The table also shows that a large percentage of the participants (91.8%) were aged between 20 years to 30 years. The table further illustrates that a significantly large proportion (58; 95.1%) of the participants were B.Sc degree holders only while only one 1 (1.6%) of the Radiographers held a PhD

degree. Majority of the participants (91.8%) had less work experience while 5 (8.2%) of the participants were quite experienced with 5-10 years of practice. The table also shows that majority of the respondents at the time of the study worked at private facilities with a total of 36 (59.0%) participants reporting this.

#### 4.1.3 Analysis of section B: Knowledge of Resuscitation procedures

**Table 4.2: Responses on Knowledge of Resuscitation procedures (N=61)**

Questions	Responses (Frequency %)		
	Yes	No	Maybe
Do you know the basic steps involved in cardiopulmonary resuscitation (CPR)?	36 (59.0%)	15 (24.6%)	10 (16.4%)
Do you know the differences in resuscitation procedures for adults, children, and infants?	25 (41.0%)	23 (37.7%)	13 (21.3%)
Do you know how to use an automated external defibrillator (AED) during an emergency?	12 (19.7%)	39 (63.9%)	10 (16.4%)
Do you know the signs and symptoms of a patient in cardiac arrest?	31 (50.8%)	14 (23.0%)	16 (26.2%)
Do you know the role of radiographers in initiating resuscitation before medical help arrives?	23 (37.7%)	24 (39.3%)	14 (23.0%)
Do you know the emergency response protocols in the radiology department?	24 (39.3%)	25 (41.0%)	12 (19.7%)
Do you know how to activate the hospital's emergency response system during a radiological emergency?	27 (55.7%)	34 (44.3%)	0 (0.0%)
Do you know about the complications that may arise during resuscitation?	36 (59.0%)	10 (16.4%)	15 (24.6%)

Research question 1: What is the level of Knowledge of resuscitation procedures amongst radiographers in Benin metropolis?

This section was designed to answer the above research question, it consisted of 8 question items and the responses to the questions and their proportions are presented in Table 4.2.

In Table 4.2, the information illustrates the level of awareness and knowledge of the respondents concerning cardiopulmonary resuscitation (CPR) and other emergency response measures. Generally, the results show that even though a reasonable percentage of respondents have at least some knowledge about CPR, there are still significant gaps in such critical areas of resuscitation and emergency preparedness.

Most of the respondents (59.0%), indicated that they were aware of the basic steps to be used in CPR; they were characterized as moderately aware. Nevertheless, only 41.0% fully understood the procedural differences in resuscitation of the adults, children, and babies, implying a lack of in-depth knowledge. Knowledge of automated external defibrillator (AED) was also very poor, with only 19.7% of them reporting competence to show a significant lack of practical life-saving ability.

About half of the participants (50.8%) were aware of the symptoms of cardiac arrest and 37.7% were aware of the role of the radiographer in the start of resuscitation before medical assistance is arrives. On the same note, recognition of emergency response guidelines in the radiology department (39.3%) and the emergency activation system of the hospital (55.7%) was moderate, which implied that a significant portion of respondents might be unprepared to address the emergencies in the clinical setting. Finally, 59.0% of the respondents were aware of possible complications in the process of resuscitation, which suggests the adequate degree of theoretical knowledge.

Overall, the respondents showed a moderate degree of awareness of the basic CPR principles, however, there were clear knowledge gaps in the fields of AEDs usage,

age-specific procedures, and emergency procedures. These results show that special CPR and emergency response training among radiographers and radiography students is necessary.

#### 4.1.4 Analysis of section C: Attitudes toward Resuscitation during Radiological Emergencies

Research question 2: What are the attitudes of radiographers towards resuscitation procedures in Benin metropolis?

