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DIAGNOSTIC RADIOLOGY TECHNOLOGY PROGRAM

ASSESSMENT OF RADIOLOGY STAFF KNOWLEDGE, PERCEPTIONS AND EXPECTATIONS REGARDING ARTIFICIAL INTELLIGENCE IN MEDICAL IMAGING

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Assessment of Radiology Staff Knowledge, Perceptions and expectations regarding Artificial Intelligence in medical imaging

تقييم المعارف والتصورات والتوقعات لدى طلبة وموظفي أقسام الأشعة التشخصية تجاه الذكاء الاصطناعي وتطبيقاته في الاشعة والتصوير الطبي

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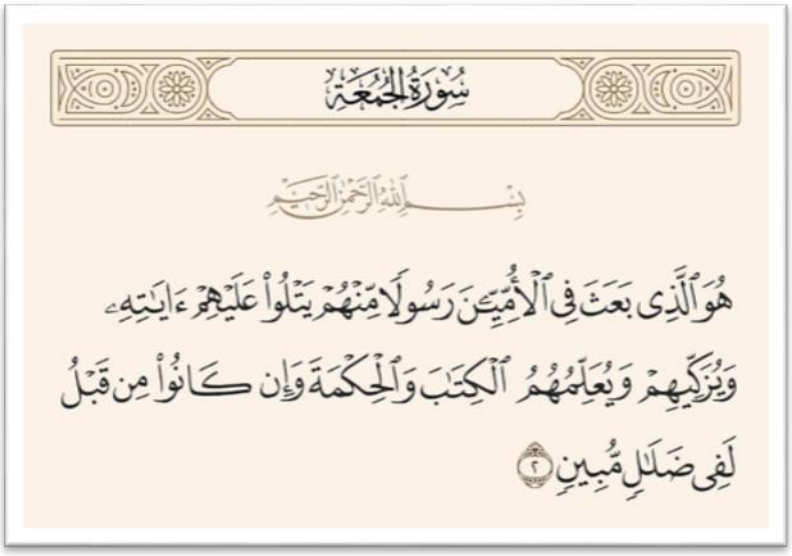


صدق الله العظيم

Acknowledgment

To everyone who has contributed, assisted in and participated in the completion of this research, to become its current form with special thanks to **Dr. Abdullah Taher** for everything he did for us sincerely.

Dedication

We dedicate this research to our fathers, mothers, family and everyone who contributed to the completion of this research, to our college and its teaching staff and to the soil of our beloved country.

Abstract

Background: Artificial Intelligence (AI) technologies have already started impacting clinical practice across various settings worldwide, including the radiography profession. This study is aimed at exploring on AI technologies in relation to knowledge, perceptions, and expectations of radiography professionals.

Aim: Assessment of radiology staff knowledge, perceptions and expectations regarding artificial intelligence in medical imaging.

Method: study performed in Sana'a hospital, Radiology Centers and universities. This study was a descriptive cross section study conducted on radiology staff, students and interns. The sample size was 328 participants and the data collected by a structured questionnaire.

Results: The largest age group in this study was between 25 and 35 years with 132 participants (37.2%), The most participants in this study were males by 197 participants (60%). The largest job category were students by 92 participants (28%).The largest experience category were less than five years 189 participants (57.6%). The results illustrated that the knowledge level of participants was low, and the most of the participants have positive opinions about AI in radiology. The mean of participants' knowledge and opinions about artificial intelligence among men was higher than that of women; the knowledge of age group between 25 and 35 was the best comparing with other age groups, while the participants' opinions about artificial intelligence of age group less than 24 was higher than other age groups. The knowledge and opinions about artificial intelligence of experience group less than 15 was higher than other experience groups**.** The knowledge among Technician was more than others jobs while the Technologists' opinions about artificial intelligence was higher than job group.

Conclusion: the advancement of AI technologies and implementations should be accompanied by proportional training of end-users in radiology. There are many benefits of AI-enabled radiology workflows and improvement on efficiencies but equally there will be widespread disruption of traditional roles and patient-centred care, which can be managed by a well-educated and well-informed workforce.

LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AI	**Artificial Intelligent**
MRI	**Magnetic resonance imaging**
CT	**Computed Tomography**
NM	**Nuclear Medicine**
AGI	**Artificial General Intelligence**
ANI	**Artificial Narrow Intelligence**
ASI	**Artificial Super intelligence**
ML	**Machine learning**

Chapter 1: Introduction

1.1 Overview

Artificial intelligence (AI) is a broad umbrella term that encompasses the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and prediction.6 It is a data-reliant paradigm that fits well with the technology-driven practice of modern medical imaging and, in particular, to computer vision tasks. In recent years, there has been a significant academic and industrial surge in proposed AI applications for diagnostic imaging7 and while the vast majority have focused on augmenting and assisting the radiologist, there is a growing niche of applications directly applicable to radiography practice (Coakley et al., 2022).

Artificial intelligence (AI) is increasingly utilized in medical imaging systems and processes, and radiographers must embrace this advancement. This study aimed to investigate perceptions, knowledge, and expectations towards integrating Artificial intelligence into medical imaging. The central driver of emerging technologies has been artificial intelligence (AI). Its evolution began in 1950 when Alan Turing proposed the possibility of engineering machines that possess human- level intelligence, capable of learning from experience. From this idea, the humble algorithm was developed. Sets of algorithms, or coded instructions, have then been grouped together in recent years to form the foundations of AI and the computerized driven systems that have permeated countless sectors, including healthcare. Due to its reliance on technology, the medical imaging domain has begun to feel AI is dominating presence and influence. Diagnostic companies, such as Siemens and GE, have started integrating AI capabilities within their machinery, with algorithms currently being used to optimize CT radiation dose, reduce image noise and carry out automated 2-detector alignment. With the increasing development of AI algorithms that allow for more automated actions, uncertainty has begun to circulate concerning the future roles of medical imaging professionals. Although exploration has already started into how AI may affect radiologists. (Coakley et. (2022).

1.2 problem statement

Al has various shortfall and challenges, which inhibits is large-scale adoption. The challenges include safety, Trust, Computation power, and Job loss concern. So, this research seeks to answer this question: what is the level of knowledge and expectations of radiology workers about artificial intelligence.

1.3 Study objectives

1.3.1 General objective

The main goal of this study is to assess the level of radiology staff familiarity, expectations and perceptions regarding artificial intelligence in medical imaging.

1.3.2 Specific objectives

To assess radiology staff familiarity about Al in radiology.

To assess the radiology staff opinions about Al in medical imaging.

To assess the expectations of radiology staff about artificial intelligence in next five to ten years.

To assess the effect of some sociodemographic factors on radiology staff familiarity, opinions, and expectations about artificial intelligence in radiology.

1.5 Significance of this study

It will give us information about the reality of artificial intelligence applications and the level of knowledge, expectations and perceptions of radiology staff about artificial intelligence.

1.5 Strengths of this study

The point of strength in this study can be summarized in the following points:

-There is no any study About AI in Yemen

1.6 Limitation of this study

There are some limitations for this research as follows:

-The short time was given to conduct this research

-Non-cooperation of some technicians and radiologists in completing the questionnaire of this study artificial intelligence

-The lack of technology advancement related to Al in radiology department in Yemen.

1.7 Research outlines:

This research consists of five chapters. Chapter 1 introduces the topic of this study, problem statement, research objectives, research significance, and research strengths and limitations. Chapter 2 covers a concise review of related literature theoretical background aspect of artificial intelligence in medical imaging, and previous studies. Chapter 3 describes the methods employed in this research work. In addition, it discusses the study methodology and procedures performed to achieve the necessary results. Chapter 4 reports the collected results of this study and the results discussion. The research results are concluded in Chapter 5, which provides a summary of major results offers recommendations and suggests possible areas for future works.

Chapter 2

Literature review

2.1 Theoretical Background

Artificial Intelligence definitions AI is as machine intelligence or intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans. The term AI is often used to describe machines that mimic human cognitive functions such as learning, understanding, reasoning or problem solving (Delipetrev et (2020).

2.1.1 Artificial Intelligence Foundations (1950s – 1970s) in 1950, Alan Turing published the milestone paper "Computing machinery and intelligence" (Turing 1950), considering the fundamental question "Can machines think?" Turing proposed an imitation game, known as the Turing test afterwards, where if a machine could carry on a conversation indistinguishable from a conversation with a human being, then it is reasonable to say that the machine is intelligent.

The Turing test was the first experiment proposed to measure machine intelligence. The first "AI period" began with the Dartmouth conference in 1956, where AI got its name and mission. McCarthy coined the term "artificial intelligence," which became the name of the scientific field. The primary conference assertion was, "Every aspect of any other feature of learning or intelligence should be accurately described so that the machine can simulate it (Delipetrev, (2020).

2.1.2 Artificial intelligence (AI) systems are software (and possibly also hardware) systems designed by humans that‹ given a complex goal‹ act in the physical or digital dimension by perceiving their environment through data acquisition‹ interpreting the collected structured or unstructured data‹ reasoning on the knowledge‹ or processing the information‹ derived from this data and deciding the best action(s) to take to achieve

the given goal. AI systems can either use symbolic rules or learn a numeric mode (Delipetrev.et (2020).

2.1.3 Artificial Intelligence includes several approaches and techniques, such as machine learning (of which deep learning and reinforcement learning are specific examples), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimization), and robotics (which includes control, perception, sensors (Delipetrev,et (2020).

2.1.4 Artificial Narrow Intelligence (ANI), often referred to as "Weak" AI is the type of AI that mostly exists today. ANI systems can perform one or a few specific tasks and operate within a predefined environment, e.g., those exploited by personal assistants Siri, Alexa, language translations, recommendation systems, image recognition systems. (Delipetrev, (2020).)

2.1.5 Artificial General Intelligence (AGI) or "Strong" AI refers to machines that exhibit human intelligence. In other words, AGI aims to perform any intellectual task that a human being can. AGI is often illustrated in science.

2.1.6 Artificial Super intelligence (ASI) is defined as "any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest ASI is supposed to surpass human intelligence in all aspects — such as creativity, general wisdom, and problem-solving.

2.1.7 Machine learning (ML) is the scientific study of algorithms those computer systems that learn through experience. ML algorithms build a model based on sample data, known as "training data", in order to make predictions.

2.1.8 Artificial Intelligence in medicine

In medicine, Alan Turing (1950) was one of the founders of modern computers and AI. The "Turing test" was based on the fact that the intelligent behavior of a computer is the ability to achieve human level performance in cognition related tasks. The1980 and

1990 saw a surge in interest in AI. Artificial intelligent techniques such as fuzzy expert systems, Bayesian networks, artificial neural networks, and hybrid intelligent systems were used in different clinical settings in healthcare. In 2016, the biggest chunk of investments in AI research were in healthcare applications compared with other sectors. AI in medicine can be dichotomized in to two subtypes: Virtual and physical. The virtual part ranges from applications such as electronic health record systems to neural network-based guidance in treatment decisions .The physical part deals with robots assisting in performing surgeries, intelligent prostheses for handicapped people ,and elderly care. The basis of evidence-based medicine is to establish clinical correlations and insights via developing associations and patterns from the existing database of information. Traditionally, they used to employ statistical methods to establish these patterns and associations .Computers learn the art of diagnosing a patient via two broad techniques-flow charts and data base approach. The flowchart-based approach involves translating the process of history taking, i.e. Physician asking a series of questions and then arriving at a Probable diagnosis by combining the symptom complex presented (Kaul,V.et.(2020).

