Challenges Faced by medical Radiology & imaging technology Students in Clinical Training

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Research Submitted in Fulfillment of the Requirement for the Degree of Bachelor in Diagnostic Radiology and Medical Imaging Technology

2023

قال تعالى:

﴿ فَانقَلَبُواْ بِنِعْمَةٍ مِّنَ اللّهِ وَفَضْلٍ لَّمْ يَمْسَسْهُمْ سُوءٌ وَاتَّبَعُواْ رِضْوَانَ اللّهِ وَاللّهُ ذُو فَضْلٍ عَظِيمٍ ﴾

صدق الله العظيم

Dedication

We dedicate our research to Our:

Parents

With love and gratitude

brothers, sisters

teachers, colleagues and friends,

all those sincere and good people

Who helped and supported us throughout the study.

Acknowledgment

Acknowledgment with gratitude to all our teachers who exerted themselves and doing their best to help us for achieving our purpose and getting the bachelor degree in Diagnostic Radiology Technology. They really deserve all thanks and respect for their kind teaching and right guidance.

Special gratefulness and thanks to the supervisor of this study **Dr. Abdullah Taher** who has been giving us his kind care and has been instructing and guiding us from the first step of the study till the last format of it. And for every person that have participated in this research.

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The researchers

ملخص الدراسة :

للتدريب السريري أهمية قصوى في التعلم واكتساب الكفاءات الرئيسية من حيث المعرفة والمهارة والسمات المهنية المطلوبة للممارسة العملية في التصوير الشعاعي السريري.

كان الهدف من هذه الدراسة تقييم التحديات التي يواجها طلبة اقسام الاشعة والتصوير الطبي فيما يتعلق بالتدريب السريري.

شملت عينة الدراسة طلبة جامعيين من المستويين الثالث والرابع وخريجي برامج الاشعة والتصوير الطبي بحيث كان عددهم ٢١٣؛ كما شملت الدراسة أعضاء هيئه التدريس عدد ١٤ اضافة الى المدربين في اقسام الاشعة بالمستشفيات والمراكز التشخيصية عدد ٤٢.

أظهرت النتائج ان هناك العديد من التحديات المتنوعة التي يواجها كلا من الطلبة والمدربين واعضاء هيئة التدريس فيما يتعلق بالتدريب السريري ومنها ما يتعلق بعدم تناسب عدد الطلبة المتدربين مع امكانات المستشفيات والمراكز؛ وكذلك تسبب غياب فرص التعليم العالي في نقص كفاءة التدريب السريري؛ كما ان هناك فجوة بين ما تعلمه الطالب وبين ممارسته التدريبية.

ويمكن ان تؤثر هذه التحديات على الأداء المستقبلي للطلبة الخريجين من حيث   التطبيق المناسب لمهارات وكفاءات التصوير الاشعاعي السريري اثناء عملهم في اقسام الاشعة.

ولذلك يجب توزيع عدد الطلبة بشكل متناسب مع الامكانات المتاحة والفرص التدريبية الموجودة في المراكز والمستشفيات وسد الفجوة بين ما يتعلمه الطلبة وبين ما يمارسونه من خلال التدريب المكثف والتوسع في تعليم الطلبة بعض المواضيع المتعلقة بعلوم الاشعة مثل علم الامراض.

Abstract

Clinical training are of paramount importance in learning and acquiring key competencies in terms of knowledge, skill, and professional attributes required forth practice of clinical radiography.

The Aim of this descriptive study was to explore the challenges faced by radiology students with regard to clinical training.

The study sample included of third- and fourth-year undergraduate students and graduates of diagnostic radiology program (n = 213), academic faculty number (n = 14), and clinical practice instructors (n = 42).

The main results showed that there are many and varied challenges encountered by both students and educators in relation to clinical training such as a problem related to the inadequacy of the number of students in centers and hospitals, absence of higher education opportunities which caused a lack of clinical training, and there was a gap between what the student has learned and his training practice.

These challenges could potentially affect the future performance of students/practitioners and/or the appropriate application of the core clinical radiography skills and competencies in the world of work. The number of students should be distributed adequately in centers and hospitals, fill the gap between what students learn and practice in training through intensive training and expansion of the subject of diseases.

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List of Abbreviation

Abbreviation	Meaning
MIT	Medical Imaging Technologist
CT	Computed Tomography
MRI	Magnetic Resonance Imaging
UST	University of Science & Technology
BSc	Bachelor of Science
SPSS	Statistical Package for Social Sciences
SD	Standard Deviation

Chapter One
INTRODUCTION

1.1 Overview

Two important aspects of medical imaging education are theory and practice. Clinical practice is an integral part of medical imaging students' education. It allows students to have direct experience with the real world of medical imaging, practice skills, and learn about general medical imaging protocols and the responsibility of the medical imaging technologist (MIT) (Safaa, 2018).

The clinical practice aims to prepare medical imaging students to apply the classroom-based theoretical knowledge and skills to real patient situations.

clinical placements allow students to have the opportunities to observe preceptors, bridging the gap between theory and practice.

It is imperative that the program provides clinical environments that are supportive and capable of nurturing meaningful learning and optimal performance in students. Students are viewed as consumers or customers, rightfully demanding the highest quality of education available, often observed medical imaging students expressing concern and dissatisfaction with their clinical learning experiences, but did not have objective data to substantiate these claims. Furthermore, there is a lack of data studying these issues which might shed light on the experiences of medical imaging students while in clinical placement (Safaa, 2018).

These factors generated an interest to formally investigate the experiences of medical imaging students during their clinical training. In addition to the need for research and data, there is a deeper theoretical need to understand how learning takes place in clinical practice.

There is a specific need to explore the consequences of inadequate or poorly administered clinical placement, consider the barriers to the effective clinical placement, and provide practical guidelines for providing effective clinical placement. To date, no studies exist which would provide insight into the experiences of students undertaking medical imaging practice in Sana'a; hence, conducting this study is timely and relevant.

1.2 problem statement

Despite many studies about the importance of student learning during clinical practice, many researchers reported on the negative experiences of students (MIT) This is due to the inability to practice work immediately after graduation and the lack of practical skills for training, so this search seeks to answer this question: What are the difficulties faced by medical radiology and imaging technology students during clinical training and how can they overcome these challenges.

1.3 Research Objectives

1.3.1 Overall objectives

The purpose of the study was to identify challenges facing the radiology student during clinical training.

1.3.2 Specific-objectives

A number of sub-objectives designed to achieve the main goal can be summarized as follows:

1. To identify problems that occur during student placements and address these accordingly.
2. To Find practical solutions to clinical training problems.
3. To put forward suggestions to improve the clinical training environments.

1.4 Public Health Significant

Based on the expected results, the research seeks to provide the optimal environment for training in radiology departments, which will lead to an increase in the patient's level .

 The outcomes of this study could help in the development of radio technologist performance.

1.5 Research Limitation

1- Students have obstacles during clinical practice such as short time and limit of study sample
2- The results was based on the student's opinion and experience.
3- Lack of time to take all opinions and aspect of Clinical training.

1.6 The Research Strength

1- No previous studies on this topic in Yemen according to available literature.

2- Some of challenges in this study questionnaire raised from the obstacle which faced by researcher during them clinical training.

3- The research seeks to provide a clinical environment capable of nurturing purposeful learning.

1.7 Research outline

This research consists of five chapters. The first chapter introduces the research topic and provides a brief description of the problem statement of the trainee students, research objectives, and study limitations.

Chapter 2 covers a brief review of relevant literature and theoretical aspects of clinical training and associated problems faced by students in the radiology department, and summery of some previous studies.

Chapter 3 describes the methodology and their performance, and implemented procedures to achieve the necessary results. Chapter 4 Reported the results and discussion.

The research findings are concluded in Chapter Five, which provides a summary of the discipline Possible results, presentations, recommendations and suggestions for future works are presented in chapter 5.

Chapter Two

LITERATURE REVIEW

2.1 Theoretical background

Medical education often uses a 'see one, do one, teach one' approach to teaching basic skills, and as radiologic technology students are in their way to work as technologist, they should have main skills to perform their work accurately.

2.1.1 Training

has been defined as "a process by which someone is taught the skills that are needed for an art, profession, or job" (Kagoma, 2018).

Clinical radiology technologist internship programs are the clinical training component of programs sponsored by the collages.

2.1.1.1 The clinical training sites

1-Collage.

2-Public hospitals.

3-private hospitals.

4-Radiology centers.

2.1.1.2 Training target levels

1-The third level.

2-Fourth level.

3-student intern.

2.1.1.3 Clinical teaching and learning resources for radiology student placement

1-General x-ray unit.

2-Mobile x-ray unit.

3-Fluoroscopy unit.

4-Ultrasound unit.

5-CT unit.

6-MRI unit.

7-Mammmography unit.

8- Nuclear medicine &DEXA (Sichone, 2020).

2.1.2 Radiologic Technologist student

To be a successful radiologic technologist, the student 'll need communication skills, mechanical aptitude, and analytical skills. As a radiologic technologist, you'll work with all age groups and demographics, so you'll need diverse, effective communication skills.

The training requires physical interaction with patients, so you should be comfortable doing so. Radiologic technologists need to move a patient to get a clear image, even if the patient is in severe pain or experiencing high anxiety (coursea, 2022).

2.1.2.1 Communication skills

Communication skills are essential when preparing a patient for an imaging procedure. The patients could be there for a variety of reasons, and some might experience fear or anxiety. Some patients might have a physical injury or suffer from trauma. As a radiologic technologist, you'll want the following communication skills:

Compassion A calm voice and demeanor Ability to explain procedures and answer questions Communication skills for all ages Recognition of non-verbal cues (coursea, 2022).

2.1.2.2 Mechanical aptitude

A career as a radiologist center around the operation of imaging equipment. Not only will you want to be comfortable operating the equipment, but as new technology evolves, you'll need to relearn how to use certain equipment. Other considerations include: Equipment maintenance Equipment repairs Keeping current with technological equipment changes (coursea, 2022).

2.1.2.3 Medical skills

As a radiologic technologist, you'll need to know human anatomy so you can properly position patients to capture the images requested by the physician. Along with anatomy skills, you'll need Knowledge of safety measures to prevent over-exposing radiation to the patient and yourself the physical ability to position a patient so quality images can be captured while keeping the patient comfortable Keeping careful patient medical record (coursea, 2022).

2.1.3 Radiologic Technologist director

The means the person who has overall responsibility for the structure and quality of training in a hospital or department, in line with collage policies and the specific arrangements within their training network, and for providing trainees information and feedback on their progress (RANZCR, 2018).

The director would be an experienced clinician, competent &able to organize and manage a large network of clinical instructors, composed of preceptors, residents, tutors, technicians. the director must be a senior person with sufficient clinical experience. The other member of the network will be responsible for instructing the student in specific segments of clinical curriculum. At the end of a predefined period, such as at the end of each academic year, an independent assessor should perform an overall assessment of student's competency. The results achieved by students would reflect the quality of the mentor's work and serve, in addition to the teaching credits and other criteria, as a reliable basis for his or her academic promotion and advancement.

2.1.4 Radiologic Technologist Instructor

Instructor who supervises radiology students during clinical practice have a managerial task of organizing and managing training resources in conjunction with departmental managers (Sichone, 2020).

2.1.4.1 RT tasks

1-Oriention of new radiology students to radiology department.

2-Organising and managing imaging equipment and consumables.

3-Preparing duty rosters for radiography students.

4-Ensuring the availability of clinical teaching and learning aids.

5-Developing and maintaining their competencies and participating in clinical supervision quality assurance programs.

To perform these tasks efficiently and confidently, clinical supervisors should be adequately supported by key stakeholders:

- Schools of radiography.

- Professional body and regulator.

- Hospital and radiology of departmental managements.

- Collages (Sichone, 2020).

2.1.4.2 Clinical supervisors guide

The practical guide should contain the following information:

• How to develop conducive clinical environments associated with positive student learning experiences.

• General principles of planning a clinical teaching session and methods of conducting small group teaching in the clinical learning environment.

- Methods of teaching professionalism to students in the clinical learning environment.

- Principles and methods of giving constructive feedback to students on their clinical performance.

- Principles and methods of assessment in the clinical learning environment.

- Supporting students with learning difficulties and disabilities.

- How to maintain competence as a clinical supervisor.

The practical guide for clinical supervisors should also state the responsibilities of the schools of radiography, clinical departments, clinical supervisors, and radiography students (Sichone, 2020).

2.1.4.2.a Responsibilities of the schools of radiography in the clinical training

responsibilities of the schools of radiography in the clinical training of radiography students:

- To prepare students in their care for the clinical environment and the learning opportunities it presents, through adequately covering theory in class.

- To have an awareness of the requirements of the clinical environment and how this will affect the learning experiences of students.

- Encourage radiography lecturers to network with clinical colleagues.

- Collaborative research activities between radiology departments and schools of radiography to provide opportunities for closer relationships (Sichone, 2020).

2.1.4.2.b Responsibilities of radiology departments affiliated with the schools of radiography

responsibilities of radiology departments affiliated with the schools of radiography as follows:

• To ensure that there is a policy on the management of students' placements, including reflecting the clinical supervisors' role in job descriptions.

• To ensure that all radiographers understand the importance and value of having radiography students within the clinical environment and that they are all required to assist in the students' development.

• To determine the maximum number of radiography students that the radiology department can manage and support effectively, considering the potential for multiple education providers' involvement with other educational programs.

The responsibilities of clinical supervisors of radiography students:

• To develop teaching and supervisory skills and act as a resource for radiography students seeking information and guidance.

• To be familiar with the radiography program curriculum and understand the standards and achievements expected at each level of training.

• To offer a level of clinical supervision appropriate to the competence and experience of the individual radiography student.

- To provide the students with opportunities to comment on their training; provide support and enable the student to discuss any problem they identify (Sichone, 2020).

2.1.4.2.c the responsibilities of radiography students in clinical supervision

the responsibilities of radiography students in clinical supervision are as follows:

- To take a proactive approach in contributing to their own clinical learning.

- To be conversant with the curriculum of their own programmed of study, including methods of assessment and the role of clinical supervisors.

- To be compliant with: local rules, practice placement providers' policies, statutory and professional regulations, and codes of conduct and behavior.

- To be aware of their direct responsibilities for the safety of patients in their care and maintain confidentiality always.

- To maintain a high level of attendance and punctuality during clinical placement.

- To attend their placement in a uniform that complies with the clinical placement and with the specific school of radiography' requirements.

The availability of this information in the practical guide ensures that every stakeholder knows the allocated responsibilities. This also

assists the clinical supervisors and students to know which stakeholder to approach in case of any problem or concern (Sichone, 2020).

2.1.5. Phases of clinical skills training

2.1.5.1 The first phase, the clinical skills instructor would explain the rationale for the procedure, introduce the equipment, instruments and materials, and present the procedure in detail. It is not necessary for all the instructors to be physicians: many skills can be mastered with the assistance of preceptors, nurses, and technicians.

2.1.5.2 The second phase, the instructor would practice a skill with students in the Clinical Skills Laboratory on mannequins, models, or in virtual reality. At the end of this phase, the instructor would inform each student's mentor and confirm with his signature that the student had mastered the skill well enough to be allowed to practice it in the real environment.

2.1.5.3 The third phase, the clinical instructor would introduce the same skill in a clinical setting, first showing to students the complete procedure, and finally allowing them to execute the tasks and procedures under his supervision.

2.1.5.4 Finally, during the final assessment, the senior assessors would have an opportunity to re-evaluate the students "portfolio of acquired skills," estimate the students' level of competency, and affirm that a skill in question has been completely mastered (Šimunović, 2010).

2.1.6 Portfolio (logbook) of Acquired Clinical Skills

It has long been observed that assessment drives learning. If we care that medical students become skillful practitioners and sensitive and compassionate healers, we must employ all instruments we have today at our disposal:

- Self-assessment.

- Peer evaluations.

- Written assessments of clinical reasoning.

- Standardized patient examinations.

- Oral examinations, and sophisticated simulations.

Most importantly, all results of the learner's work should be duly noted in portfolios. Rigorous assessment has the potential to inspire learning, influence values, reinforce competence, and reassure the public. Permanent follow-up of a student's progress during clinical skills acquisition is a prerequisite to building a competent physician. Therefore, we propose that students receive a logbook at the beginning of their training (called a "Portfolio of Acquired Clinical Skills"). In this logbook, all skills that are essential to the practice of contemporary medicine should be listed and classified. Having the Portfolio in possession, students will know from day one what to expect and what are the "must-have" skills if they aspire to becoming competent medical graduates. Clear guidelines on the purpose, contents, and organization of the training are essential. No less importantly, students would be able to plan in advance and set their

own pace individually. As previously discussed, every acquired skill should be assessed by clinical instructors, first in a virtual and subsequently a real-world setting. When a particular skill is mastered, this would be duly noted and acknowledged with the instructor's signature. The concept of combining formative professional development alongside overall assessment is relatively new and we believe that if such approach is applied, nothing of importance would be neglected and the number of medical graduates who start their careers with considerable gaps in their armamentarium would be significantly reduced (Šimunović, 2010).