This section was designed to answer the above research question, it consisted of 7 Likert scale items to evaluate agreement, and the means scores and standard deviations of the items are presented in Table 4.3

**Table 4.3: Mean scores of participants’ responses to items on Attitudes toward Resuscitation during Radiological Emergencies (N=61)**

Item	Mean score	Standard deviation	Reamrk
I believe it is part of my professional responsibility to perform resuscitation during radiological emergencies.	3.84	0.92	Agree
I feel confident in my ability to respond to a resuscitation situation in the radiology unit.	3.59	0.99	Agree
I am willing to participate in regular resuscitation drills or simulations.	4.26	0.66	Strongly agree
I believe radiographers should receive mandatory CPR training.	4.36	0.68	Strongly agree
I feel anxious when thinking about performing resuscitation on a patient.	3.38	0.99	Neutral
I believe early resuscitation efforts by radiographers can improve patient outcomes.	4.26	0.73	Strongly agree
I think that radiographers should always wait for medical doctors before initiating CPR.	2.69	1.19	Neutal

Table 4.3 is a table that shows the mean and standard deviation results of the attitude of respondents to resuscitation in radiological emergencies. The general findings

show that the respondents had a generally positive attitude with regard to resuscitation practices and their role in emergency response as professionals.

There was also strong agreement among the respondents that radiographers are expected to undergo compulsory CPR training (Mean = 4.36, SD = 0.68) and early resuscitation by the radiographers can greatly improve patient outcomes (Mean = 4.26, SD = 0.73). There was also a sense of high desire to attend frequent resuscitation drills/simulations (Mean = 4.26, SD = 0.66), which demonstrates an active and interested attitude to preparedness.

The majority of the respondents held that the resuscitation should be one of their professional responsibilities (Mean = 3.84, SD = 0.92) and that they are confident they would react to such a scenario (Mean = 3.59, SD = 0.99). A neutral answer was however found on the question about feelings of anxiety about performing resuscitation (Mean = 3.38, SD = 0.99) indicating mixed feelings, and potential nervousness in the face of pressure.

Surprisingly enough, the sentence stating that radiographers can only start CPR once medical doctors have been summoned a near-neutral mean (Mean = 2.69, SD = 1.19), which means that some respondents feel rather unsure or confused regarding the aspects of professional boundaries in an emergency intervention.

On the whole, the results show that the attitude of radiographers towards resuscitation is strongly positive, and they are eager to train and realize the significance of their role in emergency care. However, moderate anxiety and role related ambiguity indicate that constant training, departmental policies and supportive supervision should be undertaken to increase the confidence and preparedness of radiographers in emergencies related to radiology.

#### 4.1.5 Analysis of section D: Practices Related to Resuscitation in Radiological Emergencies

Research question 2: What is the degree of practice of resuscitation procedures amongst radiographers in Benin metropolis?

This section was designed to answer the above research question, it consisted of 7 Likert scale items to evaluate their frequency of practice, and the means scores and standard deviations of the items are presented in Table 4.4

**Table 4.4: Mean scores of participants' responses to items on Practices Related to Resuscitation in Radiological Emergencies (N=61)**

Item	Mean score	Standard deviation	Reamrk
I participate in resuscitation training or workshops.	2.79	1.17	Sometimes
I ensure resuscitation equipment (e.g., oxygen, defibrillator) is checked and available in my unit.	2.87	1.10	Sometimes
I review emergency protocols relevant to my department.	2.80	1.12	Sometimes
I have performed or assisted in CPR during a radiological emergency.	1.84	1.10	Rarely
I practice hand hygiene and safety procedures before and after handling emergencies.	3.23	1.15	Sometimes
I actively participate in simulations or drills related to patient resuscitation.	2.72	1.17	Sometimes
I report to the appropriate authority when emergency supplies are lacking.	3.20	1.19	Sometimes

Table 4.4 displays the average and standard deviation of the responses of the participants on their practice of the real-life engagement in resuscitation-related activities in the radiology department. The findings reveal that the general level of practice of respondents towards resuscitation was moderate to low with majority of the mean scores being within the neutral range.

The respondents were largely neutral regarding whether they were taking resuscitation training/workshops (Mean = 2.79, SD = 1.17), whether they were checking presence of resuscitation equipment in their respective units (Mean = 2.87, SD = 1.10), and whether they were reviewing departmental emergency procedures (Mean = 2.80, SD = 1.12). These neutral reactions imply inconsistent or unusual participation in preparedness exercise.