2.1.9 Artificial Intelligence in Radiology

Artificial intelligence (AI) is the most recent development in a long series of disruptive technological innovations in radiology. Medical imaging began in the late 1800 after the discovery of the X-ray, but exploded in the late 1900s with the availability of computers to create, analyze, and store digital images. Future speculation about radiology includes widespread AI involvement; however, thus far, translation of AI to clinical radiology has been limited

Artificial intelligence (AI) algorithms, particularly deep learning, have demonstrated remarkable progress in image-recognition tasks. Methods ranging from convolutional neural networks to variational auto encoders have found myriad applications in the medical image analysis field, propelling it forward at a rapid pace. Historically, in radiology practice, trained physicians visually assessed medical images for the detection; characterization and monitoring of diseases .AI methods excel at

automatically recognizing complex patterns in imaging data and providing quantitative, rather than qualitative, assessments of radiographic characteristics. In this Opinion article, weestablish a general understanding of AI methods, particularly those pertaining to image-based tasks. We explore how these methods could impact multiple facets of radiology, with a general focus on applications in oncology (Hosny,et .(2018).

2.1.10 Artificial intelligence in x-ray

X-ray is the most common form of medical imaging: it is estimated that 3.6 Billion X-ray images are taken each year. 45% of radiologists report burnout due to reasons such as time pressure and the rising volume of scans. AI in analyzing and reporting X-ray results can have an impactful effect on radiology. In this article, we'll go over the benefits of leveraging AI in X-ray analysis and provide recommendations for several challenges in implementation Artificial intelligence increases the speed of anomaly detection significantly as it can analyze images much faster than a human. Manually analyzing X-ray images is a labor-intensive process and might lead to decision fatigue and incorrect diagnosis. AI can help decrease the workload of radiologists, lower burnout rates and allow radiologists to focus on patients that need more attention. The first autonomous X-ray AI that is approved by the EU for medical use can automate up to 40% of reporting workflow. (Gao, C.et) (2023) .

The shortage of radiologists in remote locations and developing countries can be addressed by using AI in X-ray analysis. For example, tuberculosis is a major issue in developing countries. Given the resource constraints in those countries, AI models that detect tuberculosis can add significant value in terms of cost and life saving. X-ray AI models have been found to be more effective in detecting certain diseases compared to doctors. It has been found that lung cancer detection can be improved by using X-ray AI. AI also has outperformed radiologists in detecting tuberculosis. (Gao, C., (2023).

2.1.11 Artificial intelligence in CT

Researchers have proposed the use of artificial intelligence (AI) to improve CT image reconstruction. One ap- plication involves a sharpness-aware general adversarial

network to achieve low-dose CT (LDCT) denoising.5 Another concept uti- lises a multi-scale wavelet domain residual learning architecture for limited-angle CT reconstruction to eliminate artefacts and preserve edges,6 while other approaches involve optimizing IR methods through synthetic sinogram-based noise simulations7 or k-sparse autoencoders.8 These AI-based image reconstruction techniques all share a common goal, namely to improve the image quality of low-dose CT images. These methods have shown great promise in achieving exactly this, with several AI algorithms already being clinically implemented. Currently, two CT systems have received 510(k) clearance by the U.S Food and Drug Administration (FDA) for AI-based CT image reconstruction: Advanced intelligent Clear- IQ Engine (AICE), Canon Medical Systems, Tochigi, Japan 9) and deep learning (DL) Image Reconstruction (IR)/True Fidelity™ (GE Healthcare, Illinois, USA10). With the associated advantages of these technologies, it is expected that AI will continue to enhance current reconstruction methods and improve the workflow of clinical CT imaging. The primary purpose of this literature review is to ex- amine the use of AI-based algorithms in CT reconstruction and its effectiveness in improving the diagnostic image quality of low- dose images. The secondary aims are to provide an overview of the weaknesses of current CT reconstruction methods, namely fltered back-projection and iterative reconstruction, and discuss how machine learning and deep learning algorithms can overcome these limitations (Zhang,et. (2022).

2.1.12 Artificial Intelligence in Nuclear Medicine

Seemingly, more easily achievable goals of AI in medicine should not be forgotten because they might relieve people who are highly educated and have specialized skills of repetitive. routine tasks. (Roland, Hustinx, Janpruim25August2022, Artificial Intelligence in Nuclear-12-12, Medicine.12-Roland, Hustinx, Janpruim25August2022).

2.1.13 Application of nuclear medicine

The rise of AI in medicine is often associated with‘‘superhuman’’abilities and precision medicine .At the same time ,often overlooked are the facts that large parts of physicians’ everyday work consist of routine tasks and that the delegation of those (tasks to AI

would give the human workforce more time for higher-value activities ,that typically require human attributes such as creativity, cognitive insight, meaning or empathy .The day-to-day work of medical imaging involves a multitude of activities, including the planning of examinations, the detection of pathologies and their quantification, and manual research for additional information in medical records and textbooks—which often tend to bore and demand too little intellectually from the experienced physician but, with continuously rising workloads ,tend to ''overwhelm the beginner .Without diminishing the prospects of‘ ‘super diagnostics ,and precision medicine (Roland,Hustinx,Janpruim25August2022,Artificial Intelligence in Nuclear-12-12 ,Medicine.12-Roland,Hustinx,Janpruim25August2022).

2.1.14 Artificial Intelligence in MRI

Artificial Intelligence algorithm promises faster MRIs with better image quality there is great interest in leveraging AI to produce a high quality MRI, faster. Historically, methods for making MRI faster also degrade image quality. This fall, UMass will be one of the first sites in the United States to implement a deep learning based MR image reconstruction algorithm from GE Healthcare as part of our ongoing partnership with Shields. This technology, developed to allow faster MR image acquisition at 3T without compromising image quality, received FDA approval only five months ago. GE estimates nearly a 30-40% reduction in scan time for some of our most commonly performed MRI (Mark MelChionna19January, 2023).

2.1.15 Artificial Intelligence in US

AI-empowered ultrasonography has the potential to further accelerate the use of medical ultrasound in various clinical settings with broad usage by medical personnel. The application of AI in ultrasonography could help to assist physicians in the diagnosis and triage of patients. The standardization of ultrasound examinations and qualifications for operators and interpreters should be discussed in medical disciplines, institutional leadership, and governing bodies [8]. These discussions are essential in the looming era of AI. Before using any AI tools, each institution should conduct an internal validation process to verify whether it is suitable for their patients and practitioners, as

there is a lack of evidence-based nonrandomized prospective studies to validate the efficacy of AI tools [19]. Otherwise, the increasing use of ultrasonography coupled with AI assistant tools could result in wasted resources, malpractice caused by misdiagnoses, and eventually a great burden on medical institutions and their patients (Yu-Ting Shen a, (2021) .

2.2 Previous studies

Coakley **et.al (2022)** studied Radiographers' knowledge, attitudes and expectations of artificial intelligence in medical imaging found overall positive attitudes towards AI implementation were observed. The slight apprehension may stem from the lack of technical understanding of AI technologies and AI training within the community. Greater educational programs focusing on AI principles are required to help increase European radiography workforce engagement and involvement in AI technologies. Coakley, (2022).

Roslan **et.al (2022)** assessed radiographers' perceptions and expectations of artificial intelligence qualitative found has explored the knowledge of AI and its applications amongst radiographers in Singapore, their perceptions on the use of AI in radiographic practice and how they view patients' perceptions, along with their expectations of AI in the future. AI can benefit the radiography profession in Singapore, but widespread AI implementation is not recommended presently due to its persisting limitations and limited knowledge amongst radiographers. While radiographers are positively anticipating the integration of AI into their practices, they should be better prepared for imminent modifications brought about by AI and education should be put in place to ensure that radiographers are prepared to embrace AI technologies when the time comes. With patients as the recipients of healthcare, their acceptance and reactions to AI being implemented in radiographic practices should be carefully managed to provide a holistic provision of care. Radiographers should stay involved in the conversation of AI in radiography to maximize their potential as a profession as AI becomes increasingly adopted in practice**.**

Waymel **et al (2019)** studied the Impact of the rise of artificial intelligence in radiology the purpose of this study was to assess the perception, knowledge, wishes and expectations of a sample of French radiologists towards the rise of artificial intelligence (AI) in radiology While respondents had the feeling of receiving insufficient previous information on AI, they are willing to improve their knowledge and technical skills on this field. They share an optimistic view and think that AI will have a positive impact on their future practice. A lower risk of imaging-related medical errors and an increase in the time spent with patients are among their main expectations.

Aldhafeeri **(2022)** studied perspectives of radiographers on the emergence of artificial intelligence in diagnostic imaging in Saudi Arabia this study aimed to gain insight into radiographers' views on the application of artificial intelligence (AI) in Saudi Arabia by conducting a qualitative investigation designed to provide recommendations to assist radiographic workforce improvement and Radiographers were generally positive about introducing AI to radiology departments. To integrate AI successfully into radiology departments, radiographers need training programs, transparent policies, and motivation.

William et **al. (2021)** studied the Radiographers' perspectives on the emerging integration of artificial intelligence into diagnostic imaging: The study found the radiographers practicing in Ghana that responded to this survey demonstrated positive attitudes about the potential benefits of AI in medical imaging. However, concerns around AI-related errors, cyber security, data protection and decision-making issues were identified. Lack of knowledge/technical expertise, high equipment cost and cyber threats were identified as potential barriers affecting the implementation of AI in medical imaging in Ghana. they suggest the implementation of a rigorous AI education programmer modelled after that of other successful organizations to promote the credibility and adoption of AI in practice in Ghana. Future research on the educational needs of radiographers relating to AI is highly recommended to inform the radiography education and training curricula/programmers.

Chapter 3: Methodology

3.1 Materials:

3.1.1 Study design:

This study was Cross-sectional descriptive study.

3.1.2 Study area:

This study was conducted in hospitals and radiology department in Sana'a city.

3.1.3 Study population:

This study targeted all radiology staff, intern, graduates, and students in level fourth in both university of science & technology and Azal University.

3.1.4 Inclusion criteria:

All radiology staff, intern, graduates, and students for the in fourth level at university of science & technology and Azal University.

3.1.5 Exclusion criteria:

All first, second, third and diploma level in each of the University of Science and Technology, Azal University, Sana'a University and the Higher Institute.

3.1.6 Sample size:

The study sample of 328 include participants.

3.1.7 Tools:

The tools used in this study used questionnaire divided into two parts:

Part 1: A structure questionnaire demographic data, which including age, gender, occupation, and Experience yrs.

Part 2: Items to assess their knowledge, perceptions and expectations of the uses and application of AI and the opinions of the participants and their expectations about the impact of artificial intelligence in the field of radiology.

3.2 Method:

3.2.1 Data collection:

The data was collected by administered questionnaire to radiology staff, intern, graduates, and students in 4^{th} level and asked to fill to assess the level of radiology staffs knowledge, perceptions and expectation of AI during month January.

3.2.2 Statistical analysis:

The data were analyzed using SPSS version 24. The results were presented in tables and graphs.

3.2.3 Ethical consideration:

The study proposal prepared by the researchers and evaluated by the supervisor. The data collection was based on confidence and privacy, the data used for research propose only.

Chapter 4
Results and discussion

4.1 Result

The data collected during the period from 1 to 30 January 2023 from hospitals and radiographic department in Sana'a city. The study targeted all radiology staff, intern graduate, students for the level fourth in both University of Science & Technology and Azal University to assess their knowledge, perceptions and expectations regarding artificial intelligence in medical imaging. The results were described as the following.