2.1.7 The clinical learning environment

The clinical learning environment has been defined as an interactive network of forces within clinical settings that influence students' clinical and professional learning outcomes. the clinical learning environment is equivalent to the classroom for students during their fieldwork education placements. Unlike classroom learning where student activities are structured, students in clinical and practical setting are often exposed to unplanned activities where they engage with clients and other health care disciplines. In other words, clinical education takes place in a complex social context with many formal and informal learning opportunities. What is important to realize is that both the clinical/practice education context and the classroom environment are vital elements of any undergraduate program and that we need to become cognizant of how they complement and/or contradict each other. There have been several studies completed that recognize the importance of clinical learning environment. the

environment affects what is learned and the learners' response and also provides students with the opportunity to observe role models, practice in action, and reflect on what is seen, heard, and done. The clinical learning environment can have considerable impact on the development of psychomotor and problem-solving skills, attitudes and knowledge amongst students. The diagnostic radiology trainees that many factors in the clinical learning environment both formal curriculum(such as the syllabus, assessments and on-the-job training) and informal curriculum (such as the staff interaction and self-study and reflection) all shape the trainees' learning achievements(Sichone, 2020).

2.1.8 Major impediments to clinical skill training

2.1.8.1 Institutional value system

In most university hospitals, teaching is strongly influenced by the institutional value system: while research accomplishments and generation of clinical revenues are rewarded, excellence in teaching is often neglected. Clinical faculty members who are willing to serve as teachers and mentors are under permanent pressure to be "clinically productive," which is just another euphemism referring to the amount of revenues generated.

Substantive reform of institutional values will be possible only if there is strong willingness of hospital management to support the educational mission. All teaching hospitals should develop an internal set of acts and regulations that will support teaching with adequate financial input and career promotion mechanisms. At the same time,

the mechanisms for the control of the teaching process, regular assessment and evaluation of teaching staff, including students' anonymous surveys, should be defined. In the long run, this novel approach could be looked at as a sound investment: without outstanding teaching, one can hardly expect highly competent physicians, upon which the flow of hospital revenues depends.

It may be possible to introduce "credits" for good teaching practice. Over the past decades, the requirements of life-long learning and continuous medical education have become an inseparable part of every physician's professional life. A similar principle may be applied to education, such that every member of the teaching staff would need to collect credits for successful teaching and for research and publications related to medical education (Šimunović, 2010).

2.1.8.2 Mentorship

The essential prerequisite in clinical training is "a meaningful, ongoing relationship between faculty and students". Unfortunately, mentorship in the majority of today's teaching hospitals and medical schools is "either fragile or does not exist, and the progressive advancement of student competencies is not well guided across the curriculum…". We believe, as argued in recent literature, that mentorship has to be reestablished to ensure adequate observation, supervision, and mentoring of students' professional development.

Students should be introduced, at the beginning of their course, to a competent mentor who will instruct, coach, monitor, and assess their level of proficiency in clinical skills, to rate the performance of students to determine whether they are trained well enough to apply

for the official examination. In order to provide a sufficient number of competent mentors in a medical school, it is necessary to create a well-organized and carefully structured network of teachers who will cooperate across clinical specialties through "interdisciplinary ownership of the clinical curriculum" (Šimunović, 2010).

In the proposed scheme, the mentor would be an experienced clinician, competent and able to organize and manage a large network of clinical instructors, composed of preceptors, residents, tutors, technicians, and nurses. The mentor must be a senior person with sufficient clinical experience. The other members of the network will be responsible for instructing the student in specific segments of clinical curriculum. At the end of a predefined period, such as at the end of each academic year, an independent assessor should perform an overall assessment of students' competency. The results achieved by students would reflect the quality of the mentor's work and serve, in addition to the teaching credits and other criteria, as a reliable basis for his or her academic promotion and advancement (Šimunović, 2010).

2.1.8.3 Organization of clinical training

In most medical schools, curriculum is traditionally divided in two parts, preclinical and clinical. Consequently, clinical skills are generally taught in senior years of the course and students should master a large number of skills over a short period of time.

This problem can be at least partially solved if training of simple skills starts early in the curriculum, at the very beginning of the course. The instructions should start with the simplest tasks of patient care, such as

positioning patients in bed, proper cleaning and skin care, and control of antiseptic measures. Gradually, the complexity of the training would increase leading to the acquisition of more demanding skills. If such a curriculum were adopted, students, their mentors, and clinical instructors would have more time for clinical training, which would be organized in several phases (Šimunović, 2010) as it shown in Table 2.1.

Table 2.1: Phases of clinical skills training

Phase	Activities
1	Rationale of clinical skills
2	Training in clinical skills laboratory
3	Demonstration of skills in a clinical setting
4	Execution of skills in a clinical setting
5	Final assessment of proficiency

2.1.4.4 Scheduling bed-side teaching:

Rigid scheduling of training is another factor to blame for poor training results. A programmed schedule of clinical practice very often does not match with the availability of appropriate clinical cases for demonstration, and even the simplest demonstrations are sometimes not possible for myriad reasons. Standardized patients cannot solve these problems even if they are very talented actors, since they cannot be subjected to painful procedures such as venous punctures, lumbar taps, or rectal examinations. This problem can partly be solved by using a flexible schedule that can be adapted to changing circumstances.

We suggest that students and their instructor plan the schedule of in-hospital activities together. The priority should be to master a specific skill, not master it at a specific time (Šimunović, 2010).

2.1.8.5 Catalogue of knowledge and clinical skills:

The principal goal of this catalog is to clarify some of the dilemmas confronting medical students at the beginning of their study, such as "What is expected of me? Where is the line between necessary knowledge and desirable supplementary knowledge? and How can I be confident that I am a competent radio technologist ?

The Catalogue of Knowledge and the Clinical Skills not only lists the knowledge and skills that a competent graduate should possess, but it also classifies these skills in relation to their significance. Such catalogues allow students to know exactly what is expected of them and teachers can also use them when planning their teaching (Šimunović, 2010).

2.1.8.6 Practicum of clinical skills:

Composition of an all-inclusive practicum of clinical skills is another crucial step in clinical skills training. To execute a skill, a student should understand its importance, be aware of both indications and contraindications for the procedure, and know which instruments, materials, and equipment are necessary for its successful completion. Many essential details that are not explained in textbooks should be covered: for example, how to explain the procedure to the patient, how to position the patient, what kind of anesthesia needs to be applied, or how to handle the specimens for analysis. The procedure

should be described in a step-by-step manner, with appropriate comments on anatomy and physiology, as well as warnings on possible complications and their management (Šimunović, 2010).

2.1.8.7 Cooperation with Patients

Cooperation with patients is instrumental for teaching of clinical skills. Young physicians-to-be have to touch, feel, hear, and smell the textbook stories and cases in a real world. This presents a serious problem, because during the last half-century, patients' way of thinking and their attitudes toward physicians have radically changed. Today, the common patient is not a humble, grateful, and obedient one. Patients are more informed, more knowledgeable about their conditions, and less willing to be used as teaching subjects. Consequently, the student's chances to palpate a lump in a woman's breast are considerably reduced. Over the last years, there have been quite a few attempts to resolve this problem. Mannequins and different models of the human body are useful, even indispensable, in introductory lessons. In addition, there is an increasing number of good interactive software programs that create virtual reality, and their quality is improving constantly. A third track is the use of patient-actors (Šimunović, 2010).

2.1.8.8 Moving the frontiers in clinical skills education added value of basic clinical skills training integrated into an anatomy course:

Numerous diagnostics as well as treatment procedures are invasive and involve manipulation of body parts; hence, they involve sound anatomical knowledge and understanding. For this reason, these procedures should be practiced for the first time on cadavers rather than on patients. At this stage, the student's focus should be on the comprehension of a routine procedure's anatomical basis, rather than on its clinical benefits and outcomes. This involves a specific knowledge of the following: anatomical features leading to the selection of an appropriate procedure site; anatomical structures that are visualized, palpated, or pierced during the procedure; and anatomical hazards that might be encountered during the procedure, ie, different structures potentially endangered by the procedure. A short and well-illustrated guide through the anatomical basis of clinical procedures that might be required of a general practitioner (Šimunović, 2010).

2.1.9 Possible solutions for improving clinical skills training:

- Willingness of the management of teaching hospitals to reconsider the institution's value structure, with new Rules of Conduct.

- Formally linking teaching staff status and promotion to good teaching.

- Re-introduction of a firmly structured mentorship system.

- Cross-departmental ownership of the clinical curriculum.

- Publishing a clear-cut catalog, practicum and portfolio of clinical skills.

- Immersion of students into the patients' world.

- Independent external assessment of acquired skills and overall competency, on the state or national level (Šimunović, 2010).

2.1.10 Clinical training Goals:

1. Students will be clinically competent in the Radiologic Technology field.

2. Students will demonstrate effective communication skills.

3. Students will demonstrate critical thinking skills in Radiologic Technology situations.

4. Students will demonstrate professionalism in the Radiologic Technology field (Shawnee state university, 2023).

2.1.11 Student Learning Outcomes:
- Students will demonstrate proper positioning skills in the laboratory setting.

- Students will demonstrate proper positioning skills in clinical situations.

- Students will demonstrate proper selection of technical factors.

- Students will utilize radiation protection.

- Students will demonstrate written communication skills.

- Students will demonstrate oral communication skills.

• Students will perform non-routine procedures effectively.

• Students will identify errors and seek corrections in radiographic images.

• Students will demonstrate the value of life-long learning by actively seeking additional certification or education and continuing to be active members in the field.

• Students will understand the importance of professional and ethical conduct in the clinical setting.

• Students will demonstrate professional and ethical conduct in the clinical setting (Shawnee state university, 2023).

2.1.12 Previous studies:

Kyei et al (2015) Aimed to identify challenges facing the student radiographers during clinical training. The study was a quantitative one which employed a descriptive survey approach. The survey comprised of levels 300 and 400 students of the department of radiography which gathered forty-two (42) participants. questionnaire was used to collect data for the study. Data obtained was summarized as frequencies, percentages, means and standard deviations using SPSS version 16.0. Results: The study revealed challenges faced by radiography students such as the gap between theory and practices, inadequate exposure to certain specialized procedures and time allotted to each treatment room. The study showed that clinical training can be enhanced by providing enough equipment's and clinical areas for students, also films and cassettes must be made available before the date and time of clinical training. Finally, the

theory aspects of clinical training must be in tune with the practice to enhance effective learning experience by students.

Ohagwu et al. (2016). Studied The majority of the factors identified were strongly rated to contribute to the challenges of training except for unavail- ability of published programme curriculum. Multinomial logistic regression showed that the age of the students did not influence the rating of factors (p>0.05). Gender influenced the rating of high academic workload and tight scheduling of lectures and published programme curriculum is not interest-stimulating enough (p=0.008). The factor's rating by the males was higher than the females (3.23 ± 0.91 vs 3.00 ± 0.86. The institutions, where the students are domiciled, influenced their ratings of congested and not conducive classrooms (p<0.0001), and shortage of ICT facilities and e-learning packages (p=0.009). The students' level of study influenced the rating of 7 of the 18 factors investigated. The challenges facing training and clinical skill acquisition of radiographers in southeastern Nigeria have been highlighted in this study. The challenges identified include inadequate infrastructure, difficult logistics, inadequate teaching aids, negative attitudes of trainers, and poor training methods.

BizuayehuNigatuLemu (2020) studied the identification of nine themes from the focus group discussion and face-to-face interviews. From the students' and instructors' points of view, love of profession, transportation services, clinical supervision, theory-practice gap, hands-on practice, imaging modalities, availability of a skills lab, insufficient practicing area, and curriculum were considered as

important factors in the clinical placement experience. This research showed students and instructors faced many challenges during the clinical placements of radiology technology students from Addis Ababa University, and these challenges may significantly affect the future performance of these students as technologists.

Bwanga et al., (2021). This study aimed to evaluate factors that affect supervising radiographers in the clinical supervision of radiography students in Zambia. A cross-sectional design was utilised in this study. A self-administered questionnaire was used to collect data from supervising radiographers (N=120) working in public hospitals affiliated with the schools of radiography and located in the Lusaka and Copperbelt provinces of Zambia. Data were analysed using descriptive and inferential statistical methods. The response rate was 75% (N=120/160). Supervising radiographers rated the current system of clinical supervision as being unsatisfactory. Factors that facilitated the clinical supervision process were an adequate supply of X-ray films, students sharing their learning problems and radiology department management support. On the other hand, factors that inhibited the clinical supervision process were a lack of guidelines, lack of theory amongst students, combined supervision of diploma and degree students, student overcrowding, lack of educational audits, unjustified imaging requests, insufficient clinical teaching knowledge, and inadequate faculty and hospital management supports. Supervising radiographers encounter both facilitating and inhibiting factors in the facilitation of practice-based learning for radiography students. More collaboration amongst key stakeholders and supports are necessary to overcome the challenges identified in this study.

Starla L Mason (2006) collected Data were for 82 first-year and second-year students. Students identified 7 primary clinical stressors: fear of making a mistake/repeat, feeling unprepared/inexperienced, intimidation by staff and by instructors, difficult/critical patients, hurtful criticism, too much supervision and negative responses to questions/requests for help. Students indicated that more frequent feedback, availability of the clinical instructor and other staff, assurance that mistakes happen and the opportunity to make mistakes were clinical practices that eased stress. The majority of students cited hands-on learning and repetition as the clinical activities that most reinforced their learning. Summary Radiography students in this survey experience some of the same clinical stressors as radiographers and other allied health workers, although the source of stress may be different. Factors that promote an optimum clinical learning environment for students include instructor availability, opportunities to practice skills and make mistakes, frequent performance feedback and assurance that mistakes happen.

Chapter 3

Methodology

3.1 Method:

This research is a cross-sectional descriptive study that used a questionnaire to evaluate the clinical training of the radiology department, which targeted students, trainers and faculty members due to their primary relevance to the research.

3.2 Research design:

This research is designed as a descriptive cross-sectional study.

3.3 Population and research

All BSc. Radiographic technology students from third and fourth levels because they have experience and knowledge of clinical rotation, while the first and second years students were excluded because they have no experience in clinical training environments. In addition the study population included all intern students, trainers, and faculty members.

3.4 Sample size and selection of sample

The research sample were 269 respondents consisted of 213 students, 42 trainers, 14 faculty members.

3.5 Source of data:

Students, graduate, trainers and faculty members in radiology departments, Sana'a, Yemen.

3.6 Data collection procedures

The questionnaires contain questions that measure the challenges of clinical training among the respondents.

3.7 Exposure assessment

All BSc. radiographic technology (third and fourth level) intern student, instructors and faculty members in radiology department.

3.8 Data analysis strategies

By using appropriate SPSS, which estimated frequencies, percentage, means and association between the variable's ethics issue and human subjects.

1. students, trainers, and faculty members who applied as a sample were asked to fill out questionnaires.

2. the names of the respondents bland.

Chapter 4

Results

Results

During this study, 14 of Faculty Members & 213 students and 42 Trainers are asked about challenges facing the student radiographers during clinical training in Sana'a City – Yemen, were included in the study. The results of this study were described as the following:

4.1) Demographical characteristics of Study Sample:

4.1.1: Gender:

Table 4.1: The distribution of participants according to their gender (student).

Gender	No	Percent
Male	107	50.2%
Female	106	49.8%
Total	213	100%

Table 4.1 presented that, the distribution of student's participants according to their gender (50.2%) were Male, while the Female percent was (42%).