The lowest mean score was obtained in having administered or aided in CPR in a radiologic emergency (Mean = 1.84, SD = 1.10), where the majority of the respondents did not or barely had any practical real-life experience on resuscitation. Likewise, the attendance at simulation or drills on patient resuscitation was also neutral (Mean = 2.72, SD = 1.17), a fact that supports the issue that practical exposure and drills could be inadequate.

Hand hygiene and safety practice before and after emergency events (Mean= 3.23, SD=1.15) and shortages of emergency supplies reporting (Mean=3.20, SD=1.19), but these were still indicative of moderate adherence.

On the whole, the results indicate that although the respondents appreciate the significance of emergency preparedness, their actual application is still poor. This can be blamed on lack of trainings, simulation exercises, or lack of focus on radiological emergency procedures. It is thus advisable to enhance hands-on resuscitation drills, equipment verification and frequent department drills to enhance the preparedness and the reaction rate of radiographers in the event of emergencies.

#### 4.1.6 Hypothesis Testing

Null Hypothesis  $H_0$ : There is no significant relationship between Radiographers knowledge of resuscitation procedures during radiological emergencies and their practices of Resuscitation.

Alternative Hypothesis  $H_1$ : There is a significant relationship between Radiographers knowledge of resuscitation procedures during radiological emergencies and their practices of Resuscitation.

#### Variables used:

Knowledge of Resuscitation: This variable was measured using all item of Section B in our well structured questionnaire.

Practices of Resuscitation: This variable was measured using all item of Section D in our structured questionnaire.

#### Test of Hypothesis using Spearman's correlation test.

**Table 4.5: Spearman's Correlation between Knowledge of resuscitation and Practices of resuscitation**

Variable	$\rho$ (Spearman's rho)	p-value	N	Decision
Knowledge of resuscitation vs Practices of resuscitation	0.569	0.000	61	Significant

Null Hypothesis  $H_0$ : There is no significant relationship between Radiographers knowledge of resuscitation procedures during radiological emergencies and their practices of Resuscitation.

Spearman's Correlation Result:  $\rho = 0.569$   $p = 0.000$ ; Since  $p = 0.000$  is lesser than 0.05, we reject the null hypothesis  $H_0$ .

Conclusion: The findings show that there is a statistically significant relationship between the knowledge of the radiographers on the resuscitation procedures and their practice of resuscitation in cases of radiological emergency. This implies that the more the radiographers are knowledgeable, the better the resuscitation practices they portray. The correlation coefficient ( $\rho = 0.569$ ) implies a moderate positive correlation between the two variables, which implies that enhanced knowledge is relatively correlated with enhanced practical application in cases of emergencies.

## **4.2 Discussion**

This study assessed the knowledge, attitude and practices of resuscitation of patients among radiographers during radiological emergencies in Benin metropolis. The study specifically evaluated the level of knowledge of resuscitation procedures, the attitudes towards resuscitation and the practices of resuscitation among the radiographers in Benin metropolis. Questionnaires were distributed across various media and via different means to Radiographers in Edo state and only 61 radiographers attempted and completely filled out their questionnaires.

The demographic information from this study showed that male radiographers were the majority of participants at the time of the study (43; 70.5%). The data also reveals that a significant proportion of the participants (91.8%) were in the 20-30 age range. The demographic data also showed that a significantly high percentage of participants (58; 95.1%) only had B.Sc degrees. 98% of the participants had less work experience. The table also reveals that 36 participants (59.0%), reported working in private facilities at the time of the survey.

Regarding knowledge, only 59.6% of the respondents confirmed that they were aware of the basic steps to follow during CPR, 41% knew the resuscitation differences

between adults/children/infants, and only 19.7% were aware about using an AED. These statistics indicate high gaps in readiness to roll out high stakes interventions in imaging sectors. This is analogous to research done by Osiemo et al. (2020) on knowledge and practice of cardiopulmonary arrest and anaphylaxis within the radiology department, which established that radiology staff lacked significant competence in resuscitation, it was also stated that the radiology staff that participated in the study of cardiopulmonary arrest and anaphylaxis protocols had little knowledge.