4.1 Study sample Age

According to the age of study participants, there were some age groups including (less than 24 years) (25-35 years) (36-45 years) (more than 45 years). The age groups of study sample consist of four groups as it shown in Table 4.1

Table 4.1: distribution of study sample according to Age group

Age group	N	Percent
Less than 24	122	37.2%
25-35	132	40.2%
36- 45	60	18.3%
More than 45	14	4.3%
Total	328	100%

The majority of study sample age range between 25 and 35 years while the less number of sample were age more than 45 years.

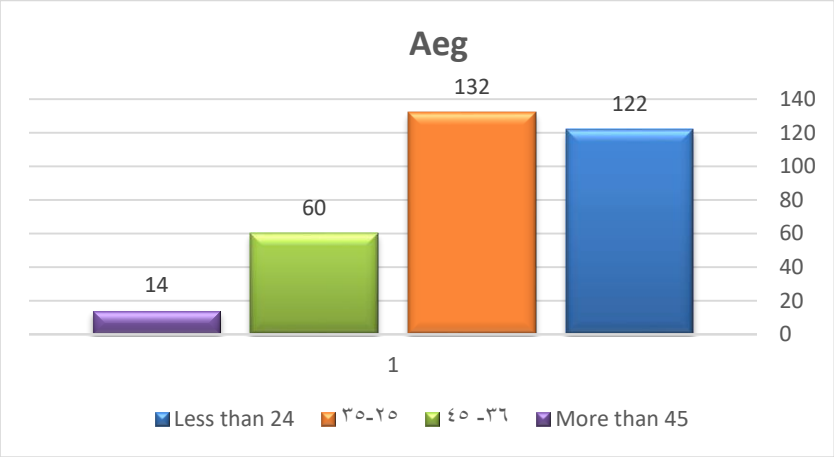


Figure 4.1: Distribution of study sample according to age

4.2 study sample Gender

According to the gender of study participants, there were males, females the results as shown in Table 4.2.

Table 4.2: Distribution of study sample numbers according to their Gender

Gender group	N	Percent
Male	197	60.1%
Female	131	39.9%
Total	328	100%

The most of study sample were males while females were few.

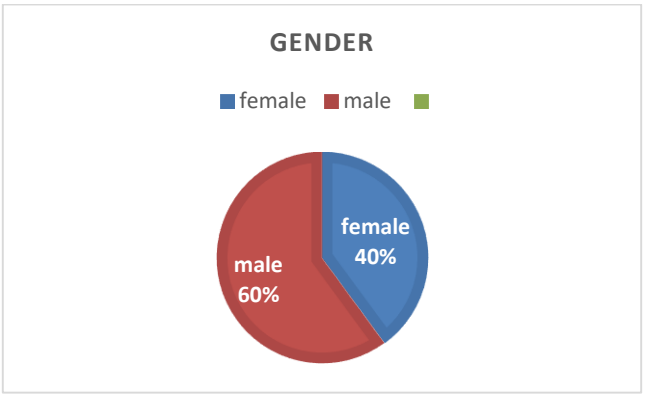


Figure 4.2: Distribution of study according to gender

4.3 study sample Jobs

According to the jobs of participants, there were Radiologist, Technologist, Technician Student/intern the job groups are shown in Table 4.3.

Table4.3: Distribution of study sample according to their Jobs

Work/job	N	Percent
Radiologist	56	17.1%
Technologist	91	27.7%
Technician	89	27.1%
Student/intern	92	28%
Total	328	100%

The highest category was students/intern, while the lowest category was radiologist.

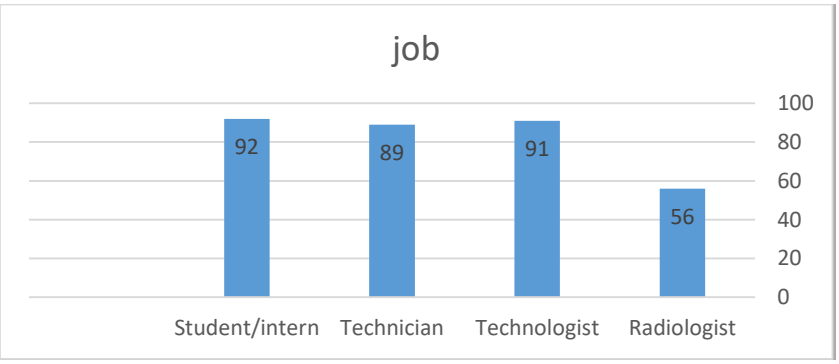


Figure 4.3: Distribution of study according to jobs

4.4 Experience of study sample

According to the years of experience of study participants, the experience categorized to some groups (less than 5 y), (5-10 y), (11-15 y), (more than 15 y). The results are shown in Table 4.4.

Table4.4: Distribution of study sample according to their experience

Experience in years	N	Percent
Less than 5 years	189	57.6%
5-10 years	69	21.0%
11-15 years	35	10.7%
More then 15	35	10.7%
Total	328	100%

The majority category was less than 5years; the lowest categories were from 11-15 years and more than15 years.

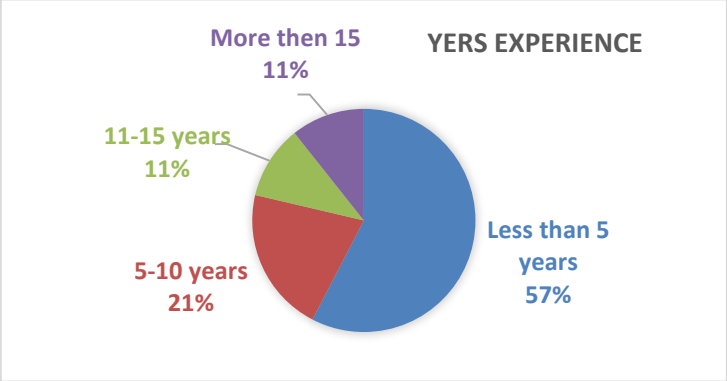


Figure 4.4: Distribution of study sample according to **years'** experience

4.5- Participants familiarity about artificial intelligence (AI)

Table 4.5: study sample according to the knowledge of the participants of AI

Item		Familiarity level N (%)				
		Never heard of	Heard about it	Somewhat familiar	Very familiar	Total
1-	Triaging images to move most critical patient to first review	107 (32.6)	121 (36.9)	65 (19.8)	35 (10.7)	328 (100.0)

2-	Optimizing workflow for overall productivity	46 (14.0)	119 (36.3)	97 (29.6)	66 (20.1)	328 (100.0)
3-	Automating part of image analysis	131 (39.9)	98 (29.9)	68 (20.7)	31 (9.5)	328 (100.0)
4-	Providing clinician decision support	75 (22.9)	109 (33.2)	83 (25.3)	61 (18.6)	328 (100.0)
5-	Enhancing imaging quality	39 (11.9)	98 (29.9)	78 (23.8)	113 (34.5)	328 (100.0)

The result in Table 4.5 showed that in item (1) 121 of participants were heard about it AI. In item (2) 119 of participants was heard about it AI. In item (3) 131 of participants were never heard about it. In item (4) 109 of participants were heard about it, in item (5) 131 of participants were very familiar. Through these answers, we notice that the level of knowledge of participants is low

4.6- Participants Opinions about artificial intelligence

Table 4.6: study sample according to Opinions Participants of AI Levels.

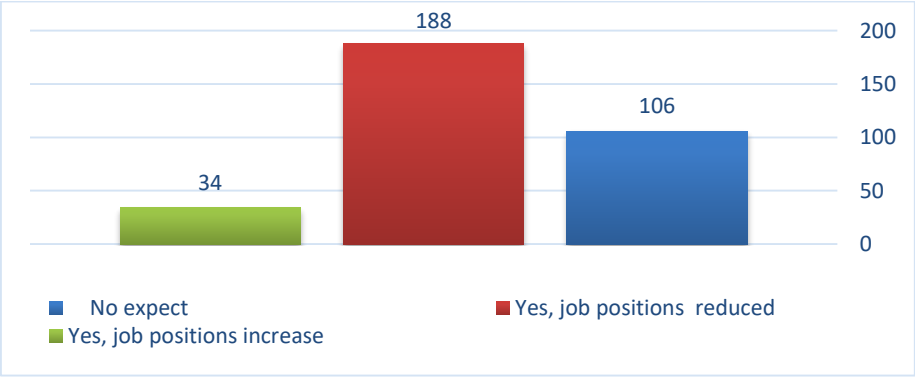
Item		Familiarity level N (%)			
		Do not agree	Have no opinion	Agree	Total
1-	I think AI implementation will allow for opportunities to expand the general role of radiographers	111 (33.8)	55 (16.8)	162 (49.4)	328 (100.)
2-	I am excited about the advancement of AI role within radiography	51 (15.5)	56 (17.1)	221 (67.4)	328 (100.0)
3-	I think the patient experience would be improved with further implementation of AI	56 (17.1)	59 18.0	213 64.9	328 (100.0)

4 -	I would be interested in possible courses on AL within the radiography sector	31 (9.5)	40 (12.2)	257 (78.4)	328 (100.0)
5 -	I think AI already plays an important role within the radiography	38 (11.6)	70 (21.3)	220 (76.1)	328 (100.0)
6 -	I am apprehensive about the introduction of AI into the radiographer field	172 (52.4)	70 (21.3)	86 (26.2)	328 (100.0)

The result in Table 4.6 showed that most of Participants agree to think AI implementation will allow for opportunities were (162). Most of Participants agree to expand the general role of radiographers were (221). Most of Participants agree think the patient experience would be improved with further implementation of AI were (231). Most of Participants agree to would be interested in possible courses on AL within the radiography sector were (257). Most of Participants agree to think AI already, plays an important role within the radiography were (220). Most of Participants do not agree to apprehensive about the introduction of AI into the radiographer field were (172). Through the table, we notice that most of the participants agree with artificial intelligence.

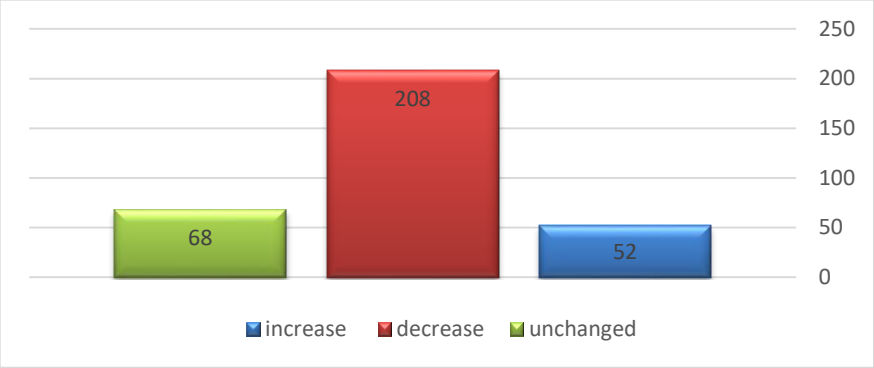
4.7- Participant's expectations about the impact of AI applications in the field of radiology in the next five to ten years.