Figure 4.1: The distribution of participants according to their gender

4.1.2. Education level

Table 4.2: Distribution of participants from students according to their education level

Education level	No	Percent
Third year	108	50.7%
Fourth year	73	34.3%
Student intern	32	15.0%
Total	**213**	**100%**

Table 4.2 Presented the distribution of student's participants according to their Education level, (50.7%) were (Third year), while the (Fourth year) was secondly (34.3%), and the (Student intern) were (15%).
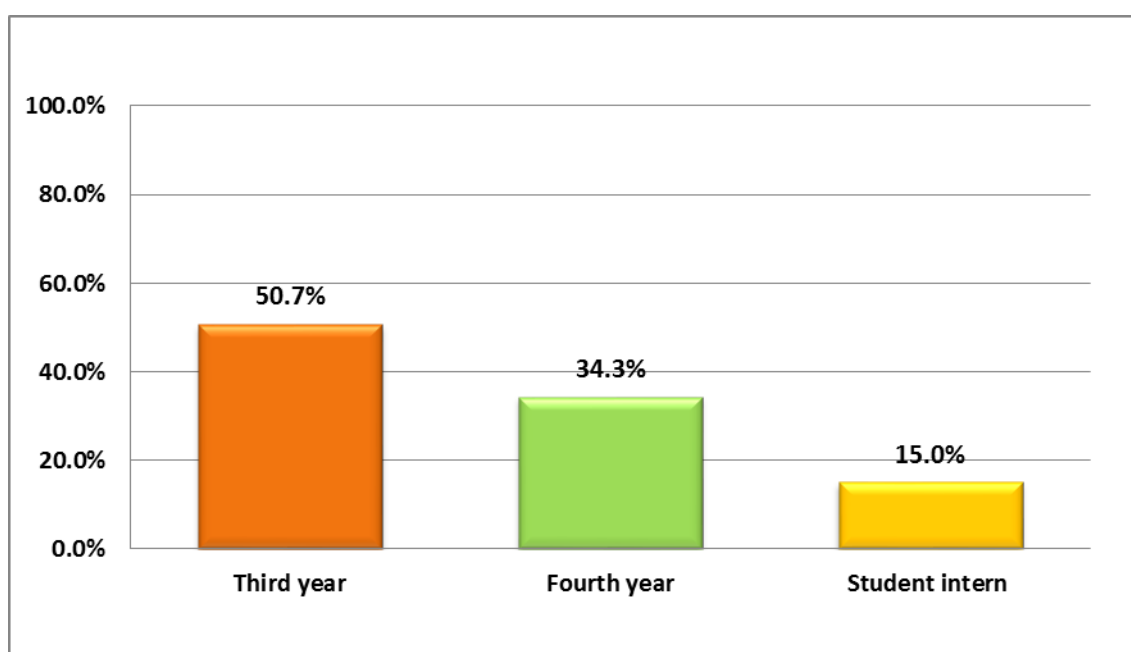
Figure 4.2 : The distribution of participants according to their education level

4.1.3. Training place

Table 4.3: Distribution of participants from students according to their training place

Training place	No	Percent
Public	115	54.0%
Private	53	24.9%
Diagnostic center	45	21.1%
Total	**213**	**100%**

Table 4.3 presented the distribution of student's participants according to their training place (54%) were in trained Public Training place, while the Private degree included (24.9%), and Diagnostic center were (21.1%).
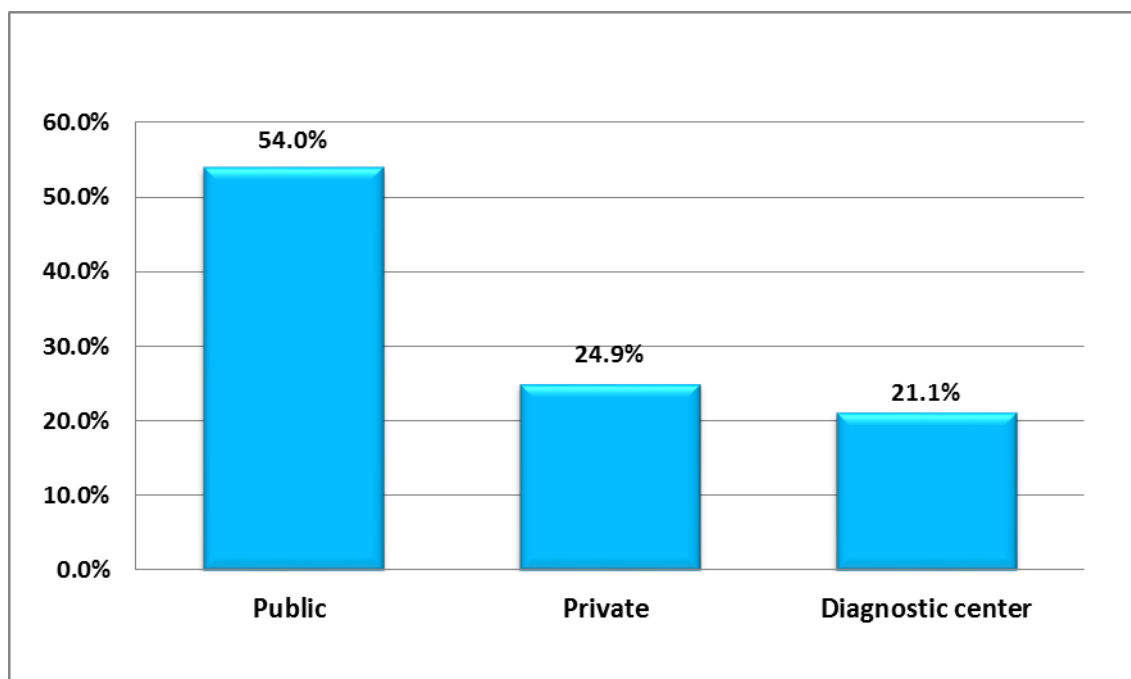
Figure 4.3 : The distribution of participants according to their training place

4.1.4. University of Students

Table 4.4: Distribution of participants from students according to their university group

University group	No	Percent
University of science & technology	88	41.3%
Azal University	96	45.1%
High institute	29	13.6%
Total	**213**	**100%**

The Table 4.4 presented the distribution of student's participants according to their university (45.1%) were from (Azal University), while (University of science & technology) came secondly by (41.3%), and the last from (High institute) represent (13.6%).
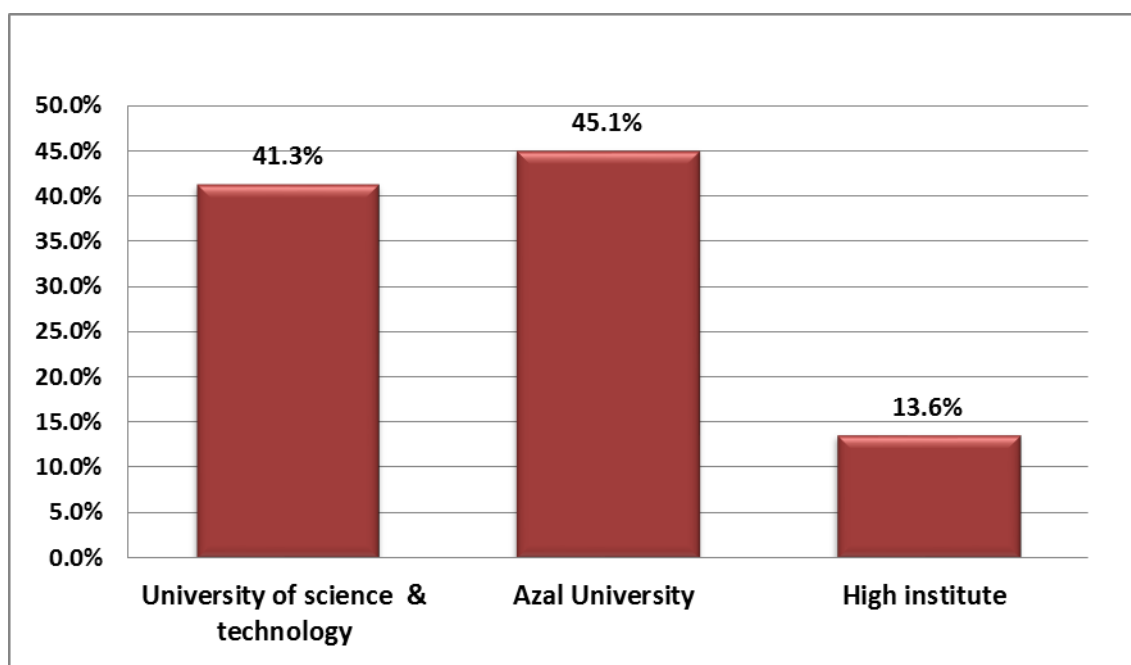
Figure 4.4: The distribution of participants according to their University group

4.2) Demographical characteristics of Trainers

4.2.1: Gender:

Table 4.5: The distribution of trainer's participants according to their gender

Gender	No	Percent
Male	31	73.8%
Female	11	26.2%
Total	**40**	**100%**

The Table 4.5 present the distribution of trainer's participants according to their gender (73.8%) were Male, while the Female percent (26.2%).
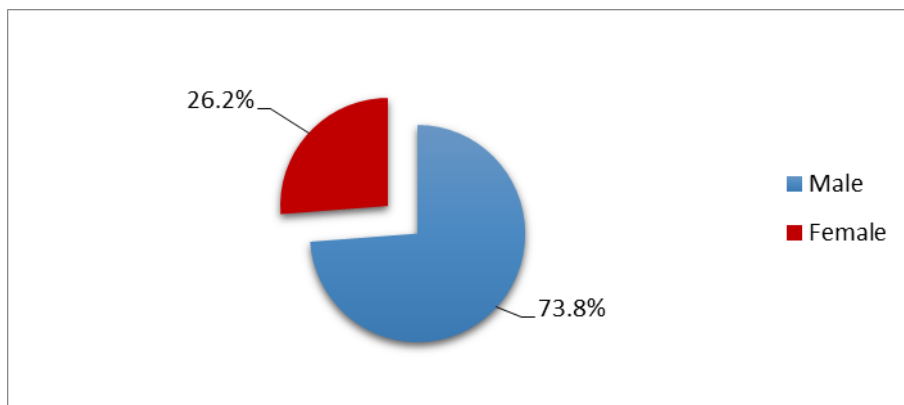
Figure 4.5: The distribution of participants according to their gender

4.2.2. Education level:

Table 4.6: Distribution of trainer's participants according to their Education level

Study level	No	Percent
Diploma	16	38.1%
Bachelor	19	45.2%
Master/PhD.	7	16.7%
Total	**42**	**100%**

 Table 4.6 Presented the distribution of trainer's participants according to their education level (45.2%) were (Bachelor), while the (Diploma) came secondly (38.1%), and the last were (Master/PhD.) by (16.7%).
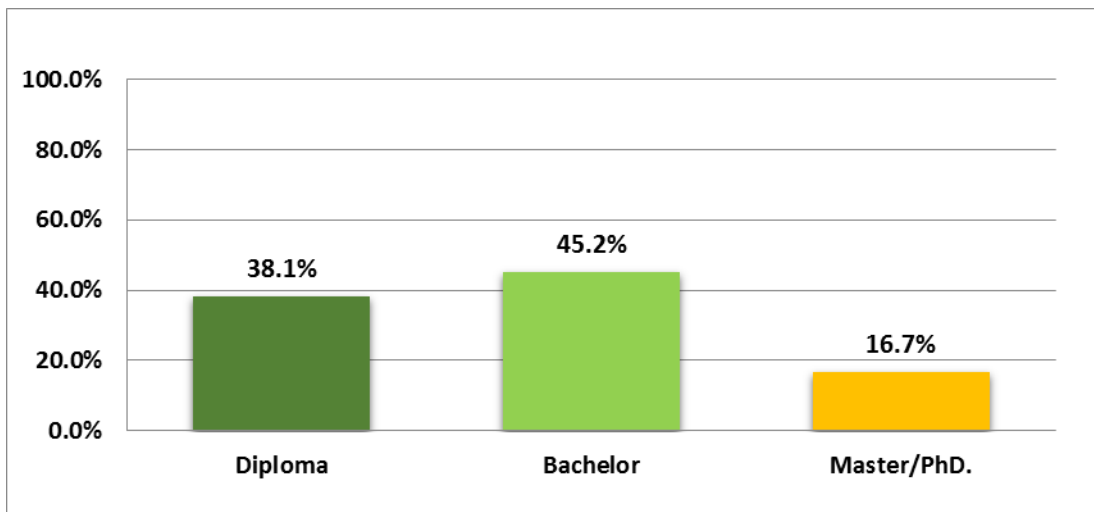
Figure 4.6: The distribution of participants according to their Study level

4.2.3. Age:

Table 4.7: Distribution of trainers participants according to their Age

Age (year)	No	Percent
< 25 year	12	28.6%
26 - 35 year	18	42.9%
36 - 45 year	9	21.4%
> 45 Year	3	7.1%
Total	**42**	**100%**

Table 4.7 presented the distribution of trainer's participants according to their Age (42.9%) were from (26 - 35 year), while the age group (< 25 year) came secondly by (28.6%), and age from (36 - 45 year) were (21.4%), and the last were (> 45 Year) represent (3 = 7.1%)
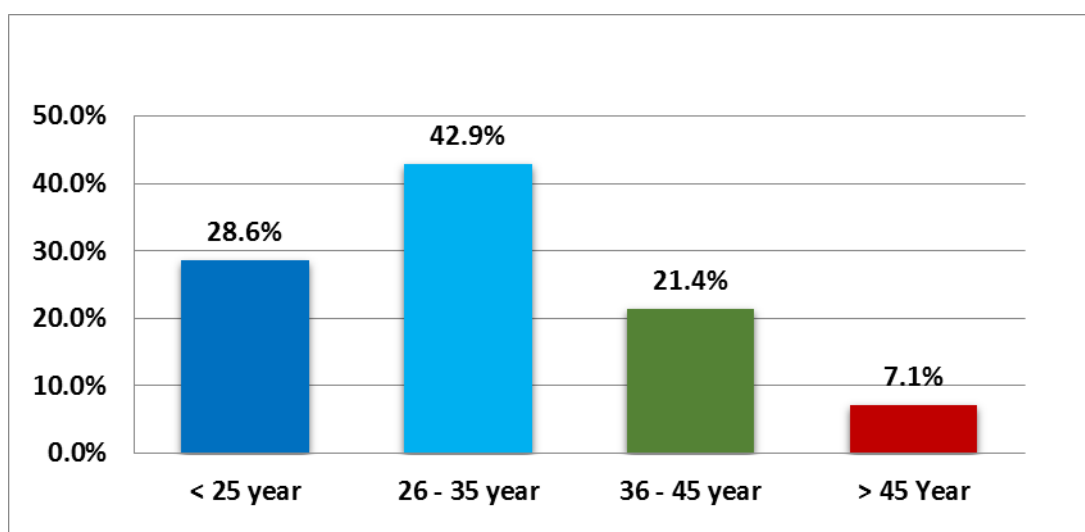
Figure 4.7: The distribution of participants according to their Age

4.2.4. Experience years

Table 4.8: Distribution of trainer's participants according to their Experience years

Experience years	No	Percent
< 5 years	16	38.1%
5 - 10 years	14	33.3%
11 - 15 year	5	11.9%
> 15 Year	7	16.7%
Total	**42**	**100%**

Table 4.8 presented the distribution of trainer's participants according to their Experience years (38.1%) were experience (< 5 years), while experience year (5 - 10 years) came secondly by (33.3%), and experience year (> 15 Year) represent (16.7%), and the last experience year (11 - 15 year) represent (11.9%).
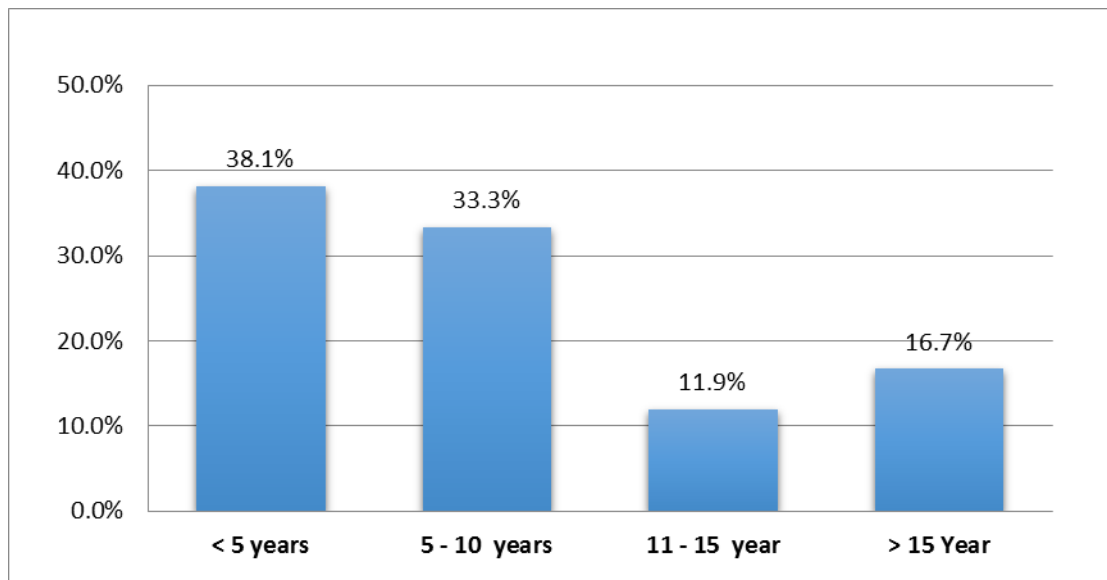
Figure 4.8: The distribution of participants according to their Experience years

4.2.5. Hospital Site:

Table 4.9: Distribution of participants according to their Study level

Hospital Site	No	Percent
Public Hospital	16	38.1%
Privet Hospital	14	33.3%
Diagnostic center	12	28.6%
Total	**42**	**100%**