The consequences are immense: time-related arrest or contrast reaction can require an immediate response in the radiology setting, and lack of knowledge will impede or hinder it.

In terms of attitudes, the mean scores are very high with the respondents willingness as evidenced by the item; radiographers should be given compulsory CPR training with a mean of 4.36 (SD 0.68) and willingness to undergo regular resuscitation drills at 4.26 (SD 0.66). Such positive attitudes are reflective of a study done by Aljarrah et al. (2025) on the Knowledge and Attitudes of CPR in the Jordanian radiographers that it was stated that although the knowledge was poor, the attitude towards CPR was positive.

The mean score on the confidence scale (mean= 3.59) and the neutral attitude towards the anxiety scale (mean= 3.38) reveal the interesting duality in that radiographers are conscious of their profession and eager to participate in it, but lack confidence in their abilities and are slightly anxious about carrying out resuscitation. The very neutral mean score (2.69) on the statement about radiographers should wait until doctors have given their approval before commencing CPR raises the question of divergent

perceptions of scope of practice and autonomy among radiology facility workers- a valuable lesson in policy and training development.

To practices, the outcomes give a cause of concern because the average scores were at the neutral to low level concerning the involvement in training (2.79), the verification of the availability of equipment (2.87), the survey of the protocols (2.80), and the item in particular whether or not he/ she had performed/assisted in CPR (1.84). Such results allow concluding that radiographers might perceive the significance of the issue and demonstrate positive attitudes, but their activity in resuscitation-related practices is insufficient. Such a mismatch is in line with a KAP study by Oteir et al. (2025), who wrote that positive attitude does not necessarily create active practice, frequently because of structural factors (training, equipment, institutional policy) or institutional culture.

The fact that the hands-on experience is low is rather alarming in the light of the specialty setting: radiology units might need to address the matter at hand and act immediately, to the point that the crash team will be avoided, and should radiographers not be able to practice or simulate resuscitation, their preparedness is at risk.

The statistically significant Spearman correlation ( $\rho = 0.569$ ,  $p = 0.000$ ) between knowledge and practice highlights a significant relationship: the more knowledge one has, the more reported practice he or she has. This helps in the assertion that knowledge enhancement is not only academic but it has functional relationship with better behaviour. It is also in line with the literature that indicates that training and increased confidence level through increased level of knowledge leads to increased frequency and engagement (Aljarrah et al., 2025). Furthermore, the favorable attitude

of the participants can serve as a motivator towards the improvement of practice, but one, which will need structural support.

Policy-making and practice-wise, the results imply a number of recommendations. To start with, it is better to ensure that compulsory and regular training on CPR/ AED that is specific to radiographers is established since there is good attitude towards such training. Simulation drills and scenario/training in the radiology department will assist in eliminating the knowledge/attitude/actual practice gap. Second, radiology department protocols must clearly establish the position of radiographers in the resuscitation process, such as triggers of emergency systems and CPR/AED performance and equipment inspection. The neutral reactions on waiting doctors expose a role definition ambiguity that can cause delays in case of actual emergencies. Third, the practice of equipment preparedness, which was poor, can be promoted through regular audit of resuscitation equipment (oxygen, defibrillator) and viewable checklists in the radiology unit. Fourth, the practice norms can be changed by the leadership support and the culture of quick response which is strengthened with the help of drills and feedback.