Figure 4.5: study sample Participants **expectations about the impact on professional radiologist's life of AI in the next five to ten years.**



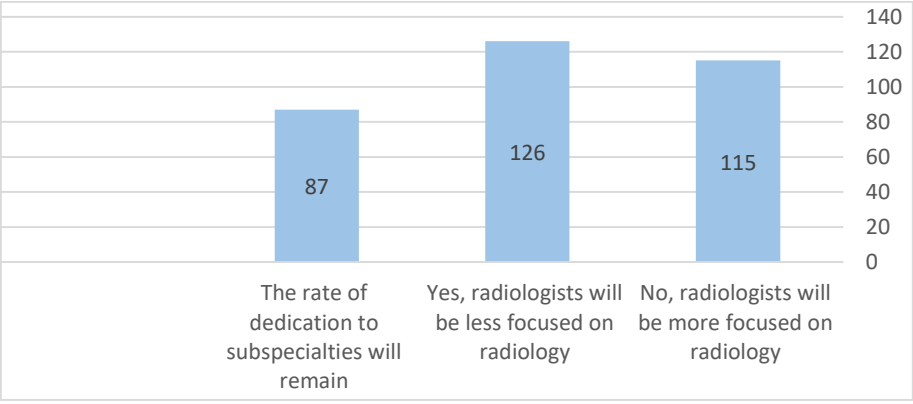
Most of participant's expectations about the impact on professional radiologist's life in terms of amount of job positions in the next 5–10 years that were yes, job positions will be reduced by (188).

Figure 4.6: study sample expectations the use of AI-based applications will make radiologists' duties of AI in the next five to ten years.



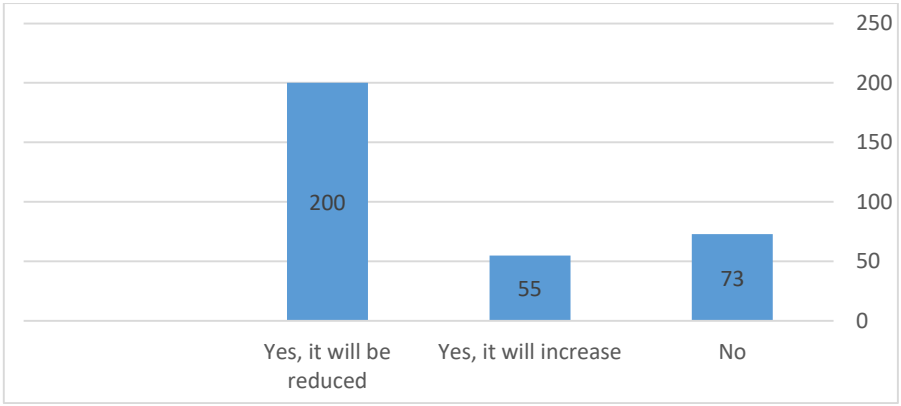
Most of participant's expectations in the next 5–10 years the use of AI-based applications will make radiologists' duties that the radiology staff will be decrease, by (208).

Figure 4.7: study sample expectations about the impact of AI based applications will help to report examinations outside in the next five to ten years.



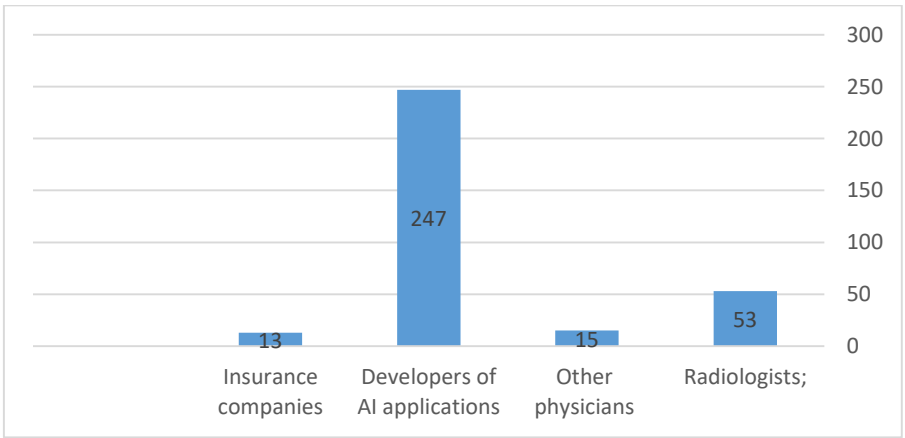
Most of participant's expectations think that, in the next 5–10 years the use of AI-based applications will help to report also examinations outside the field of sub specialization will be more yes, radiologists will be less focused on radiology by (126).

Figure 4.8: study sample expectations about the impact on professional radiologist's life in terms of total reporting workload.



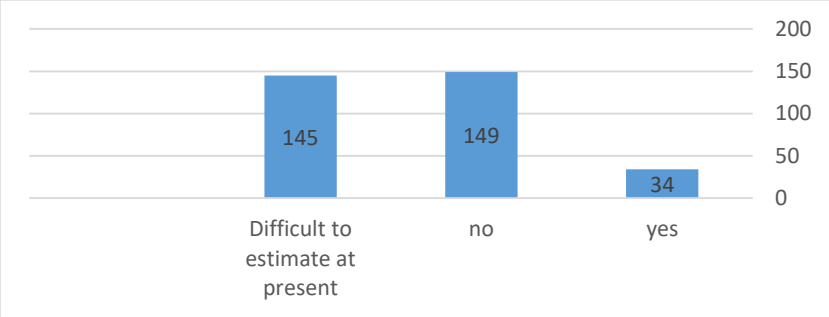
Most of participant's expectations an AI impact on professional radiologist's life in terms of total reporting workload in the next 5–10 years will be more Yes it will be reduced by (200)

Figure 4.9: study sample expectations about the impact who will take the legal responsibility of AI-system output.



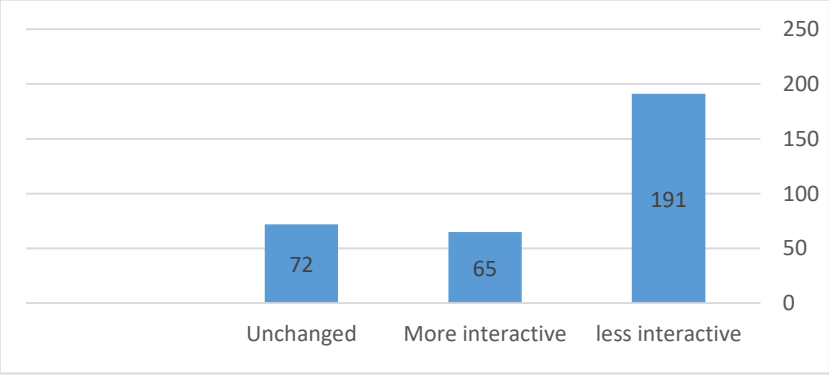
Most of participant's expectations in the next 5–10 years, who will take the legal responsibility of AI-system output will be more Developers of AI applications by (247), while participant's expectations were radiologists by(53),

Figure 4.10: study sample expectations patients mostly accept a report from AI applications of AI in the next five to ten years



The most of participant's expectations that in the next 5–10 years will patients mostly accept a report from AI applications without supervision and approval by a physician was no accept by (149).while participant's expectations difficult to estimate at present by(145).

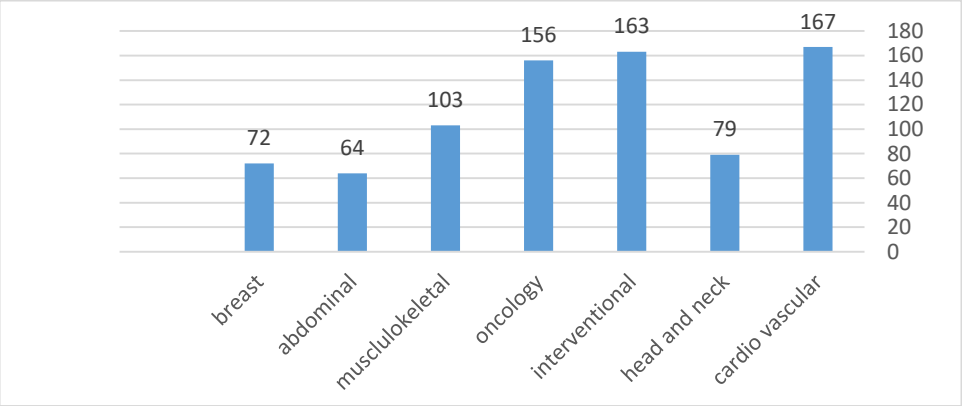
Figure 4.11: study sample expectations the relationship between the radiologist and the patient because of AI introduction



The most of participant's expectations that the relationship between the radiologist and the patient because of AI introduction will be less interactive by (191).which participant's expectations no change in this relation by (72).

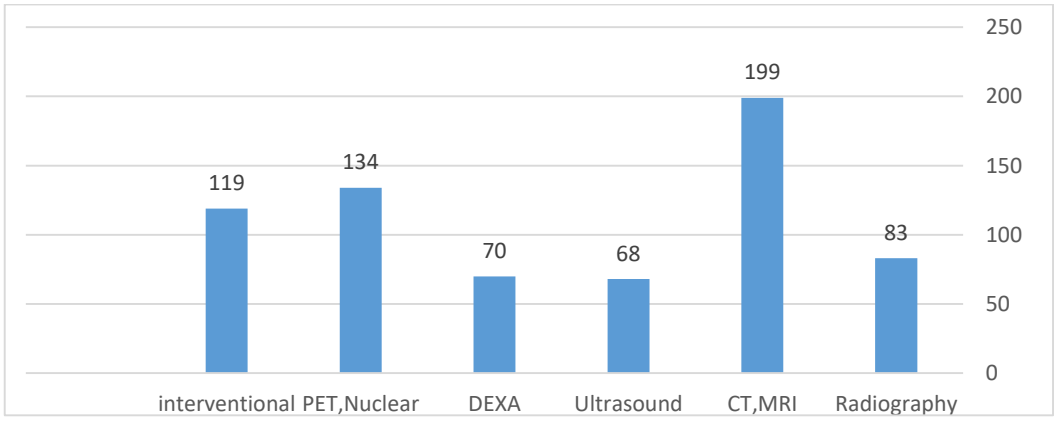
4.8- Participant's expectations about artificial intelligence

Figure 4.12 participant's expectations sample responses about their to expectation about applications in radiological subspecialties artificial intelligence



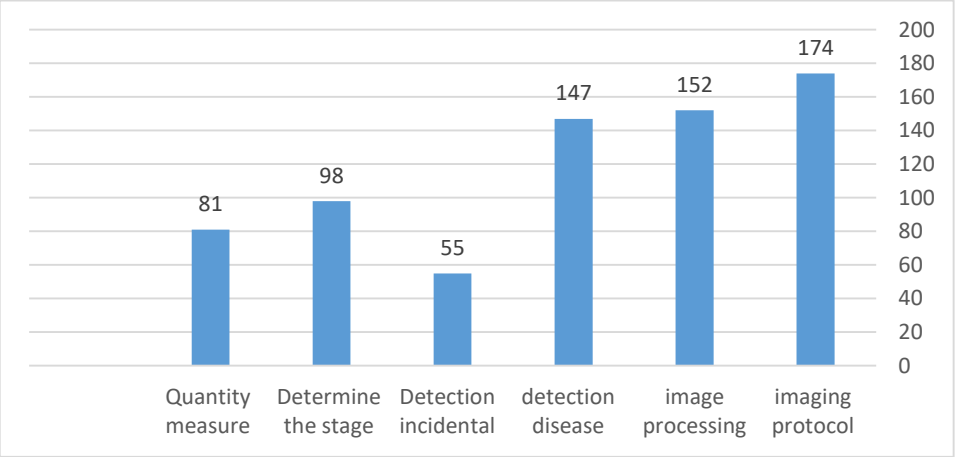
The most of participant's expectations that Cardiovascular and Interventional will be more involved with radiological subspecialties AI by (176) (163).while head and neck and abdominal will be less involved by (79) (64).