Table 4.9 presented the distribution of trainer's participants according to their Hospital Site (38.1%) were from (Public Hospital), while the (Privet Hospital) came secondly by (33.3%), and the last were from (Diagnostic center) by (28.6%).
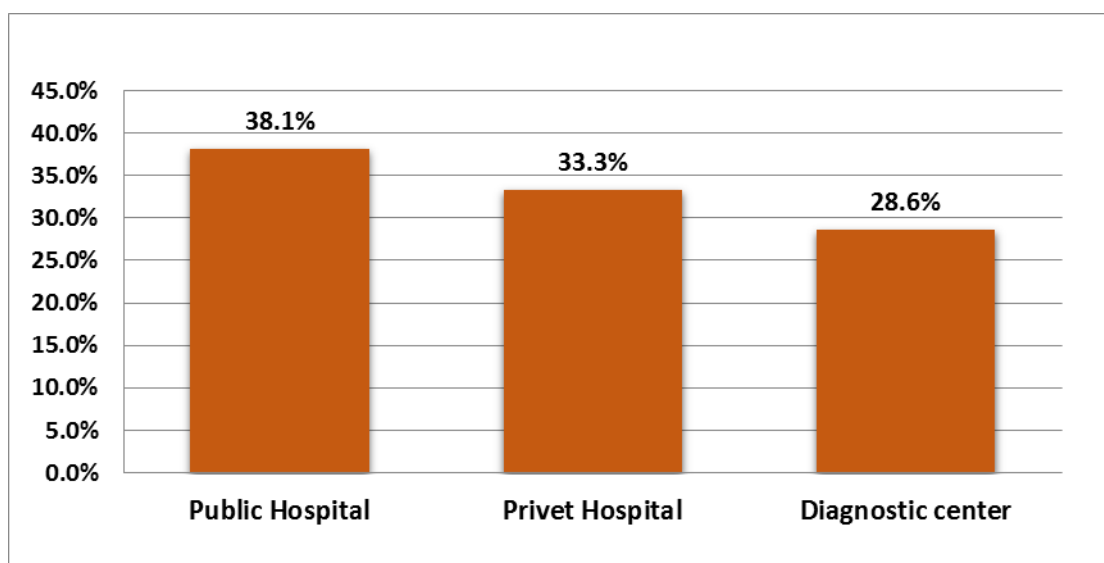
Figure 4.9: The distribution of participants according to their Hospital Site

4.3) Demographical characteristics of Faculty members

4.3.1: Gender:

Table 4.10: The distribution of faculty members participants according to their gender

Gender	No	Percent
Male	8	57.1%
Female	6	42.9%
Total	**14**	**100%**

Table 4.10 presented that the distribution of faculty members participants according to their gender (57.1%) were Male, while the Female percent was (42.9%) .
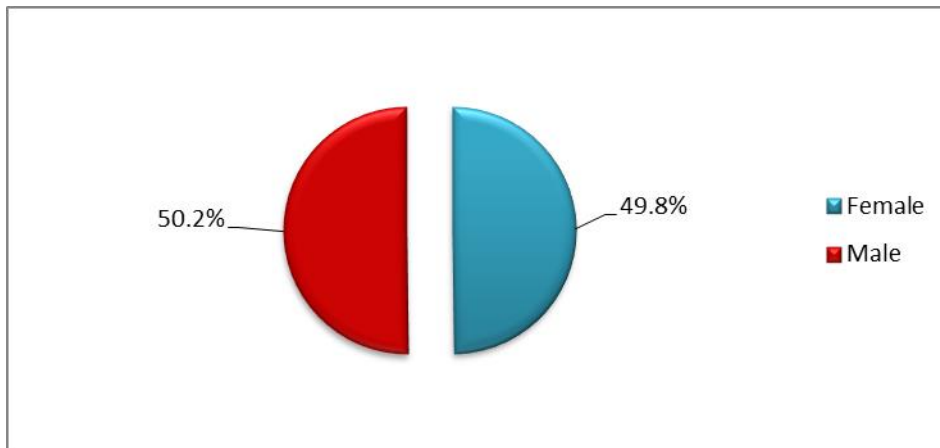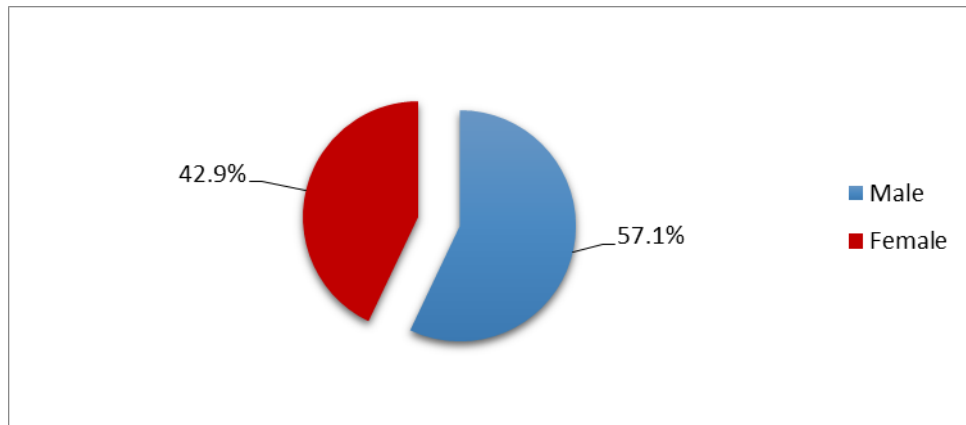

Figure 4.10: The distribution of participants according to their gender

4.3.2. Job position:

Table 4.11: Distribution of faculty members participants according to their Job position

Job position	No	Percent
Lecturer	4	28.6%
Instructor	5	35.7%
Clinical training officer	5	35.7%
Total	**14**	**100%**

Table 4.11 presented the distribution of faculty members participants according to their Job position (35.7%) were (Instructor & Clinical training officer), while the (Lecturer) came secondly by (28.6%).
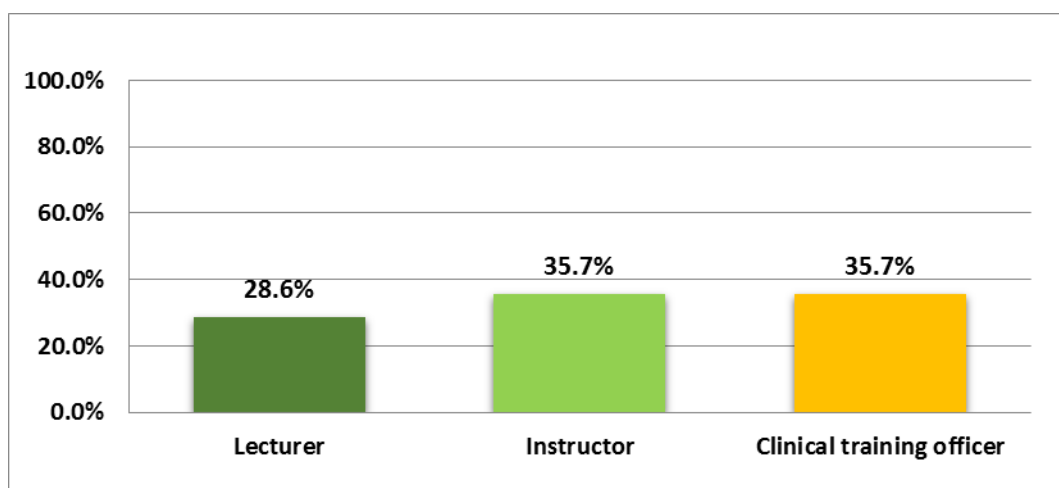
Figure 4.11 : The distribution of participants according to their Job position

4.3.3. University Site

Table 4.12: Distribution of participants according to their University Site

University Site	No	Percent
Public University	1	7.1%
Privet University	12	85.7%
Health Institute	1	7.1%
Total	**14**	**100%**

Table 4.12 presented the distribution of faculty members participants according to their University Site (85.7%) were from (Privet University), while the (Public University & Health Institute) were (7.1%).
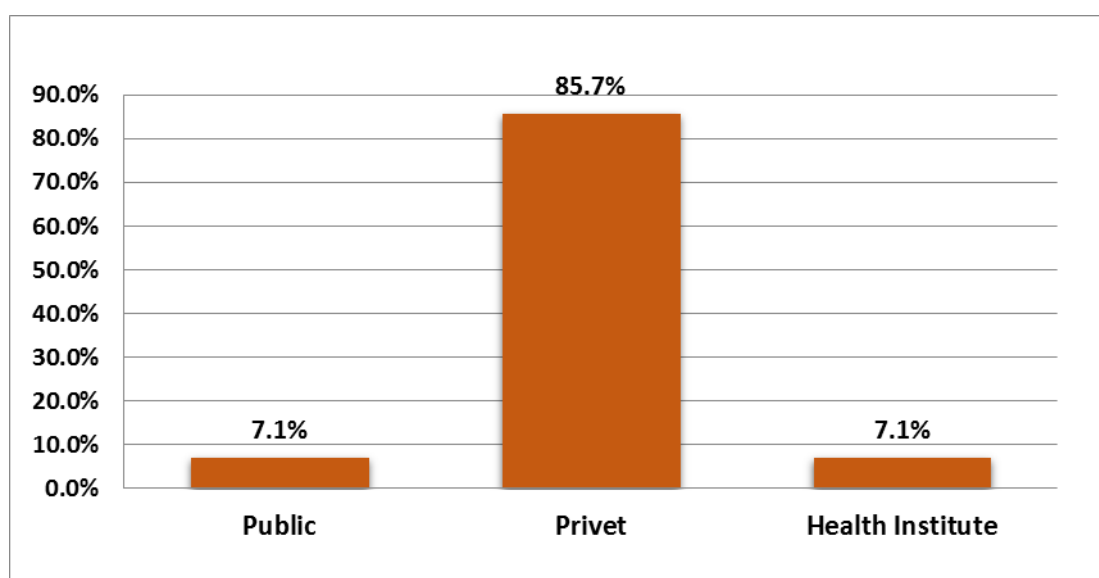
Figure 4.12 : The distribution of participants according to their University Site

4.4) Discussion:

The items of the questionnaire that have been designed to identify the challenges facing the student radiographers during clinical training at Sana'a City, Republic of Yemen.

The questionnaire includes (38) items relate to Students radiographers' Challenges during clinical training.

In order to identify the reasons, the collected data by questionnaire are Coded and entered into the SPSS program, version 24, for statistical analysis. Given Weight for each option of the Five Likert Scale is (1 = Strongly disagree , 2= Disagree , 3 = Unsure, 4 = Agree , 5 = Strongly agree) and in order to interpret the degree of agreement for the given reasons from the participants' point of view, the researcher follows the criteria for interpreting the responses as shown in Table 4.13 Were used:

Table 4. 13: Criteria for Interpreting the Weight of the participants' Responses

Degree of Agreement	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
Given weight	1	2	3	4	5
Mean	Less than 1.80	1.81 – 2.60	2.61 – 3.40	3.41 – 4.20	4.21 - 5

4.5) Distribution of Students sample responses to clinical training Challenges in the radiology department

Table 4.14: Clinical Training Challenges among Medical Radiology Students

No	items	Strongly Agree & %	Agree & %	Unsure& %	Disagree & %	Strongly Disagree & %
1	There exist a mismatch between number of students placed at a hospital or imaging center and the available resources to support their learning	67(31.5)	90(42.3)	10(4.7)	30(14.1)	16(7.5)
2	Most of the hospitals do not accept more than two students to train on one machine because of patients' privacy or comfort. Therefore, we train for half of the intended time allocated for practice.	46(21.6)	78(36.6)	28(13.1)	43(20.2)	18(8.5)
3	Our department assigns supervisors from instructors, but they are not given much opportunity to teach at the training area and usually come to take attendance	73(34.3)	62(29.1)	36(16.9)	27(12.7)	15(7)
4	Most of the time we reach our site very late as a result of shortage of transportation services.	78(36.6)	55(25.8)	21(9.9)	36(16.9)	23(10.8)
5	There is a gap between what we have learned in the class and what we observed during our training	77(36.2)	87(40.8)	17(8)	24(11.3)	8(3.8)
6	We do not see what we have learned in the class, and we are told that it is important ex. Advanced imaging, Nuclear Medicine	71(33.3)	110(51.6)	8(3.8)	19(8.9)	5(2.3)
7	Time allotted for training in skill lab before we go to practice on actual patients is not enough	49(23)	78(36.6)	32(15)	39(18.3)	15(7)
8	The radiological tests performed on this rotation are too complex for my level	12(5.6)	20(9.4)	40(18.8)	99(46.5)	42(19.7)
9	The absence of higher education opportunities and continuous professional development in radiologic technology has been as a problem causing poor training and teaching.	133(62.4)	51(23.9)	16(7.5)	6(2.8)	7(3.3)
10	There is no radiation protective measure given to students especially the monitoring badges/ dosimeters.	147(69)	48(22.5)	9(4.2)	7(3.3)	2(0.9)
11	More senior students/ trainees take away my opportunities to train	29(13.6)	88(41.3)	36(16.9)	35(16.4)	25(11.7)
12	In the training room, I don't like being corrected in front of students, radiographers, and radiology staff	52(24.4)	52(24.4)	26(12.2)	64(30)	19(8.9)
13	The radiology staff dislike when I operate as the imaging takes longer	53(24.9)	58(27.2)	35(16.4)	42(19.7)	25(11.7)
14	I feel discriminated against in the training place because of my sex	20(9.4)	34(16)	39(18.3)	59(27.7)	61(28.6)
15	I am so stressed in the training room that do not learn as much as I could	21(9.9)	64(30)	33(15.5)	73(34.3)	22(10.3)
16	I am asked to perform imaging alone that I do not feel competent at.	45(21.1)	43(20.2)	26(12.2)	71(33.3)	28(13.1)
17	It will be good if our department staffs are included fully in our teaching activities	151(70.9)	36(16.9)	8(3.8)	8(3.8)	10(4.7)

The data in Table 4.14 showed that the means range between (4.55 and 2.35) the standard deviations range between (.803 and 1.073). and the Degree of Agreement for all items (Agree). The data also show the highest three items were No. (17, 10, 9), and the Degree of Agreement of three items (Strongly Agree). The first highest item is "It will be good if our department staffs are included fully in our teaching activities", represent (70.9%) No. (17), followed by the second highest item is" There is no radiation protective measure given to students especially the monitoring badges/ dosimeters", represent (69%) No. (10), while the third highest item is "The absence of higher education opportunities and continuous professional development in radiologic technology has been as a problem causing poor training and teaching.", represent (62.4%) No. (9). while the lowest item, is " The radiological tests performed on this rotation are too complex for my level " represent (46.5%) No. (8), and the degree of this item (Disagree).

Table 4.15: General Challenges among Medical Radiology Students

No	Items	General Challenges			
		Agree		Disagree	
		Mean	%	Mean	%
1	There exist a mismatch between number of students placed at a hospital or imaging center and the available resources to support their learning	3.76	75.2%	3.76	75.2%
2	Most of the hospitals do not accept more than two students to train on one machine because of patients' privacy or comfort. Therefore, we train for half of the intended time allocated for practice.	3.43	68.6%	3.43	68.6%
3	Our department assigns supervisors from instructors, but they are not given much opportunity to teach at the training area and usually come to take attendance	3.71	74.2%	3.71	74.2%
4	Most of the time we reach our site very late as a result of shortage of transportation services.	3.61	72.2%	3.61	72.2%
5	There is a gap between what we have learned in the class and what we observed during our training	3.94	78.8%	3.94	78.8%
6	We do not see what we have learned in the class, and we are told that it is important ex. Advanced imaging, Nuclear Medicine	4.05	81.0%	4.05	81.0%
7	Time allotted for training in skill lab before we go to practice on actual patients is not enough	3.50	70.0%	3.50	70.0%
8	The radiological tests performed on this rotation are too complex for my level	2.35	47.0%	2.35	47.0%
9	The absence of higher education opportunities and continuous professional development in radiologic technology has been as a problem causing poor training and teaching.	4.39	87.8%	4.39	87.8%
10	There is no radiation protective measure given to students especially the monitoring badges/ dosimeters.	4.55	91.0%	4.55	91.0%
11	More senior students/ trainees take away my opportunities to train	3.29	65.8%	3.29	65.8%
12	In the training room, I don't like being corrected in front of students, radiographers, and radiology staff	3.25	65.0%	3.25	65.0%
13	The radiology staff dislike when I operate as the imaging takes longer	3.34	66.8%	3.34	66.8%
14	I feel discriminated against in the training place because of my sex	2.50	50.0%	2.50	50.0%
15	I am so stressed in the training room that do not learn as much as I could	2.95	59.0%	2.95	59.0%
16	I am asked to perform imaging alone that I do not feel competent at.	3.03	60.6%	3.03	60.6%
17	It will be good if our department staffs are included fully in our teaching activities	4.46	89.2%	4.46	89.2%
	Total	**3.54**	**70.7%**	**3.54**	**70.7%**
	Scoring of General Challenges	**3.84**	**76.7%**	**2.71**	**23.3%**

Table 4.15 described general Challenges faced by students in Medical Radiology. The result showed that the highest scoring (Agree) about the

challenges, the mean of agreement (3.84) represents (76.7%), And disagree and the mean of disagree (2.71) represent (23.3%).
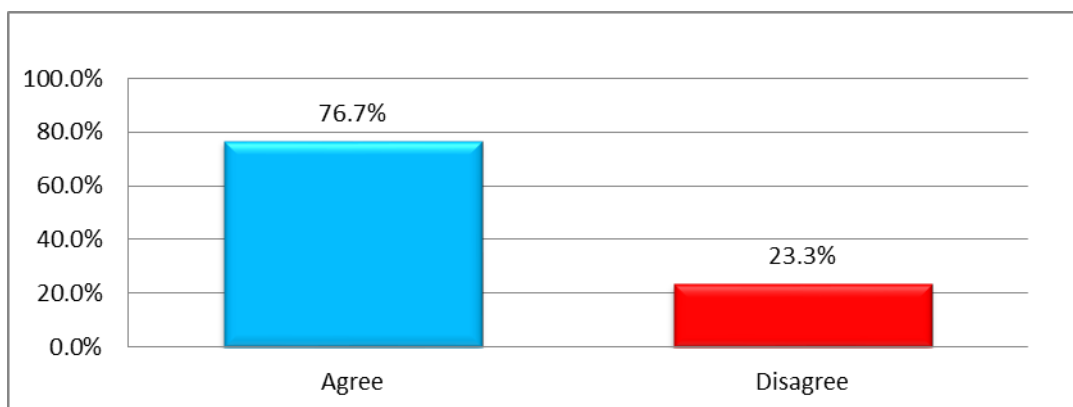
Figure 4.13: Scoring of General Challenges among Medical Radiology Students

Association between Challenges among Medical Radiology Students & demographic characteristics:

Table 4.16: Association between Challenges among Medical Radiology Students & demographic characteristics

Demographic Characteristics		Student's Challenges		
		Challenges		P. value
		Mean	SD	
Gender				
Female	106	3.54	0.421	**.118**
Male	107	3.53	0.508	
Education Level				
Third year	108	3.56	0.457	**.013**
Fourth year	73	3.60	0.477	
Student intern	32	3.32	0.418	
Training place				
Public	115	3.54	0.461	**.987**
Private	53	3.54	0.510	
Diagnostic center	45	3.53	0.432	
University group				
University of science & technology	88	3.48	0.416	**.080**
Azal University	96	3.61	0.487	
High institute	29	3.44	0.511	

There is a significant association between Student's problems and their Education Level (P-vale 0,013), while there is no significant association in other Characteristics.