The results of this research ought to be viewed in the perspective of some limitations that might have affected the outcome. To begin with, the authors narrowed the study to radiographers who were working in Benin metropolis, and thus, the results cannot be applied to other radiographers in other areas or to a different healthcare environment with varying degrees of exposure to emergency cases or training opportunities. Future research may involve conducting the study over a larger geographical region to have a more holistic picture on the knowledge, attitudes, and practices of radiographers on resuscitation procedures. Secondly, the data were collected using questionnaires that were self-reported, which could have resulted in

the bias in responses. It is possible that some of the participants may have over or underreported their real knowledge and practices because of social desirability or recall bias. This may also influence the validity of the results especially in the measurement of actual competence or compliance with resuscitation procedures. Finally, the cross-sectional nature of the study does not allow making a cause-effect relationship between knowledge, attitude and practice variables. Although correlations can be used to come up with association, the temporal nature of these relationships is unknown. A longitudinal or experimental study design may be more appropriate in the context of measurement of the effects of knowledge or training intervention-related changes on attitudes and practical performance over the years. In spite of the limitations, the study is informative about the current situation regarding the preparedness of radiographers in Benin metropolis to resuscitation.

**CHAPTER FIVE**  
**CONCLUSION, RECOMMENDATIONS, LIMITATIONS AND**  
**SUGGESTIONS**

**5.1 Conclusion**

This study assessed knowledge, attitude and practices of resuscitation of patients among radiographers during radiological emergencies. The study found out that radiographers in Benin Metropolis had moderate knowledge and lacked practical experience in resuscitation practices in spite of positive attitudes and desire to undergo CPR training. The large positive correlation between knowledge and practice implies that a better level of understanding may lead to greater readiness and response in case of radiological emergency. Nevertheless, there is a lack of exposure to training, a lack of simulation exercises, and undefined role boundaries, which interfere with the response. Enhancing organized training activities, department policies and emergency preparedness systems will play a significant role in enhancing the competence and confidence of radiographers to undertake patient resuscitation in radiological emergency situations.

**5.2 Recommendations**

1. Professional bodies such as the Radiographers Registration Board of Nigeria should develop mandatory and periodical training in Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) to all practicing radiographers in health institutions. Annual continuing professional development (CPD) programs must include these programs to enable radiographers to keep current with the latest skills and confidence in emergency resuscitation.

2. Radiology department ought to arrange quarterly acceptance exercises, mock resuscitation, as a means of enhancing teamwork, effective response to on-emerging situations, and familiarity with emergency response. Managerial heads of departments are expected to prepare checklists and performance evaluation to assess the staff readiness at the end of each drill.
3. The hospital management is supposed to ensure that clear written policies outlining the specific roles and responsibilities of radiographers at the resuscitation procedure are developed and enforced. These policies must be incorporated into departmental standard operating procedures (SOPs) and be shared at the staff orientation to ensure that there is a sense of responsibility and taking initiative in times of emergencies.
4. A scheduled checking and reporting system of resuscitation equipment including oxygen cylinders, defibrillators, and suction machines should be implemented in the radiology departments. A specific personnel or biomedical engineer must be appointed to perform weekly inspections and register the maintenance operations so that all equipment was in place and operational any time.

### **5.3 Limitations**

1. The study was confined to radiographers working in Benin Metropolis and this limits the sensitivity of extrapolating the study to other areas or institutions where training procedures, access to equipment or exposure to emergencies can be different.
2. The research was based on self-reported information, which creates the chance of a response bias. There was also a chance that the participants exaggerated their

knowledge or practices because of the social desirability or self-fear of being judged professionally, which may inflate the reported levels of competence.

3. Cross-sectional design does not permit the causal inference of knowledge, attitude, and practice variables. The study will only be able to determine associations at a point in time and not those changes or effects over time. Longitudinal or experimental studies are advised in the future to enhance the knowledge of how specific training or policy interventions impact resuscitation performance of radiographers.

#### **5.4 Suggestions For Further Studies**

Based on the findings of this research the following are areas suggested for further studies:

1. Future studies should incorporate bigger and more varied samples of various states or regions in future studies to have more generalized results.
2. Future studies should adopt qualitative or mixed method study design. The barriers and motivations shaping resuscitation practices among radiographers can be discussed with the help of qualitative methods (i.e., interviews or focus groups).
3. Inter-professional gaps and inter-professional collaborative approaches to improve emergency response might be discovered through comparative studies conducted on other allied health professionals.