Figure 4.13: participant's expectations important fields of AI-applications in the next 5–10 years that sample about the role about artificial intelligence



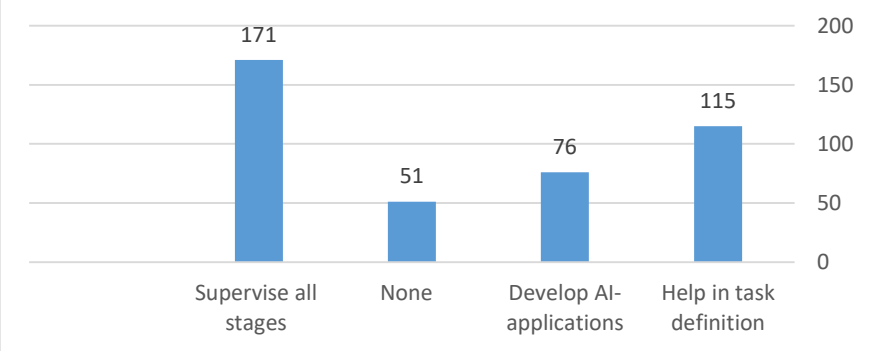
The most of participant's expectations that CT /MRI will be important fields of AI by (199), while PET/Nuclear by (134).

Figure 4.14: study sample expectation applications think are more relevant for the role about artificial intelligence



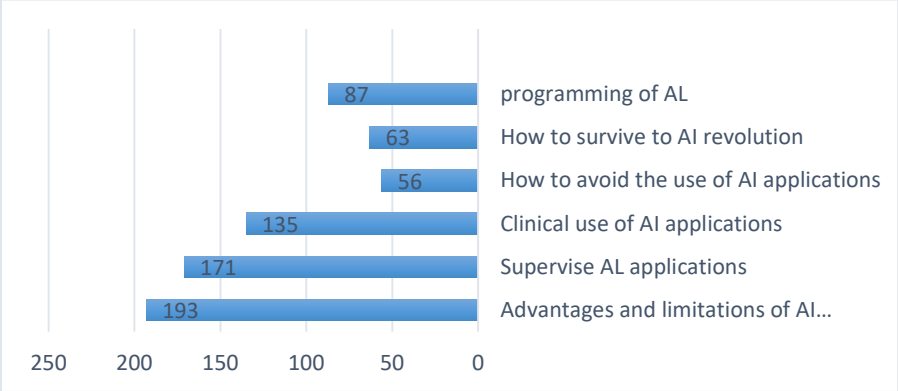
The most of participant's expectations that will be more were imaging protocol optimization by (174) that will be less were detection of incidental findings by (55**).**

Figure 4.15: study sample expectation the role of radiologists developing/validation AI applications



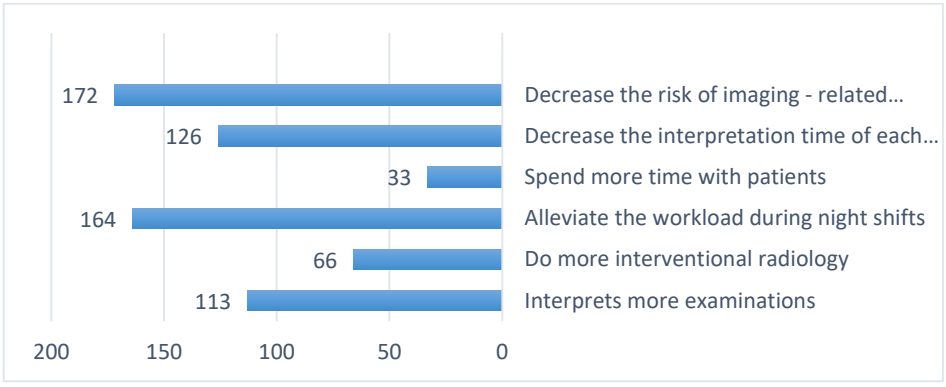
The most of participant's expectations that will be more were Supervise all stages needed to develop an AI-based application by (171).

Figure 4.16: study sample participant's expectation the things that a radiologist should learn about artificial intelligence



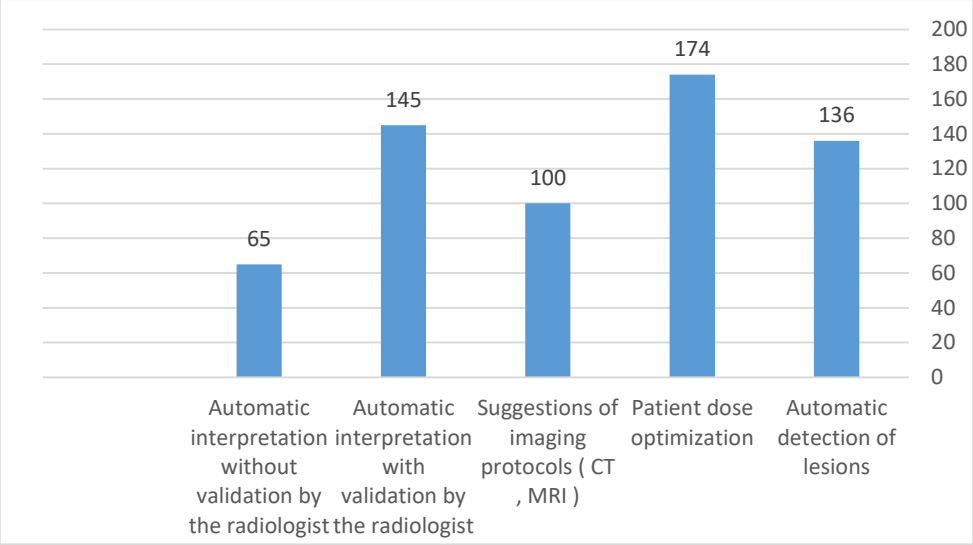
The most of participant's expectations that will be more were advantages and limitations of AI applications by (193), Supervise AI applications by (171), while were how to survive to AI revolution by (56).

Figure 4.17: study sample participant's expectation for daily practice from an AI-based solution



The most of participant's expectations that will be more were decrease the risk of imaging related medical error by (172), Alleviate the workload during night shifts by (164),

Figure 4.18: Distribution of study sample expected technical features of artificial intelligence.



The most of participant's expectations that will be more expected technical features of artificial intelligence (AI)-based tools were patient dose optimization by (174), while Automatic interpretation without validation by the radiologist (145).

Table 4.7: The knowledge about used about Artificial Intelligence

Item	Mean	Std. Deviation
Triaging images to move most critical patient to first review	2.09	0.973
Optimizing workflow for overall productivity	2.56	0.966
Automating part of image analysis	2.00	0.994
Providing clinician decision support	2.40	1.035
Enhancing imaging quality	2.81	1.042
sum knowledge	2.3689	0.75719

The most of participant's knowledge were Triaging images to move most critical patient to first review is (2.09). The most of participant's knowledge were Optimizing workflow for overall productivity (2.56).The most of participant's knowledge were Automating part of image analysis is (2.00).The most of participant's knowledge were providing clinician decision support **is** (2.40).The most of participant's knowledge were Enhancing imaging quality is (2.81).The most of participant's knowledge will be more were enhancing imaging quality is (2.81) whereas the lowest were automating part of imaging analysis is (2.00)

Table 4.7 Participants Opinions about artificial intelligence

Item	Mean	Std. Deviation
I think AI implementation will allow for opportunities to expand the general role of radiographers	2.16	0.900
I am excited about the advancement of AI role within radiography	2.52	0.750
I think the patient experience would be improved with further implementation of AI	2.48	0.770
I would be interested in possible courses on AL within the radiography sector	2.69	0.636
I think AI already plays an important role within the radiography	2.55	0.639
I am apprehensive about the introduction of AI into the radiographer field	1.74	0.849
Sum Opinions	2.3557	0.45937

The most of participant's opinions were think AI implementation will allow for opportunities to expand the general role of radiographers is (2.16), The most of participant's opinions were excited about the advancement of AI role within radiography is (2.52) The most of participant's opinions were think the patient experience would be improved with further implementation of AI is (2.48) The most of participant's opinions were would be interested in possible courses on AL within the radiography sector is (2.69). The most of participant's opinions were think AI already plays an important role within the radiography is (2.55). The most of participant's opinions were apprehensive about the introduction of AI into the radiographer field is (1.74). The most of participant's opinions will be more would be interested in possible courses on AL within the radiography sector (2.69). Whereas the lowest

Opinions Participants about artificial intelligence apprehensive about the introduction of AI into the radiographer field is (1.7)

Table 4.8: The knowledge about used about Artificial Intelligence according to their gender category

Item	Gender	N	Mean	Std. Deviation	Chi-square	Sig
Triaging images to move most critical patient to first review	Male	197	2.16	1.025	6.729	0.010
	Female	131	1.98	0.881		
Optimizing workflow for overall productivity	Male	197	2.55	1.022	6.851	0.009
	Female	131	2.56	0.878		
Automating part of image analysis	Male	197	2.09	1.041	4.275	0.039
	Female	131	1.85	0.904		
Providing clinician decision support	Male	197	2.45	1.061	2.375	0.124
	Female	131	2.32	0.994		
Enhancing imaging quality	Male	197	2.83	1.079	2.297	0.131
	Female	131	2.78	0.987		
sum knowledge	Male	197	2.4152	0.80431	6.227	0.013
	Female	131	2.2992	0.67727		

The result in the table 4.8 the most of participant's was male in triaging images to move most critical patient to first review by (2.16) The most of participant's was female in optimizing workflow for overall productivity by (2.56). The result in the table 4.8 the most of participant's was male in automating part of image analysis by (2.09) .the result in the table 4.8 the most of participant's was male in providing clinician decision support by (2.45). The result in the table 4.8 the most of participant's was male in Enhancing imaging quality by (2.83). The percentage of knowledge among men was more than that of women, there is a relationship in the knowledge of males and females in all item expect in item 4^{th} and 5^{th}.

Table 4.9 Participants Opinions about artificial intelligence

Item	Gender	N	Mean	Std. Deviation	Chi- square	Sig
I think AI implementation will allow for opportunities to expand the general role of radiographers	Male	197	2.20	0.880	2.363	0.125
	Female	131	2.08	0.929		
I am excited about the advancement of AI role within radiography	Male	197	2.57	0.730	3.185	0.0075
	Female	131	2.44	0.776		
I think the patient experience would be improved with further implementation of AI	Male	197	2.51	0.747	2.588	0.109
	Female	131	2.44	0.805		
I would be interested in possible courses on AL within the radiography sector	Male	197	2.71	0.626	0.894	0.345
	Female	131	2.66	0.652		
I think AI already plays an important role within the radiography	Male	197	2.56	0.695	0.002	0.961
	Female	131	2.55	0.693		
I am apprehensive about the introduction of AI into the radiographer field	Male	197	1.73	0.865	1.754	0.999
	Female	131	1.75	0.826		
Sum Opinions	Male	197	2.3790	0.46002	0.000	0.999
	Female	131	2.3206	0.45789		

The result in the table 4.9 the most of participant's was male in think AI implementation will allow opportunities to expand the general role of radiographers by (2.20). The most of participant's was male in excited about the advancement of AI role within radiography by (2, 57) .The most of participant's was male in think the patient experience would be improved with further implementation of AI by (2.51). The most of participant's was male in would be interested in possible courses on AL within the radiography sector by (2.71). The most of participant's was male in think AI already plays an important role within the radiography by (2.56). The most of participant's was female in apprehensive about the introduction of AI into the radiographer field by (1.75). The percentage of participants' opinions about artificial intelligence in males was higher than that of females, there is no relationship in Participants Opinions about artificial intelligence of males and females in all item expect in item 2.