Table 4.17: Clinical Training Management and solutions among Medical Radiology Students

No	Items	Strongly Agree & %	Agree & %	Unsure & %	Disagree & %	Strongly Disagree & %
1	The preparation for clinical training in the university was useful.	19(8.9)	63(29.6)	47(22.1)	53(24.9)	31(14.6)
2	I have worries about going to clinical placement without being vaccinated e.g. Hepatitis	82(38.5)	56(26.3)	29(13.6)	30(14.1)	16(7.5)
3	My trainer has a pleasant personality and available to assist learning	57(26.8)	70(32.9)	42(19.7)	28(13.1)	16(7.5)
4	I understand what my trainer is trying to teach me.	56(26.3)	101(47.4)	27(12.7)	15(7)	14(6.6)
5	My trainer's radiological skills are very good	30(14.1)	104(48.8)	33(15.5)	28(13.1)	18(8.5)
6	My trainer encourages me to become an independent learner	22(10.3)	65(30.5)	25(11.7)	68(31.9)	33(15.5)
7	My trainer gives me time to practice my radiological skills in the radiology room	22(10.3)	65(30.5)	25(11.7)	68(31.9)	33(15.5)
8	Before the radiology exam, my trainer discusses the radiological techniques	23(10.8)	85(39.9)	40(18.8)	38(17.8)	27(12.7)
9	My trainer gives me direct feedback that is clear and sufficient for my level of training.	17(8)	63(29.6)	60(28.2)	46(21.6)	27(12.7)
10	The clinical training experience and supervision offered were appropriate to my expectation	16(7.5)	51(23.9)	75(35.2)	42(19.7)	29(13.6)
11	My trainer keeps up to date with general practice issues in radiology	28(13.1)	74(34.7)	18(8.5)	53(24.9)	40(18.8)
12	There are enough clinical training days per week for me to gain the appropriate experience	38(17.8)	63(29.6)	38(17.8)	40(18.8)	34(16)
13	The variety of cases in radiology department gives me the appropriate training.	51(23.9)	112(52.6)	23(10.8)	20(9.4)	7(3.3)
14	I have the opportunity to develop the skills required at my stage	32(15)	117(54.9)	27(12.7)	23(10.8)	14(6.6)
15	The atmosphere in the training room is pleasant.	18(8.5)	78(36.6)	43(20.2)	42(19.7)	32(15)
16	I feel part of a team in the training room	27(12.7)	74(34.7)	35(16.4)	50(23.5)	27(12.7)
17	1 am too busy doing other work to go to the training room	20(9.4)	95(44.6)	51(23.9)	32(15)	15(7)
18	When I am in the training room, there is nobody to cover the ward	115(54)	66(31)	7(3.3)	13(6.1)	12(5.6)
19	Practice in skill lab. should include all imaging modalities such MRI, CT	124(58.2)	59(27.7)	13(6.1)	8(3.8)	9(4.2)
20	The curriculum should be revised, for example there are obsolete procedures which are not currently in practice. So, the time should be rearranged for some other necessary topics or subjects.	128(60.1)	53(24.9)	16(7.5)	9(4.2)	7(3.3)
21	There is need for higher education opportunities and regular continuous professional development opportunities in the area of radiology and medical imaging to enhance trainers' ability.	54(25.4)	60(28.2)	40(18.8)	24(11.3)	35(16.4)

The data in Table 4.17 showed that the means range between (4.34 and 2.88) the standard deviations range between (1.014 and 1.285). and the Degree of Agreement for all items (76.7%). The data also show the highest item that is " The curriculum should be revised, for example there are obsolete procedures which are not currently in practice. So, the time should be rearranged for some other necessary topics or subjects", represent (60.1%) number (20), followed by the second highest item is "Practice in skill lab. should include all imaging modalities such MRI, CT", represent (58.2%) No. (19), while the third highest item is "When I am in the training room, there is nobody to cover the ward", represent (54%) No. (18), while the lowest item, is " My trainer encourages me to become an independent learner " represent (31.9%) No. (6), and the degree of this item (Disagree).

Table 4.18: Association between Responses of Medical Radiology Students & demographic characteristics

Demographic Characteristics		Student's Management		
		Management		P. value
		Mean	SD	
Gender				
Female	106	3.35	0.525	.316
Male	107	3.49	0.567	
Education Level				
Third year	108	3.44	0.508	
Fourth year	73	3.34	0.573	.252
Student intern	32	3.53	0.623	
Training place				
Public	115	3.46	0.547	
Private	53	3.36	0.567	.514
Diagnostic center	45	3.38	0.541	
University group				
University of science & technology	88	3.33	0.528	
Azal University	96	3.49	0.527	.141
High institute	29	3.46	0.660	

There is No significant association between Demographic Characteristics (Gender, Education level, Training place, University group) and Student's Challenges regarding to Solves (p-value 0.316, 0.252, 0.514, 0.141, > 0.000).

Table 4.19: Clinical Training Challenges among Medical Radiology Trainers

No	items	Strongly Agree & %	Agree & %	Unsure & %	Disagree & %	Strongly Disagree & %
1	There is no match between the number of students trained by us in the radiology department, equipment and the resources available to us to support their training.	9(21.4)	19(45.2)	4(9.5)	7(16.7)	3(7.1)
2	It seems that there is no suitable partnership between the university and training centers to facilitate the training of students.	6(14.3)	12(28.6)	13(31)	7(16.7)	4(9.5)
3	Can't we accept more than two students at the same time because we always need to take care of a lot of patients.	12(28.6)	17(40.5)	2(4.8)	11(26.2)	0(0)
4	We are not given an appropriate incentive to train students, which does not encourage us.	13(31)	17(40.5)	2(4.8)	8(19)	2(4.8)
5	It is difficult to serve all patients during student training because we are mostly in a hurry to serve patients in order to avoid complaints.	13(31)	19(45.2)	1(2.4)	7(16.7)	2(4.8)
6	There is a gap between what students at the university learned and what we practice during training.	6(14.3)	21(50)	7(16.7)	7(16.7)	1(2.4)
7	Most of the time, students arrive at the training place late due to the inadequacy of transportation services.	5(11.9)	11(26.2)	7(16.7)	15(35.7)	4(9.5)
8	We cannot cover all the techniques learned by students at the university such as advanced imaging / nuclear medicine...	20(47.6)	16(38.1)	4(9.5)	2(4.8)	0(0)
9	Radiological tests performed during the training are complex and higher than the student level.	4(9.5)	3(7.1)	11(26.2)	17(40.5)	7(16.7)
10	The absence of postgraduate opportunities and continuous professional development in radiology technology is a problem that causes poor clinical training.	20(47.6)	18(42.9)	0(0)	2(4.8)	2(4.8)
11	There are no radiology preventive measures given to students during training such as radiometers and protective shields.	18(42.9)	17(40.5)	3(7.1)	2(4.8)	2(4.8)
12	Increasing the number of trained students reduces training opportunities for some of them.	**20(47.6)**	19(45.2)	3(7.1)	0(0)	0(0)
13	In the training room, some students do not like to be corrected in front of other students and the rest of the staff of the radiology department.	10(23.8)	13(31)	12(28.6)	5(11.9)	2(4.8)
14	Radiology staff do not want the student's work because it takes longer to shoot.	10(23.8)	16(38.1)	2(4.8)	10(23.8)	4(9.5)
15	I'm very busy doing other work about training students.	7(16.7)	3(7.1)	4(9.5)	26(61.9)	2(4.8)
16	I don't ask the student to do the medical imaging alone if he does not feel capable and competent.	15(35.7)	22(52.4)	0(0)	3(7.1)	2(4.8)

The data in Table 4.19 showed that the means range between (4.40 and 2.52) the standard deviations range between (.627 and 1.153). and the Degree of Agreement for all items (Agree). The data also show the highest three items were No. (12, 8, 10), and the Degree of Agreement of three items (Strongly Agree). The first highest item is " Increasing the number of

trained students reduces training opportunities for some of them.", represent (47.6%) Number (12), followed by the second highest item is "We cannot cover all the techniques learned by students at the university such as advanced imaging / nuclear medicine...", represent (47.6%) No. (8), while the third highest item is "The absence of postgraduate opportunities and continuous professional development in radiology technology is a problem that causes poor clinical training.", represent (47.6%) No. (10). while the lowest item, is " I'm very busy doing other work about training students" represent (61.9%) No. (15), and the degree of this item (Disagree).

Table 4.20: Distribution of General Challenges among Medical Radiology Trainers

No	Items	General Challenges			
		Agree		Disagree	
		Mean	%	Mean	%
1	There is no match between the number of students trained by us in the radiology department, equipment and the resources available to us to support their training.	3.57	71.4%	3.57	71.4%
2	It seems that there is no suitable partnership between the university and training centers to facilitate the training of students.	3.21	64.2%	3.21	64.2%
3	Can't we accept more than two students at the same time because we always need to take care of a lot of patients.	3.71	74.2%	3.71	74.2%
4	We are not given an appropriate incentive to train students, which does not encourage us.	3.74	74.8%	3.74	74.8%
5	It is difficult to serve all patients during student training because we are mostly in a hurry to serve patients in order to avoid complaints.	3.81	76.2%	3.81	76.2%
6	There is a gap between what students at the university learned and what we practice during training.	3.57	71.4%	3.57	71.4%
7	Most of the time, students arrive at the training place late due to the inadequacy of transportation services.	2.95	59.0%	2.95	59.0%
8	We cannot cover all the techniques learned by students at the university such as advanced imaging / nuclear medicine...	4.29	85.8%	4.29	85.8%
9	Radiological tests performed during the training are complex and higher than the student level.	2.52	50.4%	2.52	50.4%
10	The absence of postgraduate opportunities and continuous professional development in radiology technology is a problem that causes poor clinical training.	4.24	84.8%	4.24	84.8%
11	There are no radiology preventive measures given to students during training such as radiometers and protective shields.	4.12	82.4%	4.12	82.4%
12	Increasing the number of trained students reduces training opportunities for some of them.	4.40	88.0%	4.40	88.0%
13	In the training room, some students do not like to be corrected in front of other students and the rest of the staff of the radiology department.	3.57	71.4%	3.57	71.4%
14	Radiology staff do not want the student's work because it takes longer to shoot.	3.43	68.6%	3.43	68.6%
15	I'm very busy doing other work about training students.	2.69	53.8%	2.69	53.8%
16	I don't ask the student to do the medical imaging alone if he does not feel capable and competent.	4.07	81.4%	4.07	81.4%
	Total	**3.62**	**72.4%**	**3.62**	**72.4%**
	Scoring of General Challenges	**3.83**	**76.5%**	**2.69**	**23.5%**

The Table 4.20 described general Challenges of Trainers in Medical Radiology. The result showed that the Highest Scoring (Agree) about the Challenges, the mean of agreement (3.83) represents (76.5%), and the mean of disagree (2.69) represent (23.5%).
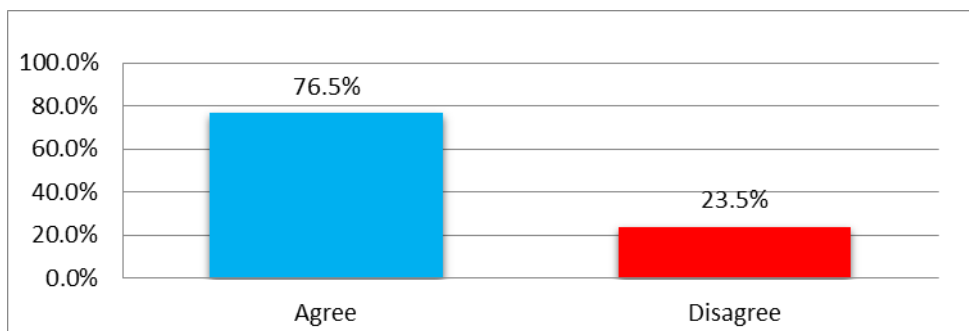
Figure 4.14: Scoring of General Challenges among Medical Radiology Trainers

Table 4.21: Association between Challenges among Medical Radiology Trainers & demographic characteristics

Demographic Characteristics		Trainer's Challenges		
		Challenges		P. value
		Mean	SD	
Gender				
Male	31	3.59	0.462	**.776**
Female	11	3.70	0.608	
Study level				
Diploma	16	3.64	0.350	**.707**
Bachelor	19	3.65	0.620	
Master/PhD.	7	3.47	0.455	
Age				
< 25 year	12	3.55	0.602	**.894**
26 - 35 year	18	3.69	0.486	
36 - 45 year	9	3.57	0.442	
> 45 Year	3	3.63	0.472	
Experience years				
< 5 years	16	3.63	0.582	**.673**
5 - 10 years	14	3.67	0.486	
11 - 15 year	5	3.73	0.397	
> 15 Year	7	3.41	0.410	
Study level				
Public Hospital	16	3.69	0.452	**.306**
Privet Hospital	14	3.45	0.531	
Diagnostic center	12	3.72	0.509	

There is No significant association between Demographic Characteristics (Gender, Study level, Age, Experience, Study level) and Trainer's Challenges regarding (p-value 0.770, 0.707, 0.894, 0.673, 0.306, > 0.000).

Table 4.22: Clinical Training Management among Medical Radiology Trainers

No	items	Strongly Agree & %	Agree & %	Unsure & %	Disagree & %	Strongly Disagree & %
1	Preparations and preparation are being prepared to train our students well.	3(7.1)	21(50)	11(26.2)	5(11.9)	2(4.8)
2	Students have good personalities and want to learn.	13(31)	23(54.8)	5(11.9)	1(2.4)	0(0)
3	I know what the student is trying to learn from me.	10(23.8)	28(66.7)	3(7.1)	1(2.4)	0(0)
4	I encourage the student to become an independent learner.	15(35.7)	24(57.1)	2(4.8)	1(2.4)	0(0)
5	Give students enough time to apply radiology skills.	7(16.7)	25(59.5)	9(21.4)	1(2.4)	0(0)
6	Before photographing the patient, I discuss imaging techniques with the student.	5(11.9)	28(66.7)	7(16.7)	2(4.8)	0(0)
7	Give the student direct and sufficient observations of his level of training.	5(11.9)	29(69)	8(19)	0(0)	0(0)
8	Follow everything new in the field of radiology techniques, medical imaging and training in the radiology department.	6(14.3)	26(61.9)	4(9.5)	5(11.9)	1(2.4)
9	The student has enough training days per week to gain the right experience.	5(11.9)	14(33.3)	9(21.4)	9(21.4)	5(11.9)
10	The diversity of cases in the radiology department gives the student appropriate training.	28(66.7)	12(28.6)	1(2.4)	1(2.4)	0(0)
11	I have the opportunity to develop my skills required for training.	16(38.1)	21(50)	2(4.8)	3(7.1)	0(0)
12	Conditions in the training place are suitable for training students.	8(19)	20(47.6)	8(19)	5(11.9)	1(2.4)
13	There is no discrimination in the training place because of the sex of the student or his university.	13(31)	20(47.6)	2(4.8)	6(14.3)	1(2.4)
14	We feel that the student is part of the team in the radiology department.	13(31)	21(50)	4(9.5)	4(9.5)	0(0)
15	It would be good for university staff to be fully involved in our training activities in the training centers.	13(31)	14(33.3)	10(23.8)	1(2.4)	3(7.1)
16	Radiology departments/centers must provide us with continuous career and professional development opportunities in order to better serve patients and build trust and ability to educate students.	22(52.4)	16(38.1)	4(9.5)	0(0)	0(0)
17	The curriculum of students in universities must be reviewed. For example, there are old techniques and are no longer currently applied, so the curriculum must be rearranged for other necessary topics.	22(52.4)	10(23.8)	7(16.7)	2(4.8)	1(2.4)
18	There is a need for universities to provide higher education programs (master's/PhD) in the field of radiology and medical imaging to enhance the ability of trainers and their abilities in training students.	31(73.8)	8(19)	3(7.1)	0(0)	0(0)

The data in table 4.22 show that the means range between (4.67 and 3.12) the standard deviations range between (.612 and 1.234). and the Degree of Agreement for all items (Agree) The data also showed the highest item (Strongly Agree) represent (73.8%) " There is a need for universities to provide higher education programs (master's/PhD) in the field of radiology

and medical imaging to enhance the ability of trainers and their abilities in training students.", followed by the second highest item (Strongly Agree) represent (66.7%) is "The diversity of cases in the radiology department gives the student appropriate training.", while the third highest item (Strongly Agree) represent (52.4%) is "Radiology departments/centers must provide us with continuous career and professional development opportunities in order to better serve patients and build trust and ability to educate students.", while the lowest item (Disagree) represent (21.9%) is " The student has enough training days per week to gain the right experience.