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## APPENDIX I: QUESTIONNAIRE

### SECTION A: Demographic information

1. Sex            a. male        b. female
2. Age            a. Below 20     b. 20-30     c.31-40     d. Above 40
3. Highest Degree attained    a. DCR/DIR        b. B.Sc        c. M.Sc     d.  
others specify .....
4. Years of practice    a. Less than 5yrs     b.5-10yrs     c.10-20yrs   
d. Above 20yrs
5. Place of work    a. private facility     b. Specilist hospital     c. Teaching  
hospital     d. Other

### SECTION B: Knowledge of Resuscitation during Radiological

#### Emergencies

6. Do you understand the basic steps involved in cardiopulmonary resuscitation (CPR).    a. Yes     b. No
7. Are you aware of the differences in resuscitation procedures for adults, children, and infants.    a. Yes     b. No
8. Do you know how to use an automated external defibrillator (AED) during an emergency.    a. Yes     b. No
9. Can you identify the signs and symptoms of a patient in cardiac arrest.    a. Yes   
b. No
10. Do you understand the role of radiographers in initiating resuscitation before medical help arrives.    a. Yes     b. No
11. Are you familiar with the emergency response protocols in my radiology department.    a. Yes     b. No

12. Do you know how to activate the hospital's emergency response system during a radiological emergency. a. Yes  b. No

13. Are you knowledgeable about the complications that may arise during resuscitation. a. Yes  b. No

**Section C: Attitudes toward Resuscitation during Radiological Emergencies**

Please choose the response that best represents your view: Strongly Agree =SA, Agree=A, Neutral =N, Disagree =D, Strongly Disagree =SD .

	SA	A	N	D	SD
I believe it is part of my professional responsibility to perform resuscitation during radiological emergencies.					
I feel confident in my ability to respond to a resuscitation situation in the radiology unit.					
I am willing to participate in regular resuscitation drills or simulations.					
I believe radiographers should receive mandatory CPR training.					
I feel anxious when thinking about performing resuscitation on a patient.					
I believe early resuscitation efforts by radiographers can improve patient outcomes.					
I think that radiographers should always wait for medical doctors before initiating CPR.					

**Section D: Practices Related to Resuscitation in Radiological Emergencies**

(Please indicate how frequently you perform or engage in the following using the scale: Always, Often, Sometimes, Rarely, Never)

	Always	Often	Sometimes	Rarely	Never
I participate in resuscitation training or workshops.					
I ensure resuscitation equipment (e.g., oxygen, defibrillator) is checked and available in my unit.					
I review emergency protocols relevant to my department.					
I have performed or assisted in CPR during a radiological emergency.					
I practice hand hygiene and safety procedures before and after handling emergencies.					

I actively participate in simulations or drills related to patient resuscitation.					
I report to the appropriate authority when emergency supplies are lacking.					

APPENDIX II: ETHICAL APPROVAL

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL

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

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/137

PROPOSAL TITLE: "ASSESSMENT OF THE KNOWLEDGE, ATTITUDES AND PRACTICES OF RESUSCITATION OF PATIENTS AMONG RADIOGRAPHERS DURING RADIOLOGICAL EMERGENCIES IN EDO STATE"

PRINCIPAL INVESTIGATOR(S): OBODO EMMANUEL CHINONSO

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

DATE CONSIDERED: AUGUST 6TH, 2025

DECISION OF THE COMMITTEE: APPROVED

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

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI

SIGNATURE & DATE: [Signature] 6/8/2025

SUPERVISOR (S): MRS OKEH E.O.

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

APPENDIX III: PLAGIARISM CLEARANCE FORM

**INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER OFFICE (IPTTO)**  
Vice Chancellor's Office  
University of Benin  
PMB1154, Benin City, Nigeria



**CLEARANCE FORM**

DATE: 02-12-2025

NAME: OBODO EMMANUEL CHIMONSO

MATRIC NO: BMS1806160

DEPARTMENT: RADIOGRAPHY

FACULTY: BASIC MEDICAL SCIENCES

SESSION OF GRADUATION: 2024/2025

**DIRECTOR**  
DATE .....  
**IPTTO**  
Head Of Unit (IPTTO)  
UNIBEN, BENIN