Table 4.10.: The knowledge about used Artificial Intelligence according to their age category

Item	Age group	N	Mean	Std. Deviation	Chi-square	Sig
Triaging images to move most critical patient to first review	Less than 24	122	1.98	.881	3.471	.016
	25-35	132	2.29	1.052		
	36-45	60	1.92	.926		
	More than 45	14	1.79	.893		
Optimizing workflow for overall productivity	Less than 24	122	2.43	.852	2.406	.067
	25-35	132	2.72	1.058		
	36-45	60	2.53	.929		
	More than 45	14	2.29	.994		
Automating part of image analysis	Less than 24	122	1.88	.849	1.952	.121
	25-35	132	2.14	1.120		
	36-45	60	1.98	.983		
	More than 45	14	1.71	.825		
Providing clinician decision support	Less than 24	122	2.30	.987	0.579	.629
	25-35	132	2.47	1.087		
	36-45	60	2.43	1.031		
	More than 45	14	2.36	1.008		
Enhancing imaging quality	Less than 24	122	2.69	.945	1.287	.279
	25-35	132	2.94	1.117		
	36-45	60	2.78	1.010		
	More than 45	14	2.71	1.204		
Sum knowledge	Less than 24	122	2.2557	.64604	2.902	.035
	25-35	132	2.5121	.85293		
	36-45	60	2.3300	.71575		
	More than 45	14	2.1714	.70974		

The result described in Table 4.10 show the most of participant's was 25-35 in Triaging images to move most critical patient to first review by (2.29) .The most of participant's was 25-35 Optimizing workflow for overall productivity by (2.72). The most of participant's was 25-35 automating part of image analysis by (2.14) .The most of participant's was 25-35 providing clinician decision support by (2.47). The most of participant's was 25-35 enhancing imaging quality by (2.94). The percentage of knowledge among 25-35 was more than that anther age group, there is no relationship in the knowledge of age group in all item expect in item fist.

Table (4.11). The level Opinions Participants and used about Artificial Intelligence according to their age group.

Item	Age group	N	Mean	Std. Deviation	Chi-square	Sig
I think AI implementation will allow for opportunities to expand the general role of radiographers	Less than 24	122	2.20	.924	.296	.829
	25-35	132	2.13	.894		
	36-45	60	2.10	.858		
	More than 45	14	2.29	.994		
I am excited about the advancement of AI role within radiography	Less than 24	122	2.57	.715	1.723	.162
	25-35	132	2.41	.819		
	36-45	60	2.60	.669		
	More than 45	14	2.71	.611		

I think the patient experience would be improved with further implementation of AI	Less than 24	122	2.61	.699	3.343	.019
	25-35	132	2.32	.832		
	36-45	60	2.55	.723		
	More than 45	14	2.57	.756		
I would be interested in possible courses on AL within the radiography sector	Less than 24	122	2.74	.572	.883	.450
	25-35	132	2.62	.694		
	36-45	60	2.72	.640		
	More than 45	14	2.79	.579		
	Total	328	2.69	.636		
I think AI already plays an important role within the radiography	Less than 24	122	2.67	.595	2.969	.032
	25-35	132	2.42	.783		
	36-45	60	2.62	.613		
	More than 45	14	2.50	.760		
	Total	328	2.55	.693		
I am apprehensive about the introduction of AI into the radiographer field	Less than 24	122	1.85	.850	2.408	.067
	25-35	132	1.73	.857		
	36-45	60	1.63	.823		
	More than 45	14	1.29	.726		
Sum opinions	Less than 24	122	2.4399	.38275	2.914	.035
	25-35	132	2.2715	.50754		
	36-45	60	2.3694	.44899		
	More than 45	14	2.3571	.54246		

The result described in table 4.11 show the most of participant's was less than 45 in think AI implementation will allow for opportunities to expand the general role of radiographers by(2.29) .The most of participant's was less than 45 in excited about the advancement of AI role within radiography by (2.71). The most of participant's was less than 24 in I think the patient experience would be improved with further by (2.61) implementation of AI. . The most of participant's was less than 45 in would be interested in possible courses on AL within the radiography sector by (2.79). The most of participant's was less than 24 in think AI already plays an important role within the radiography by (2.67). The most of participant's was less than

24 in apprehensive about the introduction of AI into the radiographer field by (1.85). The percentage of participants' opinions about artificial intelligence in less 24 was higher than age group. There is no relationship in Participants Opinions about artificial intelligence of age groups in all item expect in item (3, 5).

Table 4.12.: The knowledge about used Artificial Intelligence according to their Years of experience

Item	Years of experience	N	Mean	Std. Deviation	Chi-square	Sig
Triaging images to move most critical patient to first review Enhancing imaging quality	Less than 5 years	189	1.99	0.863	5.076	.002
	5-10 years	69	2.48	1.119		
	11-15 years	35	2.03	1.098		
	More then 15	35	1.89	0.932		
Optimizing workflow for overall productivity	Less than 5 years	189	2.47	0.925	5.076	.002
	5-10 years	69	2.88	1.037		
	11-15 years	35	2.49	0.853		
	More then 15	35	2.49	1.040		
Automating part of image analysis	Less than 5 years	189	1.90	0.912	2.426	.066
	5-10 years	69	2.20	1.170		
	11-15 years	35	2.23	1.060		
	More then 15	35	1.86	0.912		
Providing clinician decision support	Less than 5 years	189	2.32	1.034	1.256	.290
	5-10 years	69	2.59	1.062		
	11-15 years	35	2.37	1.031		
	More then 15	35	2.46	0.980		
Enhancing imaging quality	Less than 5 years	189	2.77	1.005	.525	.665
	5-10 years	69	2.94	1.110		
	11-15 years	35	2.83	1.071		
	More then 15	35	2.74	1.094		
sum knowledge	Less than 5 years	189	2.2889	0.69323	3.464	.017
	5-10 years	69	2.6203	0.88261		
	11-15 years	35	2.3886	0.77603		
	More then 15	35	2.2857	0.72483		

The result described in Table 4.12 show the most of participant's was 5-10 in Triaging images to move most critical patient to first review by (2.48) .The most of participant's was 5-10 Optimizing workflow for overall productivity by (2.88). The most of participant's was 11-15 automating part of image analysis by (2.23) .The most of participant's was 5-10 providing clinician decision support by (2.59). The most of participant's was 5-10 enhancing imaging quality by (2.94). The percentage of knowledge among 5-10 was more than that anther category experience; there is no relationship in the knowledge of category experience except item. (1), (2).

Table 4.13: The level Opinions Participants and used about Artificial Intelligence according to their Years of experience.

Item	Years of experience	N	Mean	Std. Deviation	Chi-square	Sig
I think AI implementation will allow for opportunities to expand the general role of radiographers	Less than 5 years	189	2.08	.924	.930	.426
	5-10 years	69	2.26	.869		
	11-15 years	35	2.23	.843		
	More then 15	35	2.26	.886		
I am excited about the advancement of AI role within radiography	Less than 5 years	189	2.47	.796	1.366	.253
	5-10 years	69	2.51	.720		
	11-15 years	35	2.57	.698		
	More then 15	35	2.74	.561		
I think the patient experience would be improved with further implementation of AI	Less than 5 years	189	2.46	.795	.702	.551
	5-10 years	69	2.46	.739		
	11-15 years	35	2.46	.780		
	More then 15	35	2.66	.684		
I would be interested in possible courses on AL within the radiography sector	Less than 5 years	189	2.70	.627	.971	.406
	5-10 years	69	2.61	.691		
	11-15 years	35	2.66	.684		
	More then 15	35	2.83	.514		
I think AI already plays an important role within the radiography	Less than 5 years	189	2.56	.709	.664	.575
	5-10 years	69	2.46	.698		
	11-15 years	35	2.63	.646		
	More then 15	35	2.63	.646		

I am apprehensive about the introduction of AI into the radiographer field	Less than 5 years	189	1.79	.862	.532	.660
	5-10 years	69	1.67	.816		
	11-15 years	35	1.69	.867		
	More then 15	35	1.66	.838		
Sum Opinions	Less than 5 years	189	2.3430	.44202	.764	.515
	5-10 years	69	2.3285	.50242		
	11-15 years	35	2.3714	.49190		
	More then 15	35	2.4619	.43365		

The result described in table 4.13 show the most of participant's was less than 15 in think AI implementation will allow for opportunities to expand the general role of radiographers by(2.26) .The most of participant's was less than 15 in excited about the advancement of AI role within radiography by (2.74). The most of participant's was less than 15 in I think the patient experience would be improved with further by (2.66) implementation of AI. The most of participant's was less than 15 in would be interested in possible courses on AL within the radiography sector by (2.83). The most of participant's was less than 15 and 11-15 years in think, AI already plays an important role within the radiography by (2.63). The most of participant's was less than 5 in apprehensive about the introduction of AI into the radiographer field by (1.79). The percentage of participants' opinions about artificial intelligence in less 15 was higher than experience group. There is no relationship in the knowledge of category experience**.**

Table 4.14: The knowledge about used Artificial Intelligence according to their jobs.

Item	Jobs	N	Mean	Std. Deviation	Chi- square	Sig
Triaging images to move most critical patient to first review	Radiologist	56	1.98	.963	0.934	.425
	Technologist	91	2.18	1.007		
	Technician	89	2.16	1.076		
	Student /intern	92	1.99	.832		
Optimizing workflow for overall productivity	Radiologist	56	2.16	.869	4.526	.004
	Technologist	91	2.70	.972		
	Technician	89	2.69	1.083		
	Student /intern	92	2.53	.831		
Automating part of image analysis	Radiologist	56	1.82	.765	1.689	.169
	Technologist	91	1.98	1.011		
	Technician	89	2.18	1.114		
	Student /intern	92	1.95	.965		
Providing clinician decision support	Radiologist	56	2.27	1.183	.605	.612
	Technologist	91	2.42	.908		
	Technician	89	2.49	1.088		
	Student /intern	92	2.36	1.012		
Enhancing imaging quality	Radiologist	56	2.46	1.008	2.570	.054
	Technologist	91	2.84	1.067		
	Technician	89	2.91	1.125		
	Student /intern	92	2.89	.919		
sum knowledge	Radiologist	56	2.1393	.77123	2.642	.049
	Technologist	91	2.4220	.73118		
	Technician	89	2.4854	.85753		
	Student /intern	92	2.3435	.64165		

The result described in Table 4.14 show the most of participant's was Student /intern in Triaging images to move most critical patient to first review by (1.99). The most of participant's was Technologist Optimizing workflow for overall productivity by (2.70). The most of participant's was Technician automating part of image analysis by (2.18) .The most of participant's was Technician providing clinician decision support by (2.49). The most of participant's was Technician enhancing imaging quality by (2.91). The percentage of knowledge among Technician was more than that anther category job, there is relationship in the knowledge of category job in all item expect in item first, third, 4th.