Table 4.23: Association between Management among Medical Radiology Trainers & demographic characteristics

Demographic Characteristics		Trainer's Management		
		Management		P. value
		Mean	SD	
Gender				
Male	31	3.95	0.288	.353
Female	11	4.14	0.450	
Study level				
Diploma	16	3.97	0.275	
Bachelor	19	4.12	0.251	**.041**
Master/PhD.	7	3.75	0.547	
Age				
< 25 year	12	3.91	0.466	
26 - 35 year	18	4.10	0.275	.107
36 - 45 year	9	4.04	0.196	
> 45 Year	3	3.63	0.228	
Experience years				
< 5 years	16	3.99	0.425	
5 - 10 years	14	4.06	0.280	.815
11 - 15 year	5	4.01	0.237	
> 15 Year	7	3.90	0.345	
Study level				
Public Hospital	16	4.03	0.289	
Privet Hospital	14	3.97	0.353	.895
Diagnostic center	12	3.99	0.414	

There is significant association between Trainer's Management and their Study level (P-vale 0,041), while there is no significant association in other Characteristics.

Table 4.24: Clinical Training Challenges among Medical Radiology Faculty members

No	Items	Strongly Agree & %	Agree & %	Unsure & %	Disagree & %	Strongly Disagree& %
1	There exist a mismatch between the number of students we have and the available placement area to support their clinical training.	0(0)	3(21.4)	0(0)	8(57.1)	3(21.4)
2	Our department assigns supervisors from a pool of instructors, but they are not given much opportunity to teach at the placement area and usually come to take attendance.	0(0)	2(14.3)	3(21.4)	6(42.9)	3(21.4)
3	The instructor's role in clinical education practice is not clearly defined.	2(14.3)	4(28.6)	1(7.1)	5(35.7)	2(14.3)
4	Either radiographers or radiologic technologists working in hospitals are not that much willing to teach students because of lack of incentives.	0(0)	3(21.4)	1(7.1)	6(42.9)	4(28.6)
5	We are encountering many problems concerning clinical practice such shortage of transportation services.	2(14.3)	3(21.4)	3(21.4)	5(35.7)	1(7.1)
6	There is a gap between what students have learned in the class and what they observed during clinical training.	0(0)	6(42.9)	0(0)	7(50)	1(7.1)
7	The students do not see what they have learned in the class, and they are told that it is important ex. Advanced imaging, Nuclear Medicine.	0(0)	1(7.1)	1(7.1)	7(50)	5(35.7)
8	Time allocation to cover courses and lack of a skills lab/simulation training time and facilities to demonstrate technical concepts prior to the start of clinical training on actual patients is not enough.	2(14.3)	5(35.7)	2(14.3)	4(28.6)	1(7.1)
9	The curriculum is more "technologist" focused and thus the need for revision is considered urgent to suit the training of the modern university professional.	0(0)	4(28.6)	0(0)	8(57.1)	2(14.3)
10	The absence of higher education opportunities in radiologic technology locally in Yemen have contributed to poor teaching-learning in clinical training.	0(0)	0(0)	3(21.4)	7(50)	4(28.6)
11	There are no protective measures given to students especially the monitoring badges/ dosimeters.	0(0)	4(28.6)	0(0)	5(35.7)	5(35.7)
12	We have worries about students going to clinical training without being vaccinated e.g. Hepatitis.	0(0)	1(7.1)	1(7.1)	10(71.4)	2(14.3)
13	There are enough clinical training days per week for student to gain the appropriate experience	0(0)	2(14.3)	0(0)	8(57.1)	4(28.6)

The data in Table 4.24 show that the means range between (4.14 and 2.79) the standard deviations range between (.864 and 1.251), and the Degree of Agreement for all items (Disagree). The data also show the highest three items were (Disagree). The first highest item No. (12) repeated (10 times) represent (71.4%) is " We have worries about students going to clinical

training without being vaccinated e.g. Hepatitis.", followed by the second highest item No. (13) repeated (8 times) by (57.1%) is "There are enough clinical training days per week for student to gain the appropriate experience" , also item No. (1) repeated (8 times) represent (57.1%) is "There exist a mismatch between the number of students we have and the available placement area to support their clinical training " , and item No. (9) repeated (8 times) represent (57.1%) is "The curriculum is more "technologist" focused and thus the need for revision is considered urgent to suit the training of the modern university professional " .

While the lowest item No. (10) disagrees, repeated (7 times) represent (50%) is "The absence of higher education opportunities in radiologic technology locally in Yemen have contributed to poor teaching-learning in clinical training".

And item No. (7) disagrees, repeated (7 times) represent (50%), is " The students do not see what they have learned in the class, and they are told that it is important ex. Advanced imaging, Nuclear Medicine".

And No. (6) disagrees, repeated (6 times) represent (50%) is " There is a gap between what students have learned in the class and what they observed during clinical training".

Table 4.25: Distribution of General Challenges among Medical Radiology Faculty members

No	Items	General Challenges			
		Agree		Disagree	
		Mean	%	Mean	%
1	There exist a mismatch between the number of students we have and the available placement area to support their clinical training.	3.79	75.8%	3.79	75.8%
2	Our department assigns supervisors from a pool of instructors, but they are not given much opportunity to teach at the placement area and usually come to take attendance.	3.71	74.2%	3.71	74.2%
3	The instructor's role in clinical education practice is not clearly defined.	3.07	61.4%	3.07	61.4%
4	Either radiographers or radiologic technologists working in hospitals are not that much willing to teach students because of lack of incentives.	3.79	75.8%	3.79	75.8%
5	We are encountering many problems concerning clinical practice such shortage of transportation services.	3.00	60.0%	3.00	60.0%
6	There is a gap between what students have learned in the class and what they observed during clinical training.	3.21	64.2%	3.21	64.2%
7	The students do not see what they have learned in the class, and they are told that it is important ex. Advanced imaging, Nuclear Medicine.	4.14	82.8%	4.14	82.8%
8	Time allocation to cover courses and lack of a skills lab/simulation training time and facilities to demonstrate technical concepts prior to the start of clinical training on actual patients is not enough.	2.79	55.8%	2.79	55.8%
9	The curriculum is more "technologist" focused and thus the need for revision is considered urgent to suit the training of the modern university professional.	3.57	71.4%	3.57	71.4%
10	The absence of higher education opportunities in radiologic technology locally in Yemen have contributed to poor teaching-learning in clinical training.	4.07	81.4%	4.07	81.4%
11	There are no protective measures given to students especially the monitoring badges/ dosimeters.	3.79	75.8%	3.79	75.8%
12	We have worries about students going to clinical training without being vaccinated e.g. Hepatitis.	3.93	78.6%	3.93	78.6%
13	There are enough clinical training days per week for student to gain the appropriate experience	4.00	80.0%	4.00	80.0%
	Total	**3.60**	**72.0%**	**3.60**	**72.0%**
	Scoring of General Challenges	**2.79**	**26.5%**	**3.67**	**73.5%**

The table 4.25 describes general Challenges faced by Faculty members in Medical Radiology. The result showed that the Highest Scoring (Disagree) about the Challenges, the mean of agreement (3.67) represents (73.5%), and the mean of agree (2.79) represent (26.5%).
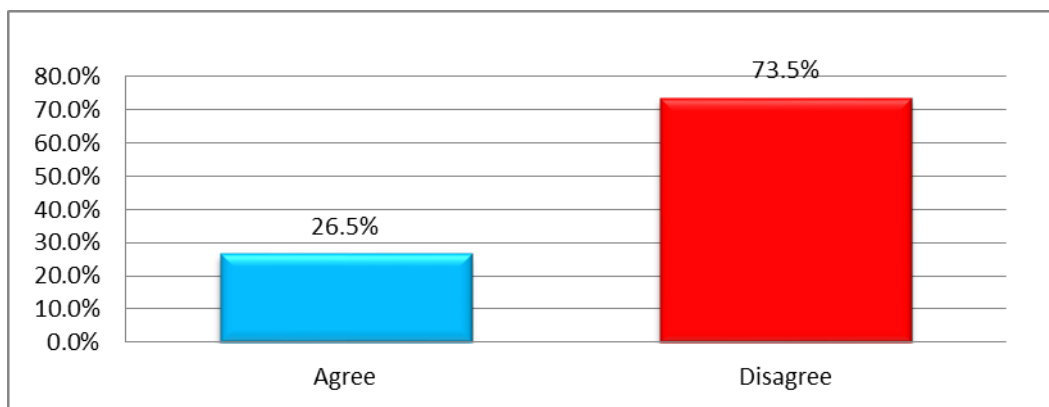
Figure 4.15: Scoring of General Challenges among Medical Radiology Faculty members

Table 4.26: Association between Challenges among Medical Radiology Faculty members & demographic characteristics

Demographic Characteristics		Faculty members Challenges		
		Challenges		P. value
		Mean	SD	
Gender				
Male	8	3.52	0.454	.931
Female	6	3.72	0.426	
Job position				
Lecturer	4	3.35	0.231	.299
Instructor	5	3.82	0.347	
Clinical training officer	5	3.60	0.582	
University Site				
Public University	1	3.60	0.437	.317
Privet University	12			
Health Institute	1			

There is No significant association between Demographic Characteristics (Gender, Job position, University Site) and Faculty Member's Challenges, the (p-value 0.931, 0.299, 0.317 > 0.000).

Table 4.27: Clinical Training Management among Medical Radiology Faculty members

No	Items	Strongly Agree & %	Agree & %	Unsure & %	Disagree & %	Strongly Disagree & %
1	Most of the hospitals do not accept more than two students to train on one machine because of patients' privacy or comfort. Therefore, the department tries to solve this problem by placing students in turns every other day; this means the students' practice.	0(0)	2(14.3)	5(35.7)	7(50)	0(0)
2	The preparation for clinical training in the university was useful.	0(0)	4(28.6)	4(28.6)	5(35.7)	1(7.1)
3	Some of our students supervised by staff with less qualification especially in hospital (diploma) while the students are doing BSc.	0(0)	2(14.3)	4(28.6)	6(42.9)	2(14.3)
4	The trainer is enthusiastic about teaching	0(0)	4(28.6)	1(7.1)	8(57.1)	1(7.1)
5	The trainers gives students clear and sufficient feedback	0(0)	0(0)	1(7.1)	7(50)	6(42.9)
6	The clinical training experience and supervision offered were appropriate to my expectation.	0(0)	0(0)	0(0)	8(57.1)	6(42.9)
7	The atmosphere in the training room is pleasant.	0(0)	1(7.1)	6(42.9)	7(50)	0(0)
8	It will be good if our department staff included fully in clinical training activities to ensure a unified learning outcome and a clear link between both theory and practice.	0(0)	4(28.6)	5(35.7)	5(35.7)	0(0)
9	Training in skill lab should include all imaging modalities, not only general radiography and ultrasound.	0(0)	4(28.6)	0(0)	8(57.1)	2(14.3)
10	The partnership between the university and clinical training sites to facilitate student training need more concern and building.	0(0)	2(14.3)	0(0)	6(42.9)	6(42.9)
11	The curriculum should be revised, for example there are obsolete procedures which are not currently in practice. The time should be rearranged for some other necessary topics or subjects.	0(0)	0(0)	0(0)	7(50)	7(50)
12	The academic faculty development through understanding of pedagogical principles, evidence-based teaching and learning frameworks as well as feedback skills are key to improving standards of medical imaging and radiography training.	0(0)	0(0)	0(0)	8(57.1)	6(42.9)
13	There is a need to qualify training educator/Radiographer through the provision of higher degree qualifications and regular continuous professional development opportunities in the area of radiology & medical imaging.	0(0)	0(0)	0(0)	10(71.4)	4(28.6)
14	The students would benefit from current and improved practical skills and protocols from their trainers and mentors who have obtained latest knowledge through continuous professional development.	0(0)	0(0)	1(7.1)	6(42.9)	7(50)

The data in Table 4.27 showed that the means range between (4.50 and 3.07) the standard deviations range between (.519 and .829). and the Degree of Agreement for all items (73.5%) was (Disagree).

The data also show the highest item Number (13) Disagree, repeated (10 times) represent (71.4%) that is " There is a need to qualify training educator/Radiographer through the provision of higher degree qualifications and regular continuous professional development opportunities in the area of radiology & medical imaging.".

And the second highest items were items No. (4 , 6 , 9 & 12) Disagree, all items repeated same value (8 times) represent (57.1%) No, (4) "The trainer is enthusiastic about teaching " . No, (6) The clinical training experience and supervision offered were appropriate to my expectation". No, (9) " The training in skill lab should include all imaging modalities, not only general radiography and ultrasound". No, (12) " The academic faculty development through understanding of pedagogical principles, evidence-based teaching and learning frameworks as well as feedback skills are key to improving standards of medical imaging and radiography training".

And the third highest items were items No. (1 , 5, 7 & 11) Disagree, all items repeated same value (7 times): No. (1) "Most of the hospitals do not accept more than two students to train on one machine because of patients' privacy or comfort. Therefore, the department tries to solve this problem by placing students in turns every other day; this means the students practice" represent (50%). No. (5) " The trainers gives students clear and sufficient feedback" represent (50%). No. (7) " The atmosphere in the training room is pleasant." represent (50%) No. (11) " The curriculum should be revised, for example there are obsolete procedures which are not currently in practice. The time should be rearranged for some other necessary topics or subjects" same value (50%).

Table 4.28: Association between Management among Medical Radiology Faculty members & demographic characteristics

Demographic Characteristics		Faculty members Challenges		
		Management		P. value
		Mean	SD	
Gender				
Male	8	3.88	0.323	.123
Female	6	3.87	0.084	
Job position				
Lecturer	4	3.86	0.101	.306
Instructor	5	3.76	0.279	
Clinical training officer	5	4.00	0.262	
University Site				
Public University	1	3.87	0.243	.188
Privet University	12			
Health Institute	1			

There is No significant association between Demographic Characteristics (Gender, Job position, University Site) and Faculty Member's Management, the (p-value 0.123, 0.306, 0.188 > 0.000).

Discussion:

The results showed the most important problems faced by trained students in the field of radiology technology and medical imaging which classified as the highest degree (approval) and represents (78.8%) There is a gap between what we have learned in the class and what we observed during our training and represents (70%) Namely, it would be good if our department staff were fully included in our educational activities The second highest problem, which was classified with a rate of (69%), is that there is no protective measure against radiation for students, especially monitoring badges. Dosimeters The third highest problem was classified as (62.4%). The absence of higher education opportunities and continuous professional development in radiology technology is a problem, which causes poor training and education. The previous study Kyei et al in (2015)

also revealed the challenges faced by radiography students such as the gap between theory and practice, insufficient exposure to some specialized procedures and the time allotted for each treatment room While the problems that the coaches agreed to were in that We cannot cover all the techniques a student learned at university such as advanced imaging such as / nuclear medicine by (47.6%) Also (47.6%) of the trainers agreed with the students that the lack of opportunities for postgraduate studies and continuing professional development in radiology technology is a problem that causes poor clinical training, and this also confirms the opinion of the students. While (47.6%) agreed that increasing the number of trained students reduces training opportunities for some of them As for the lack of approval, it included one of the items (61%), which is that I am very busy doing other work related to training the student As for the problems of faculty members, the data also shows that the top three items were (not agreeable). The first highest item is, "We have concerns about students going into clinical training without having been vaccinated, such as hepatitis." , representing (71.4%) , followed by the second highest component representing (57.1%) which is "There are enough clinical training days per week for the student to acquire the appropriate experience." and "A mismatch between the number of students we have and the area of placement available to support their clinical training also accounts for the same percentage (57.1%)." and "The curriculum focuses more on "technical" and therefore the need for revision is considered urgent to match university vocational training by (57.1%). While the third highest item represents (50%), which is the absence of higher education opportunities in radiology technology locally in Yemen, which contributed to poor training. And he does not see the students what they have learned in class, and they have been told that they are important in Previous Advanced Nuclear Medicine Imaging Whereas the lowest item is "There is a gap

between what students learned in the classroom and what they observed during clinical training" (42.9%) and the score for this item is (agree).

The students and trainers also agreed with a degree of (agree) in that There are no radiology preventive measures given to students during training such as radiometers and protective shield The absence of higher education opportunities and continuous professional development in radiologic technology has been as a problem causing poor training and teaching. There exist a mismatch between number of students placed at a hospital or imaging center and the available resources to support their learning Most of the hospitals do not accept more than two students to train on one machine because of patients' privacy or comfort. Therefore, we train for half of the intended time allocated for practice. This represents an agreed upon problem.

The data also shows the solutions that were (approved) by the students The highest item representing (60.1%) was "The curriculum should be reviewed, for example, there are outdated procedures that are not currently in practice, so the time must be rearranged for some other subjects or necessary topics." Followed by the second highest item representing (58.2%), which is practice in the skills laboratory. It must include all imaging methods such as magnetic resonance imaging, computed tomography. While the third component (54%) was "When I am in the training room, there is no one to cover the wing." While the lowest item (31.9%) got (disagree) is "My coach encourages me to become an independent learner" _ As for the solutions proposed by the trainers who obtained a degree of (OK), it included the highest component and represents (73.8%), which is that "there is a need for universities to provide higher education programs (Master's / PhD) in the field of radiology and medical imaging to enhance the ability of trainers and their capabilities in training students." It is followed by the second highest item representing

(66.7%). And it is "the diversity of cases in the radiology department that gives the student the appropriate training." While the third highest item (52.4%) is "radiology departments / centers should provide us with opportunities for continuous professional development in order to provide better service to patients, build confidence and the ability to educate students." While the lowest element was (21.9%) and the score for this item was (disagreeable), which is "The student has enough training days per week to gain the right experience." - While the solutions presented to the faculty members obtained a degree of (disagreeable). (71.4%), which is the highest component, represents that "there is a need to qualify a training teacher/radiology technician by providing higher qualifications and continuous and regular professional development opportunities in the field of radiology and medical imaging." It is followed by the second highest item, representing (57.1%), and it included: The "trainer is passionate about teaching" and "The clinical training experience and supervision provided were appropriate to my expectations." and "Training in the skills lab should include all imaging modalities, not just general radiography and ultrasound." and "Developing academic faculty through an understanding of pedagogical principles and evidence-based teaching and learning frameworks as well as feedback skills are key to improving medical imaging standards and radiographic training." While the third highest items represented (50%) "Most hospitals do not accept more than two students to be trained on one machine due to patients' privacy or comfort. Therefore, the department tries to solve this problem by rotating students every day; this means that students practice." Coaches give students clear and adequate feedback. The atmosphere in the training room is nice. &"The syllabus should be reviewed, for example, there are old procedures that are not applied currently. The time should be rearranged for some subjects or other necessary subjects"

Chapter 5

Conclusion & recommendation

5.1 Conclusion:

- Based on the result of students, trainers, and faculty members, all of them agreed with that there is a problem related to the inadequacy of the number of students in centers and hospitals, especially for the third and fourth academic levels

- Also, there is a gap between what the student has learned and his training practice.

- They were unanimously agreed that the absence of higher education opportunities caused a lack of clinical training.

- Also, they were agreed that there was no protective protection for students and it was agreed that not all advanced technologies learned by a student, such as nuclear medicine, could be covered and it would be important for the department staff to be fully involved in educational activities.

- It was also agreed that the clinical training days would be per week Adequate.

- The trainers agreed that increasing the number of students reduces the opportunities for training for some of them.

- It was indicated by the faculty members that there is no concern about the students going to the training without taking their vaccinations.

- The curriculum also focuses more on "technology" and therefore the need for revision is considered urgent to match the University vocational training.

5.2 Recommendations:

- The students should be distributed reasonably among the number of centers and hospitals.
- The abundance and diversity of cases could contribute to raising the level of training.
- The atmosphere should be pleasant in the training room. The trainer should also encourage the student to become an independent learner
- The trainer should not be distracted from doing other work and leaving the training of the students.
- The radiology departments and centers should provide the trainers with opportunities for continuous professional development.
- The trainers should provide clear and adequate notes for the student's level.
- It should be enough days of the week to acquire skills.
- It must be practice in the skills laboratory, which must include all methods of imaging.
- Some topics that are not currently practical and need to be changed.
- There is a need to qualify a teaching trainer / radiology technician through the availability of qualifications and opportunities for continuous professional development in the field of radiology.
- The development of academic staff members should be done through an understanding of pedagogical principles and teaching frameworks, evidence-based learning as well as feedback skills.
- This research has expansion for future studies which includes new and more expanded aspects.

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Appendix

Question for faculty members

Clinical Training Challenges and Needs:
Experiences of faculty members in Medical Radiology and Imaging Technology Department

Dear Faculty member :
Your participation in this questionnaire will be anonymous; please answer the questions as honestly as possible.
Please indicate the following with a "√":
GENDER: ☐ Male ☐ Female
JOB POSITION: ☐ Lecturer ☐ Instructor ☐ Clinical training officer
UNIVERSITY SITE: ☐ Public ☐ Privet ☐ Other
Please answer the following questions/items by indicating whether you: Strongly Disagree, Disagree, Unsure, Agree, Strongly Agree

N	Item	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1	There exist a mismatch between the number of students we have and the available placement area to support their clinical training.					
2	Most of the hospitals do not accept more than two students to train on one machine because of patients' privacy or comfort. Therefore, the department tries to solve this problem by placing students in turns every other day; this means the students practice for half of the intended time allocated for practice.					
3	The preparation for clinical training in the university was useful.					
4	Our department assigns supervisors from a pool of instructors, but they are not given much opportunity to teach at the placement area and usually come to take attendance.					
5	The instructor's role in clinical education practice is not clearly defined.					
6	Either radiographers or radiologic technologists working in hospitals are not that much willing to teach students because of lack of incentives.					
7	We are encountering many problems concerning clinical practice such shortage of transportation services.					
8	There is a gap between what students have learned in the class and what they observed during clinical training.					
9	The students do not see what they have learned in the class, and they are told that it is important ex. Advanced imaging, Nuclear Medicine.					
10	Time allocation to cover courses and lack of a skills lab/simulation training time and facilities to demonstrate technical concepts prior to the start of clinical training on actual patients is not enough.					
11	The curriculum is more "technologist" focused					

	and thus the need for revision is considered urgent to suit the training of the modern university professional.					
12	The absence of higher education opportunities in radiologic technology locally in Yemen have contributed to poor teaching-learning in clinical training.					
13	There are no protective measures given to students especially the monitoring badges/ dosimeters.					
14	We have worries about students going to clinical training without being vaccinated e.g. Hepatitis.					
15	Some of our students supervised by staff with less qualification especially in hospital (diploma) while the students are doing BSc.					
16	The trainer is enthusiastic about teaching					
17	The trainers gives students clear and sufficient feedback					
18	The clinical training experience and supervision offered were appropriate to my expectation.					
19	There are enough clinical training days per week for student to gain the appropriate experience					
20	The atmosphere in the training room is pleasant.					
21	It will be good if our department staff included fully in clinical training activities to ensure a unified learning outcome and a clear link between both theory and practice.					
22	Training in skill lab should include all imaging modalities, not only general radiography and ultrasound.					
23	The partnership between the university and clinical training sites to facilitate student training need more concern and building.					
24	The curriculum should be revised, for example there are obsolete procedures which are not currently in practice. The time should be rearranged for some other necessary topics or subjects.					
25	The academic faculty development through understanding of pedagogical principles, evidence-based teaching and learning frameworks as well as feedback skills are key to improving standards of medical imaging and radiography training.					
26	There is a need to qualify training educator/Radiographer through the provision of higher degree qualifications and regular continuous professional development opportunities in the area of radiology & medical imaging.					
27	The students would benefit from current and improved practical skills and protocols from their trainers and mentors who have obtained latest knowledge through continuous professional development.					

Question for trainers

Questionnaire about the Clinical Training Challenges:
Experiences of Trainers in Radiology departments

Dear Trainer:

Your participation in this questionnaire will be anonymous; please answer the questions as honestly as possible.

Please indicate the following with a "√":

GENDER: ☐ Male ☐ Female

LEVEL OF STUDY: ☐ Diploma ☐ Bachelor ☐ Master or above

HOSPITAL SITE: ☐ Public ☐ Privet ☐ Diagnostic center

EXPERIENCE YEARS: ☐ 1- 5 Years ☐ 6 – 10 Years ☐ More than 10 Years

Please answer the following questions/items by indicating whether you: Strongly Disagree, Disagree, unsure, Agree, Strongly Agree

N	Questions/items	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1	There exist a mismatch between number of students placed at a hospital or imaging centre and the available resources to support their learning					
2	There is shortage of imaging equipment in our hospitals. Therefore, it is difficult to teach students as well as service provision to patients.					
3	There appears to be no partnership between the university and clinical training sites to facilitate student training.					
4	The preparation for clinical training in the training place was useful.					
5	We cannot accept many students at once because we always need to attend to many patients on a daily basis. Therefore, it is difficult to serve all patients while training students because we are mostly in a hurry to serve patients in order to avoid complaints.					
6	We are not also given any incentive for training students or issuance of letter of appreciations, this also discourages us.					
7	There is a gap between what students have learned in the university and what we practice during training.					
N	Questions/items	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
8	Most of the time students reach our site very late as a result of shortage of transportation services.					
9	We can't cover all techniques they learned in the class, and they are told that it is important ex. Advanced imaging, Nuclear Medicine.					
10	The radiological tests performed on this rotation are too complex for student level					

N	Questions/items	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
11	The absence of higher education opportunities and continuous professional development in radiologic technology has been as a problem causing poor training and teaching.					
12	There is no radiation protective measure given to students especially the monitoring badges/ dosimeters.					
13	We have worries about going to clinical training without being vaccinated e.g. Hepatitis.					
14	My trainees have a pleasant personality and want to learn.					
15	I understand what my student is trying to learn from me.					
16	I encourage student to become an independent learner.					
17	I give students time to practice radiological skills in the radiology room					
18	Before the radiology exam, I discuss the radiological techniques with student.					
19	I give student direct feedback that is clear and sufficient for his level of training.					
20	I keep up to date with training issues in radiology department					
21	The student has enough clinical training days per week to gain the appropriate experience.					
22	More senior students/ trainees take away student's opportunities to train					
23	The variety of cases in radiology department gives students the appropriate training.					
24	I have the opportunity to develop my skills required for training					
25	The atmosphere in the training room is pleasant for students training.					
N	Questions/items	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
26	In the training room, some students don't like being corrected in front of other students, radiographers, and radiology staff.					
27	The radiology staff dislike when student operate as the imaging takes longer.					
28	There is no discrimination in the training place because of student sex or his university.					
29	We feel the student is part of a team in the training room					
30	1 am too busy doing other work to train students					
31	I didn't ask student to perform imaging alone that he does not feel competent at.					
32	It will be good if university staffs are included fully in training activities.					
33	The department should work on continuous career development opportunities to better serve patients					

	and build confidence in teaching students.					
34	The students' curriculum should be revised, for example there are obsolete procedures which are not currently in practice. So, the time should be rearranged for some other necessary topics or subjects.					
35	There is need for higher education opportunities in the area of radiology and medical imaging to enhance trainers' ability.					

استبيان الطلبة

استبيان حول صعوبات واحتياجات التدريب السريري: من وجهة نظر طلبة برامج الأشعة

أعزائي طلبة اقسام الاشعة التشخيصية   المحترمون

نتشرف ان نقدم بين ايديكم هذه الاستمارة التي تدخل ضمن متطلبات انجاز بحث التخرج ضمن برنامج (بكالوريوس تكنولوجيا الاشعة والتصوير الطبي) _ كلية الطب والعلوم الصحية _ جامعة العلوم والتكنولوجيا ، ونحيطكم علما بان الاجابات المقدمة من طرفكم تحظى بالاهمية البالغة لدينا وبالسرية التامة وستستخدم لاغراض البحث العلمي فقط ... ونشكركم على مساهماتكم الجادة بالاجابة على جميع الفقرات التالية وبصراحة تامة ، ولكم منا جزيل الشكر والتقدير

<u>يرجى اختيار الاجابة المناسبة</u> بوضع علامة "√":

الجنس: أنثى ⬜   ، ذكر ⬜

المستوى الدراسي: السنة الثالثة ⬜   السنة الرابعة ⬜   امتياز ⬜

نوع مركز التدريب: حكومي ⬜   خاص ⬜   مركز تشخيص ⬜

الرجاء الإجابة على الفقرات / البنود التالية بالإشاره إلى ما تراه مناسب من وجهة نظرك الخاصة إذا كنت:
غير موافق بقوة،غير موافق، غير متأكد، موافق،موافق بشدة بوضع علامة (√)على الخيار الذي تراه مناسب

موافق بشدة	موافق	غير متأكد	غير موافق	غير موافق بشدة	الفقرة	م
					هناك عدم تناسب في عدد الطلاب المتدربين في المستشفى ومراكز الاشعة والموارد المتوفرة لدعم تدريبهم	١
					المستشفيات لا تقبل اكثر من اثنين من الطلاب للتدريب على الجهاز	٢
					التحضير للتدريب السريري في الجامعة كان جيدا	٣
					قسم الاشعة بالجامعة يعين المشرفين من المدرسين ، لكن لم يتم اعطائهم فرصة كبيرة لتدريسنا في مكان التدريب السريري	٤
					في أغلب الأوقات نصل الى موقع التدريب في وقت متأخر جدا نتيجة العجز في خدمات النقل	٥
					هناك فجوة بين ما تعلمناه في الجامعة وما نلاحظه أثناء التدريب	٦
					بعض الاشياء المهمة التي تعلمناها لا نستطيع التدريب العملي فيها	٧
					لا يكفي الوقت المخصص للتدريب في معامل الجامعة قبل ان نذهب الى التدريب الفعلي في المستشفيات.	٨
					الفحوصات الاشعاعية في التدريب معقدة للغاية بالنسبة لمستواي	٩
					غياب فرص التعليم العالي المناسب (الماجستير والدكتوراه) وفرص التطوير المهني المستمر في اقسام الأشعة بالمستشفيات تسببت في ضعف التدريب والتعليم لدى المدربين	١٠
					لا توجد معدات حماية من الاشعاع تعطى للطلبة مثل اجهزة قياس الجرعات الاشعاعية ودروع الحماية الاشعاعية	١١
					اشعر بالقلق لذهابي للتدريب دون اخذ اللقاحات اللازمة مثل لقاح فيروس الكبد.	١٢
					مدربي لديه شخصيه لطيفه ومتاحه للمساعدة في التعلم	١٣
					أفهم ما يحاول مدربي تعليمي	١٤

موافق بشدة	موافق	غير متأكد	غير موافق	غير موافق بشدة	الفقرة	م
					مهارات التصوير الاشعاعي والطبي لدى مدربي جيده جدا	١٥
					مدربي يشجعني لأتعلم بشكل مستقل	١٦
					يمنحني مدربي الوقت الكافي لممارسة مهارات التصوير الاشعاعية في غرفة الاشعة.	١٧
					قبل الفحص الاشعاعي للمريض، مدربي يناقش معي التقنيات الاشعاعية التي سيستخدمها.	١٨
					يعطيني مدربي ملاحظات مباشرة واضحة وكافية لمستوى تدريبي	١٩
					تجربة التدريب السريري والاشراف المقدم مناسبا لتوقعي	٢٠
					مدربي على اطلاع دائم بالتقنيات الجديدة في مجال الاشعة	٢١
					هناك عدد كاف من أيام التدريب الإكلينيكي في الأسبوع لاكتساب الخبرة المناسبة.	٢٢
					ياخذ كثرة الطلبة المتدربين فرصي في التدريب	٢٣
					تنوع الحالات في قسم الاشعة يمنحني التدريب المناسب	٢٤
					لدي الفرصة لتطوير المهارات المطلوبة حسب مرحلتي في التدريب	٢٥
					البيئة التدريبية في اقسام ومراكز الاشعة مناسبة للتدريب	٢٦
					في غرفة التدريب،لا احب ان يتم تصحيحي امام الطلاب وموظفي الاشعة	٢٧
					يكره طاقم الاشعة عندما اعمل لان التصوير يستغرق وقتا أطول	٢٨
					أشعر بالتمييز في مكان التدريب بسبب جنسي	٢٩
					أشعر بأنني جزء من فريق غرفة التدريب	٣٠
					لدي إمكانية الوصول الى مجموعة معينة من المرضى ولديهم مشاكل تتناسب مع مستوى تدريبي	٣١
					يطلب مني اجراء تصوير لا أشعر بالكفاءة فيه بمفردي	٣٢
					عندما أكون في غرفة التدريب،احيانا لا يوجد موظف لتغطية العمل	٣٣
					من الجيد ان يكون موظفو القسم لدينا متهيئون لتدريبنا بالكامل	٣٤
					التدريب في المعمل الجامعي لا يحتوي على جميع طرائق التصوير مثل التصوير بالرنين المغناطيسي ، والتصوير المقطعي المحسوب	٣٥
					يجب مراجعة المناهج الدراسية ، على سبيل المثال هناك إجراءات قديمة ولم تعد تمارس حاليا ، لذلك يجب إعادة ترتيب المنهج لبعض الموضوعات الضرورية الأخرى	٣٦
					هناك حاجة لايجاد فرص التعليم العالي التطوير المهني المستمر المنتظم في مجال الاشعة والتصوير الطبي لتعزيز قدرة المدربين	٣٧
					يسود شعور بالتعاون والاحترام المتبادل من الجميع في مكان التدريب	٣٩

استبيان المدربين
إستبيان حول

تحديات وإحتياجات التدريب السريري من وجهة نظر المدربين في أقسام الأشعة بالمستشفيات ومراكز التدريب

الأفاضل : منتسبي أقسام الاشعة التشخيصية بالمستشفيات والمراكز التشخيصية   المحترمون
نتشرف أن نقدم بين أيديكم هذه الاستمارة التي تدخل ضمن متطلبات إنجاز بحث التخرج ضمن برنامج (بكالوريوس تكنولوجيا الاشعة والتصوير الطبي) _ كلية الطب والعلوم الصحية   جامعة العلوم والتكنولوجيا، ونحيطكم علما بان الاجابات المقدمة من طرفكم تحظى بالاهمية البالغة لدينا وبالسرية التامة وستستخدم لأغراض البحث العلمي فقط ونشكركم على مساهماتكم الجادة بالاجابة على جميع الفقرات التالية وبصراحة تامة ، ولكم منا جزيل الشكر والتقدير.