Table 4.15: The level Opinions Participants and used about Artificial Intelligence according to their job.

Item	Jobs	N	Mean	Std. Deviation	Chi-square	sig
I think AI implementation will allow for opportunities to expand the general role of radiographers	Radiologist	56	1.88	.955	3.117	.026
	Technologist	91	2.18	.902		
	Technician	89	2.34	.797		
	Student /intern	92	2.13	.928		
I am excited about the advancement of AI role within radiography	Radiologist	56	2.16	.910	6.228	.000
	Technologist	91	2.68	.612		
	Technician	89	2.51	.725		
	Student /intern	92	2.59	.729		
I think the patient experience would be improved with further implementation of AI	Radiologist	56	2.11	.928	6.966	.000
	Technologist	91	2.67	.633		
	Technician	89	2.44	.738		
	Student /intern	92	2.55	.747		
I would be interested in possible courses on AL within the radiography sector	Radiologist	56	2.61	.705	.726	.537
	Technologist	91	2.67	.668		
	Technician	89	2.69	.614		
	Student /intern	92	2.76	.581		

I think AI already plays an important role within the radiography	Radiologist	56	2.16	.910	9.869	.000
	Technologist	91	2.70	.587		
	Technician	89	2.49	.693		
	Student /intern	92	2.71	.525		
I am apprehensive about the introduction of AI into the radiographer field	Radiologist	56	1.89	.908	1.632	.182
	Technologist	91	1.62	.827		
	Technician	89	1.69	.834		
	Student /intern	92	1.82	.838		
Sum Opinions	Radiologist	56	2.1339	.60170	5.901	.001
	Technologist	91	2.4194	.40167		
	Technician	89	2.3577	.44349		
	Student /intern	92	2.4257	.38782		

The result described in table 4.15 show the most of participant's was Technician in think AI implementation will allow for opportunities to expand the general role of radiographers by(2.34) .The most of participant's was Technologist in excited about the advancement of AI role within radiography by (2.68). The most of participant's was Technologist in I think the patient experience would be improved with further by (2.67) implementation of AI. . The most of participant's was Student /intern in would be interested in possible courses on AL within the radiography sector by (2.76). The most of participant's was Technologist in think AI already plays an important role within the radiography by (2.70). The most of participant's was Radiologist in apprehensive about the introduction of AI into the radiographer field by (1.89). The percentage of participants' opinions about artificial intelligence in Technologist was higher than job group. There is relationship in Participants Opinions about artificial intelligence of job groups in all item expect in item (4, 6).

Participant's expectations about the impact of AI applications in the field of radiology in the next five to ten years.

Table 4.16: study sample expectations about the impact of AI in the next five to ten years to according their gender group.

Gender	No expect	Yes, job positions will increase	Yes, job positions will be reduced	Total	Sig	Chi-square
Male	24	105	68	197	0.157	3.699
Female	1o	83	38	131		
Total	34	188	106	328		

Most of participant's expectations about the impact on professional radiologist's life in terms of amount of job positions in the next 5–10 years that were yes, job positions will be increase by (188) in male. there are no statistically significant

Table 4.17: study sample expectations about the impact of AI in the next five to ten years to their gender group

Gender	Increase	Decrease	Unchanged	Total	Sig	Chi-square
Male	32	116	49	197	0.057	5.725
Female	20	92	19	131		
Total	52	208	68	328		

Most of participant's expectations in the next 5–10 years the use of AI-based applications will make radiologists' duties that the radiology staff will be decrease, by (208) in male. There are statistically significant between males and females.

Table 4.18: f study sample expectations about the impact of AI in the next five to ten years according to their gender group

Gender	No, radiologists will be more focused on radiology subspecialties	Yes, radiologists will be less focused on radiology subspecialties	The rate of dedication to subspecialties will remain unchanged	Total	Sig	Chi-square
Male	74	74	49	197	0.477	1.481
Female	41	52	38	131		
Total	115	126	87	328		

Most of participant's expectations think that, in the next 5–10 years the use of AI-based applications will help to report also examinations outside the field of sub specialization will be more yes, radiologists will be less focused on radiology by (74) in male. There are no statistically significant

Table 4.19: study sample expectations about the impact of AI in the next five to ten years according to their gender group

Gender	No	Yes, it will increase	Yes, it will be reduced	Total	Sig	Chi-square
Male	55	31	111	197	0.010	9.155
Female	18	24	89	131		
Total	73	55	200	328		

Most of participant's expectations an AI impact on professional radiologist's life in terms of total reporting workload in the next 5–10 years will be more Yes it will be reduced by (100) in male . There are statistically significant between males and females.

Table 4.20: study sample expectations about the impact of AI in the next five to ten years according to their gender group

Gender	Radiologists	Other physicians	Developers of AI applications	Insurance companies	Total	Sig	Chi-square
Male	29	9	153	6	197	0.563	2.044
Female	24	6	94	7	131		
Total	53	15	247	13	328		

Most of participant's expectations in the next 5–10 years, who will take the legal responsibility of AI-system output, will be more Developers of AI applications by (153) in male, there are no statistically significant.

Table 4.21: study sample expectations about the impact of AI in the next five to ten years according to their gender group

Gender	Yes	No	Difficult to estimate at present	Total	Sig	Chi-square
Male	28	100	69	197	.000	19.540
Female	6	49	76	131		
Total	34	149	145	328		

The most of participant's expectations that in the next 5–10 years will patients mostly accept a report from AI applications without supervision and approval by a physician was no accept by (69) in male. There are statistically significant between males and females.

Table 4.22: study sample expectations about the impact of AI in the next five to ten years according to their gender group

Gender	Low interactive	More interactive	Unchanged	Total	Sig	Chi-square
Male	110	45	42	197	0.240	2.854
Female	81	20	30	131		
Total	191	65	72	328		

The most of participant's expectations that the relationship between the radiologist and the patient because of AI introduction will be less interactive by (110). There are no statistically significant

Participant's expectations about artificial intelligence

Table 4.23: the study sample expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the gender category

Item	Gender	No	Yes	Total	Sig	Chi-square
Cardiac and chest imaging	Male	107	90	197	0.020	5.397
	Female	54	77	131		
Head and neck imaging	Male	148	49	197	0.682	0.167
	Female	101	30	131		
Interventional and Angiography	Male	94	103	197	0.250	1.323
	Female	71	60	131		
Oncologic	Male	111	86	197	0.082	3.018
	Female	61	70	131		

Musculoskeletal imaging	Male	135	62	197	0.973	0.001
	Female	90	41	131		
Abdominal imaging	Male	158	39	197	0.873	0.025
	Female	106	25	131		
Breast	Male	154	43	197	0947	0.004
	Female	102	29	131		

The result described in table 4.23 show the most of participant's which radiological subspecialties do you foresee will be more influenced by Al in the next 5-10 years will be males more than females there are no statistically significant except item (1).

Table 4.24: study sample expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the gender category

Item	Gender	No	Yes	Total	Sig	Chi square
Conventional x-ray	Male	148	49	197	0.825	0.049
	Female	97	34	131		
MRI &CT	Male	77	120	197	0.912	0.012
	Female	52	79	131		
Ultrasound	Male	155	42	197	0.747	0.104
	Female	105	26	131		
DXA	Male	157	40	197	0.574	0.316
	Female	101	30	131		
Nuclear medicine	Male	116	81	197	0.905	0.014
	Female	78	53	131		
Interventional and angiography	Male	130	67	197	0.294	1.100
	Female	79	52	131		

The result described in Table 4.24 show the most of participant's Role of radiologists in developing/validating AI applications to medical imaging were males more than females there are no statistically significant.

Table 4.25: study sample expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the gender category

Item	Gender	No	Yes	Total	Sig	Chi-square
Imaging protocol optimization	Male	99	98	197	0.142	2.160
	Female	55	76	131		
Image post-processing	Male	109	88	197	0.457	0.554
	Female	67	64	131		
Detection of early diseases	Male	118	79	197	0.035	4.435
	Female	63	68	131		
Detection of incidental findings	Male	163	34	197	0.771	0.085
	Female	110	21	131		
Determine the stage of the disease	Male	146	51	197	0.053	3.748
	Female	84	47	131		
Quantitative imaging and measurement of vital signs	Male	147	50	197	0.724	0.125
	Female	100	31	131		

The result described in Table 4.25 show the most of participant's Following AI applications think are more relevant as aids to radiological profession were males more than females. There are no statistically significant except item (3), (5).

Table 4.26: the study sample according to expectations for the role of artificial intelligence in x-rays in the next five to ten years according to the gender category

Item	Gender	No	Yes	Total	Sig	Chi-square
Help in task definition	Male	126	71	197		
	Female	87	44	131	0.648	0.208
Develop AI-based application	Male	153	44	197		
	Female	99	32	131	0.660	0.194
Non	Male	166	31	197		0.013
	Female	111	20	131	0.909	
Supervise all stages needed to develop an AI-based application in the field of radiology	Male	96	101	197		0.148
	Female	61	70	131	0.701	

The result described in Table 4.26 show the most of participant's Role of radiologists in developing/validation AI applications to medical imaging were males more than females. There are no statistically significant.

Table 4.27: The study sample expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the gender category

Item	Gender	No	Yes	Total	Sig	Chi-square
Advantages and limitations of AI applications	Male	86	111	197		
	Female	49	82	131	0.260	1.269
Supervision of artificial intelligence application	Male	121	76	197		
	Female	72	59	131	0.244	1.356

Clinical use of AI application	Male	115	82	197		
	Female	64	67	131	0.090	2.877
How to avoid the use of AI application	Male	164	33	197		
	Female	108	23	131	0.849	0.036
How to survive the artificial intelligence revolution	Male	162	35	197		
	Female	103	28	131	0.417	0.660
Programming radiological and medical imaging machines	Male	150	47	197	0.180	
	Female	91	40	131		1.800

The result described in Table 4.27 show the most of participant's Things that a radiologist should learn in the field of artificial intelligence in radiology were males more than females. There are no statistically significant.

Table 4.28: The study sample expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the gender category

Item	Gender	No	Yes	Total	Sig	Chi-square
Interpretation of many radiological examination	Male	136	61	197		
	Female	79	52	131	0.103	2.655
Do more interventional radiology	Male	155	42	197		
	Female	107	24	131	0.507	0.440
Alleviate the workload during night shifts	Male	98	99	197		
	Female	66	65	131	0.910	0.013
Spend more time with patients	Male	176	21	197		
	Female	119	12	131	0.658	0.196
	Male	129	68	197		

Reducing the time for interpreting examinations and diagnosing diseases	Female	73	58	131	0.075	3.166
	Total	202	126	328		
Decrease the risk of imaging related medical error	Male	98	99	197	0.331	
	Female	58	73	131		0.944

The result described in Table 4.28 show the most of participant's Expectations for daily practice from an AI-based solution. Were males more than females. There are no statistically significant

Table 4.29: the study sample expectations about the role of artificial intelligence in X-rays in the next five to ten years according to the gender category

Item	Gender	No	Yes	Total	Sig	Chi-square
Automatic detection of lesions	Male	118	79	197		
	Female	74	57	131	0.539	0.377
Patient dose optimization	Male	94	103	197		
	Female	60	71	131	0.734	0.116
Suggestion of imaging protocol	Male	138	59	197		
	Female	90	41	131	0.795	0.068
Automatic interpretation with validation by radiologist	Male	112	85	197		
	Female	71	60	131	0.635	0.225
Automatic interpretation without validation by radiologist	Male	160	37	197		
	Female	103	28	131	0.564	0.333

The result described in Table 4.29 show the most of participant's Expected technical features of artificial intelligence (AI)-based tools were males more than females. There are no statistically significant

Participant's expectations about the impact of AI applications in the field of radiology in the next five to ten years.