يرجى التاشير بـ (√) امام الخيار المناسب:

المؤهل : ◯ دبلوم اشعة   ◯ بكالوريوس اشعة   ◯ ماجستير/دكتوراه   ◯ ....

العمر: ◯ أقل من ٢٥ عام   ◯ ٢٦ ــ ٣٥ عام   ◯ ٣٦ ــ ٤٥ عام   ◯ أكبر من ٤٥ عام

سنوات الخبرة: ◯ أقل من ٥ سنوات   ◯ ٥ ــ ١٠ سنوات   ◯ ١١ـ ١٥ سنة   ◯ اكثر من ١٥ سنة

الجنس: ◯ ذكر   ◯ انثى

جهة العمل: ◯ مستشفى حكومي   ◯ مستشفى خاص   ◯ مركز اشعة تشخيصي

يرجى الإجابة على الفقرات التالية من خلال الإشارة بـ (√) إلى ما تراه مناسب من الاجابات
إذا كنت: لا توافق بشدة ، لا توافق ، غير متأكد ، توافق ، توافق بشدة

أوافق بشدة	أوافق	غير متأكد	لا أوافق	لا أوافق بشدة	الفقرة	م
					لا يوجد تناسب بين عدد الطلبة المتدربين لدينا في قسم الاشعة والاجهزة والموارد المتوفرة لدينا لدعم تدريبهم	١
					يبدو انه لا توجد شراكة مناسبة بين الجامعة ومراكز التدريب لتسهيل تدريب الطلبة.	٢
					يتم التحضير والتجهيز لتدريب الطلبة لدينا بشكل جيد	٣
					لا يمكننا قبول اكثر من طالبين في نفس الوقت لأننا نحتاج دائما الى رعاية الكثير من المرضى.	٤
					لا يتم منحنا حافز مناسب لتدريب الطلاب، وهذا لا يشجعنا	٥
					من الصعب خدمة جميع المرضى أثناء تدريب الطلاب لأننا في الغالب على عجلة من امرنا لخدمة المرضى من اجل تجنب الشكاوي.	٦
					هناك فجوة بين ما تعلمه الطلبة في الجامعة وما نمارسه اثناء التدريب.	٧
					في معظم الأوقات يصل الطلبة الى مكان التدريب في وقت متأخر نتيجة لقصور خدمات النقل	٨
					لا يمكننا تغطية جميع التقنيات التي تعلمها الطلبة في الجامعة مثل التصوير المتقدم /الطب النووي...	٩
					الفحوصات الاشعاعية التي يتم اجراؤها خلال التدريب معقدة واعلى من مستوى الطالب	١٠

اوافق بشدة	اوافق	غير متأكد	لا اوافق	لا اوافق بشدة	الفقرة	م
					غياب فرص الدراسات العليا والتطوير المهني المستمر في تكنولوجيا الاشعة يمثل مشكلة تسبب ضعف التدريب السريري.	١١
					لا يوجد اجراءات وقائية من الاشعة تعطى للطلبة اثناء التدريب مثل اجهزة قياس الاشعة ودروع الحماية	١٢
					يتمتع الطلبة بشخصيات طيبة ويريدون التعلم	١٣
					أعرف ما يحاول الطالب تعلمه مني	١٤
					أشجع الطالب على ان يصبح متعلما مستقلا	١٥
					أمنح الطلاب الوقت الكافي لتطبيق مهارات التصوير الاشعاعية	١٦
					قبل تصوير المريض، أناقش تقنيات التصوير مع الطالب	١٧
					أعطي للطالب ملاحظات مباشرة وكافية لمستوى تدريبه	١٨
					اتابع كل جديد في مجال تقنيات الاشعة والتصوير الطبي و التدريب في قسم الاشعة	١٩
					لدى الطالب عدد ايام تدريب كافية في الاسبوع لاكتساب الخبرة المناسبة	٢٠
					زيادة عدد الطلبة المتدربين يقلل فرص التدريب لبعضهم	٢١
					تنوع الحالات في قسم الاشعة يعطي الطالب التدريب المناسب	٢٢
					لدي الفرصة لتطوير مهاراتي المطلوبة للتدريب	٢٣
					الظروف في مكان التدريب مناسبة لتدريب الطلاب	٢٤
					في غرفة التدريب، لا يحب بعض الطلاب ان يتم تصحيحهم امام الطلاب الاخرين وبقية طاقم قسم الاشعة	٢٥
					لا يرغب موظفو الاشعة عمل الطالب لان قيامه بالتصوير يستغرق وقتا اطول	٢٦
					لا يوجد تمييز في مكان التدريب بسبب جنس الطالب او جامعته	٢٧
					نشعر ان الطالب جزء من الفريق في قسم الاشعة	٢٨
					انا مشغول جدا بالقيام بأعمال اخرى عن تدريب الطلاب	٢٩
					لا أطلب من الطالب القيام بالتصوير الطبي بمفرده اذا كان لا يشعر بالقدرة والكفاءة	٣٠
					سيكون من الجيد ان يتم إشراك موظفي الجامعة بشكل كامل في الانشطة التدريبية لدينا في مراكز التدريب	٣١
					يجب ان تعمل اقسام/مراكز الاشعة على توفير فرص التطوير الوظيفي والمهني المستمر لنا لكي نقدم خدمة أفضل للمرضى ونبني الثقة والقدرة لتعليم الطلبة	٣٢
					يجب مراجعة مناهج الطلبة بالجامعات، على سبيل المثال، هناك تقنيات قديمة ولم تعد تطبق حاليا ، لذلك يجب اعادة ترتيب المنهج للموضوعات الضرورية الاخرى	٣٣
					هناك حاجة لكي توفر الجامعات برامج التعليم العالي (ماجستير/دكتوراه) في مجال الاشعة والتصوير الطبي لتعزيز قدرة المدربين وامكاناتهم في تدريب الطلبة	٣٤

استبيان للطلبة
تحديات واحتياجات التدريب السريري لطلبة برامج الاشعة : من وجهة نظر أعضاء هيئة التدريس في برامج الأشعة

الأفاضل أعضاء هيئة التدريس ومساعديهم   المحترمون

نتشرف أن نقدم بين أيديكم هذه الاستمارة التي تدخل ضمن متطلبات إنجاز بحث التخرج ضمن برنامج (بكالوريوس تكنولوجيا الأشعة والتصوير الطبي) _ كلية الطب والعلوم الصحية _ جامعة العلوم والتكنولوجيا ، ونحيطكم علما بان الإجابات المقدمة من طرفكم تحظى بالأهمية البالغة لدينا وبالسرية التامة ولن تستخدم إلا لأغراض البحث العلمي فقط، ونشكركم على مساهماتكم الجادة بالإجابة على جميع الفقرات التالية وبصراحة تامة ، ولكم منا جزيل الشكر والتقدير.

يرجى الإشارة إلى ما ترونه مناسب في ما يلي بالرمز "√":

الجنس : ذكر ☐   ، أنثى ☐

الوظيفة : عضو هيئة تدريس ☐   ، معيد ☐   ،   موظف التدريب السريري ☐

الجامعة: حكومي ☐   خاص ☐   معهد صحي ☐

يرجى الإجابة على الأسئلة / العناصر التالية من خلال الإشارة بالرمز "√" في الخانة التي تعبر عن وجهة نظرك بخصوص الفقرات التالية إذا كنت: لا توافق بشدة ، لا توافق ، غير متأكد ، توافق ،أو توافق بشدة

أوافق بشدة	أوافق	غير متأكد	لا أوافق	لا أوافق بشدة	الفقرة	م
					لا يتناسب عدد الطلبة الذين لدينا مع الفرص المتاحة لتدريبهم وامكانات مراكز التدريب السريري	١
					يتم التحضير والإعداد للتدريب السريري من قبل الجامعة بشكل جيد	٢
					يعين قسم الاشعة/ المسؤول عن التدريب بالجامعة مشرفين من أعضاء هيئة التدريس ومساعديهم، لكنهم لا يمنحون فرصة كبيرة للتدريب في مراكز التدريب السريري وغالبا ما يحضرون لمتابعة حضور الطلبة فقط	٣
					لا تقبل معظم المستشفيات أكثر من طالبين للتدريب على جهاز واحد في نفس الوقت. لذلك، يحاول القسم حل هذه المشكلة عن طريق وضع الطلبة بالتناوب كل يومين، وهذا يعني أن الطلاب يتدربون لمدة نصف الوقت المخصص للتدريب	٤
					دور اعضاء هيئة التدريس ومساعديهم في تنفيذ التدريب السريري غير محدد بوضوح	٥
					قلة استعداد المدربين و تقنيو الأشعة الذين يعملون في المستشفيات والمراكز لتدريب الطلبة بسبب قلة الحوافز والمكافات التي تعطى لهم	٦
					نواجه العديد من المشاكل المتعلقة بالتدريب السريري، مثال القصور في خدمات نقل الطلبة من والى مراكز التدريب في الوقت المحدد	٧
					هناك فجوة بين ما يتعلمه الطلبة في الجامعة وما يلاحظونه خلال التدريب السريري	٨
					لا يجد الطلبة تدريب في بعض المواضيع التي درسوها وقيل لهم أنها هامة مثل بعض تقنيات التصوير المتقدمة، الخاصة، الطب النووي،....	٩

أوافق بشدة	أوافق	غير متأكد	لا أوافق	لا أوافق بشدة	الفقرة	م
					لا يكفي الوقت المخصص للتطبيق العملي في معامل الجامعة لبعض مواضيع العلوم الاساسية التي يدرسها الطلبة قبل بدء التدريب السريري على المرضى الفعليين في المستشفيات	١٠
					المناهج الدراسية الحالية اكثر تركيزا على الجانب التقني، وهناك حاجة ماسة الى المراجعة لكي تتناسب مع متطلبات التدريب السريري الحديثة	١١
					ساهم غياب فرص التدريب و برامج الدراسات العليا في تكنولوجيا الاشعة محليا في ضعف جودة التدريب السريري	١٢
					لا توجد تدابير حماية من الاشعة تعطى للطلبة مثل مقاييس جرعات الاشعة ودروع الحماية الاشعاعية	١٣
					لدينا مخاوف بشأن ذهاب الطلبة الى مراكز التدريب السريري دون اخذ اللقاحات الضرورية (على سبيل المثال لقاح التهاب الكبد)	١٤
					يتم استيعاب ومعالجة شكوى الطلاب على المراكز والمستشفيات بعناية	١٥
					يتم نزول مشرفي التدريب السريري الى المستشفيات والمراكز بصورة دورية للتأكد والمتابعة.	١٦
					هناك حاجة الى تواصل فعال بين مدربي الطلبة والمشرف على التدريب السريري في الجامعة فيما يتعلق بتدريب الطلبة	١٧
					يجب وضع معايير دقيقة ومحددة لاختيار المستشفيات والمراكز المخصصة للتدريب السريري	١٨
					بعض الطلبة يتم تدريبهم من قبل مدربين ذو مؤهلات أقل بينما الطلبة لدينا يدرسون برنامج ذو مؤهل أعلى	١٩
					يعطي المدربون الطلبة ملاحظات وتغذية راجعة واضحة وكافية	٢٠
					تجربة التدريب السريري والاشراف المقدمة للطلبة مناسبة لتوقعاتي	٢١
					عدد أيام التدريب السريري في الأسبوع للطالب كافية لاكسابه المهارات والخبرة المناسبة	٢٢
					يجب أن يتم تضمين منتسبي برنامج الاشعة بالجامعة في أنشطة التدريب السريري بشكل كامل لضمان نتيجة تعليمية موحدة والربط الواضح بين النظري والتطبيق	٢٣
					يجب أن يشمل التدريب في معامل الجامعة جميع تقنيات التصوير، وليس فقط التصوير الاشعاعي الاعتيادي والتصوير بالموجات فوق الصوتية	٢٤
					تحتاج الشراكة بين الجامعة ومراكز التدريب السريري مزيد من الاهتمام والبناء لتسهيل تدريب الطلبة	٢٥
					يجب مراجعة المناهج الدراسية وإعادة ترتيب المنهج لاستيعاب بعض الموضوعات الضرورية الأخرى	٢٦
					هناك حاجة ماسة لتدريب وتأهيل مدربي التدريب السريري من خلال توفير فرص التطوير المهني المستمر و برامج الدراسات العليا في مجال الأشعة والتصوير الطبي لزيادة كفاءاتهم التدريبية.	٢٧

ملاحظات تود إضافتها :

....

....

ملخص الدراسة:

للتدريب السريري أهمية قصوى في التعلم واكتساب الكفاءات الرئيسية من حيث المعرفة والمهارة والسمات المهنية المطلوبة للممارسة العملية في التصوير الشعاعي السريري.

كان الهدف من هذه الدراسة تقييم التحديات التي يواجها طلبة اقسام الاشعة والتصوير الطبي فيما يتعلق بالتدريب السريري.

شملت عينة الدراسة طلبة جامعيين من المستويين الثالث والرابع وخريجي برامج الاشعة والتصوير الطبي بحيث كان عددهم ٢١٣؛ كما شملت الدراسة أعضاء هيئه التدريس عدد ١٤ اضافة الى المدربين في اقسام الاشعة بالمستشفيات والمراكز التشخيصية عدد ٤٢.

أظهرت النتائج ان هناك العديد من التحديات المتنوعة التي يواجها كلا من الطلبة والمدربين واعضاء هيئة التدريس فيما يتعلق بالتدريب السريري ومنها ما يتعلق بعدم تناسب عدد الطلبة المتدربين مع امكانات المستشفيات والمراكز؛ وكذلك تسبب غياب فرص التعليم العالي في نقص كفاءة التدريب السريري؛ كما ان هناك فجوة بين ما تعلمه الطالب وبين ممارسته التدريبية.

ويمكن ان تؤثر هذه التحديات على الأداء المستقبلي للطلبة الخريجين من حيث التطبيق المناسب لمهارات وكفاءات التصوير الاشعاعي السريري اثناء عملهم في اقسام الاشعة.

ولذلك يجب توزيع عدد الطلبة بشكل متناسب مع الامكانات المتاحة والفرص التدريبية الموجودة في المراكز والمستشفيات وسد الفجوة بين ما يتعلمه الطلبة وبين ما يمارسونه من خلال التدريب المكثف والتوسع في تعليم الطلبة بعض المواضيع المتعلقة بعلوم الاشعة مثل علم الامراض.

جامعة العلوم والتكنولوجيا

كلية الطب والعلوم الصحية

قسم الاشعة التشخيصية والتصوير الطبي

التحديات التي تواجه طلبة تكنولوجيا الاشعة في التدريب السريري

مقدم من الطالبات:

شيماء العُمـــــري

غدير المطـــــري   أمة الرحيم النعماني

رغـــد باحـــــاج   اروى الصبـــــري

إشراف:

الدكتور/ عبدالله طاهر

(أستاذ مساعد في الفيزياء الطبية والإشعاع)

قُدم هذا البحث لاستكمال متطلبات الحصول على درجة البكالوريوس في الاشعة التشخيصية والتصوير الطبي

١٤٤٤هـ - ٢٠٢٣م