Table 4.30: Study sample expectations about the impact of AI in the next five to ten years according to their Years of experience.

Years of experience	No expect	Yes, job positions will increase	Yes, job positions will be reduced	Total	Sig	Chi-square
Less than five years	49	18	122	189	0.057	12.227
5-10 Y	30	10	29	69		
11-15 Y	13	3	19	35		
More than 15 Y	14	3	18	35		
Total	106	43	188	328		

Most of participant's expectations about the impact on professional radiologist's life in terms of amount of job positions in the next 5–10 years that were yes, job positions will be reduced by (188) in less than five years .there are statistically significant

Table 4.31: Study sample to expectations about the impact of AI in the next five to ten years according to their Years of experience.

Years of experience	Increase	Decrease	Unchanged	Total	Sig	Chi-square
Less than five years	23	136	30	189	0.014	16.045
5-10 Y	12	39	18	69		
11-15 Y	8	16	11	35		
More than 15 Y	9	17	9	35		
Total	52	208	68	328		

Most of participant's expectations in the next 5–10 years the use of AI-based applications will make radiologists' duties that the radiology staff will be decrease, by (208) in less than five years. There are statistically significant between Years of experience

Table 4.32: Study sample expectations about the impact of AI in the next five to ten years according to their Years of experience.

Years of experience	No, radiologists will be more focused on radiology subspecialties	Yes, radiologists will be less focused on radiology subspecialties	The rate of dedication to subspecialties will remain unchanged	Total	Sig	Chi-square
Less than 5 years	62	84	43	189	0.237	8.016
5-10 Y	26	22	21	69		
11-15 Y	15	9	11	35		
More than 15 Y	12	11	12	35		
Total	115	126	87	328		

Most of participant's expectations think that, in the next 5–10 years the use of AI-based applications will help to report also examinations outside the field of sub specialization

will be more yes, radiologists will be less focused on radiology by (84) in Less than 5 years. There are no statistically significant

Table 4.33: Study sample expectations about the impact of AI in the next five to ten years to their Years of experience.

Years of experience	No	Yes, it will increase	Yes, it will be reduced	Total	Sig	Chi-square
Less than five years	37	27	125	189	0.158	9.292
5-10 Y	17	18	34	69		
11-15 Y	8	5	22	35		
More than 15 Y	11	5	9	35		
Total	73	55	200	328		

Most of participant's expectations an AI impact on professional radiologist's life in terms of total reporting workload in the next 5–10 years will be more Yes it will be reduced by (125) in less than five years . There are no statistically significant.

Table 4.34: Study sample expectations about the impact of AI in the next five to ten years to their Years of experience.

Years of experience	Radiologists	Other physicians	Developers of AI applications	Insurance companies	Total	Sig	Chi-square
Less than five years	32	9	137	11	189	0.260	11.240
5-10 Y	7	1	60	1	69		
11-15 Y	8	2	25	0	35		
More than 15 Y	6	3	25	1	35		
Total	53	15	247	13	328		

Most of participant's expectations in the next 5–10 years, who will take the legal responsibility of AI-system output, will be more Developers of AI applications by (137) in Less than five years, there are no statistically significant

Table 4.35: Study sample expectations about the impact of AI in the next five to ten years to their Years of experience.

Years of experience	Yeas	No	Difficult to estimate at present	Total	Sig	Chi-square
Less than five years	17	82	90	189	0.437	5.880
5-10 Y	10	28	31	69		
11-15 Y	3	20	12	35		
More than 15 Y	4	19	12	35		
Total	34	149	145	328		

The most of participant's expectations that in the next 5–10 years will patients mostly accept a report from AI applications without supervision and approval by a physician was no accept by (90) in Less than five years .There are no statistically significant.

Table 4.36: Study sample expectations about the impact of AI in the next five to ten years to their Years of experience.

Years of experience	Low interactive	More interactive	Unchanged	Total	Sig	Chi-square
Less than five years	118	31	40	189	0.128	9.918
5-10 Y	33	19	17	69		
11-15 Y	17	11	7	35		
More than 15 Y	23	4	8	35		
Total	191	65	72	328		

The most of participant's expectations that the relationship between the radiologist and the patient because of AI introduction will be less interactive by (118) in Less than five years. There are no statistically significant

Participant's expectations about artificial intelligence

Table 4.37: The study sample expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the Years of experience.

Item	Years of experience	NO	Yes	Total	Sig	Chi-square
Cardiac and chest imaging	Less than five years	88	101	189	0.060	7.408
	5-10 Y	41	28	69		
	11-15 Y	20	15	35		
	More than 15 Y	12	23	35		
Head and neck Imaging	Less than five years	137	52	189	0.392	3.000
	5-10 Y	55	14	69		
	11-15 Y	28	7	35		
	More than 15 Y	29	6	35		
Interventional and Angiography	Less than five years	97	92	189	0.776	1.106
	5-10 Y	34	35	69		
	11-15 Y	15	20	35		
	More than 15 Y	19	16	35		
Oncologic	Less than five years	86	103	189	0.009	11.607
	5-10 Y	39	30	69		
	11-15 Y	26	9	35		
	More than 15 Y	21	14	35		

Musculoskeletal imaging	Less than five years	123	66	189	0.162	5.138
	5-10 Y	54	15	69		
	11-15 Y	26	9	35		
	More than 15 Y	22	13	35		
Abdominal imaging	Less than five years	145	44	189	0.166	5.077
	5-10 Y	61	8	69		
	11-15 Y	30	5	35		
	More than 15 Y	28	7	35		
Breast	Less than five years	149	40	189	0.258	4.031
	5-10 Y	57	12	69		
	11-15 Y	27	8	35		
	More than 15 Y	23	12	35		

The result described in Table 4.37 show the most of participant's which radiological subspecialties do you foresee will be more influenced by Al in the next 5-10 years will be Less than five years more than category there are no statistically significant except item (4).

Table 4.38: The study sample expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the Years of experience.

Item	Years of experience	NO	YES	Total	Sig	Chi- square
Conventional x-ray	Less than five years	138	51	189	0.128	5.684
	5-10 Y	57	12	69		
	11-15 Y	28	7	35		
	More than 15 Y	22	13	35		
	Less than five years	76	113	189		

MRI &CT	5-10 Y	28	41	69		
	11-15 Y	12	23	35	0.908	0.550
	More than 15 Y	13	22	35		
Ultrasound	Less than five years	144	45	189		
	5-10 Y	63	6	69	0.037	8.492
	11-15 Y	28	7	35		
	More than 15 Y	25	10	35		
DXA	Less than five years	146	43	189		
	5-10 Y	59	10	69		
	11-15 Y	27	8	35	0.458	2.598
	More than 15 Y	26	9	35		
Nuclear medicine	Less than five years	109	80	189		
	5-10 Y	47	22	69		
	11-15 Y	16	19	35	0.152	5.280
	More than 15 Y	22	13	35		
Interventional and angiography	Less than five years	116	73	189		
	5-10 Y	47	22	69		
	11-15 Y	26	9	35	0.338	3.371
	More than 15 Y	20	15	35		

The result described in Table 4.38 show the most of participant's Role of radiologists in developing/validating AI applications to medical imaging were Less than five years more than category there are no statistically significant except item (3) .

Table 4.39: The study sample expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the Years of experience.

Item	Years of experience	No	Yes	Total	Sig	Chi-square
Imaging protocol optimization	Less than five years	84	105	189	0.173	4.977
	5-10 Y	36	33	69		
	11-15 Y	21	14	35		
	More than 15 Y	13	22	35		
Image post-processing	Less than five years	90	99	189	0.053	7.676
	5-10 Y	45	24	69		
	11-15 Y	22	13	35		
	More than 15 Y	19	16	35		
Detection of early diseases	Less than five years	97	92	189	0.167	5.072
	5-10 Y	46	23	69		
	11-15 Y	18	17	35		
	More than 15 Y	20	15	35		
Detection of incidental findings	Less than five years	159	30	189	0.750	1.212
	5-10 Y	57	12	69		
	11-15 Y	27	8	35		
	More than 15 Y	30	5	35		
Determine the stage of the disease	Less than five years	123	66	189	0.058	7.486
	5-10 Y	57	12	69		
	11-15 Y	25	10	35		
	More than 15 Y	25	10	35		

Quantitative imaging and measurement of vital signs	Less than five years	139	50	189	0.773	1.118
	5-10 Y	55	14	69		
	11-15 Y	26	9	35		
	More than 15 Y	27	8	35		

The result described in Table 4.39 show the most of participant's Following AI applications think are more relevant as aids to radiological profession were Less than five years more than category. There are no statistically significant except item (2), (5).

Table 4.40: The study sample according to expectations for the role of artificial intelligence in x-rays in the next five to ten years according to the Years of experience.

Item	Years of experience	No	Yes	Total	Sig	Chi-square
Help in task definition	Less than five years	120	69	189	0.153	5.278
	5-10 Y	52	17	69		
	11-15 Y	19	16	35		
	More than 15 Y	22	13	35		
Develop AI-based application	Less than five years	146	43	189	0.529	2.213
	5-10 Y	56	13	69		
	11-15 Y	24	11	35		
	More than 15 Y	26	9	35		
Non	Less than five years	162	27	189	0.841	0.834
	5-10 Y	58	11	69		
	11-15 Y	29	6	35		

Supervise all stages needed to develop an AI-based application in the field of radiology	Less than five years	84	105	189	0.069	7.094
	5-10 Y	30	39	69		
	11-15 Y	23	12	35		
	More than 15 Y	20	15	35		

The result described in Table 4.40 show the most of participant's Role of radiologists in developing/validation AI applications to medical imaging were Less than five years more than category. There are no statistically significant.

Table 4.41: The study sample according to expectations for the role of artificial intelligence in x-rays in the next five to ten years according to the Years of experience.

Item	Years of experience	NO	YES	Total	Sig	Chi-square
Advantages and limitations of AI applications	Less than five years	70	119	189	0.260	4.116
	5-10 Y	34	35	69		
	11-15 Y	17	18	35		
	More than 15 Y	14	21	35		
Supervision of artificial intelligence application	Less than five years	107	82	189	0.556	2.079
	5-10 Y	45	24	69		
	11-15 Y	22	13	35		
	More than 15 Y	19	16	35		
Clinical use of AI application	Less than five years	97	92	189	0.258	4.033
	5-10 Y	40	29	69		
	11-15 Y	24	11	35		
	More than 15 Y	18	17	35		

How to avoid the use of AI application	Less than five years	157	32	189	0.781	1.084
	5-10 Y	58	11	69		
	11-15 Y	30	5	35		
	More than 15 Y	27	8	35		
How to survive the artificial intelligence revolution	Less than five years	150	39	189	0.842	0.833
	5-10 Y	58	11	69		
	11-15 Y	29	6	35		
	More than 15 Y	28	7	35		
Programming radiological and medical imaging machines	Less than five years	131	58	189	0.121	5.822
	5-10 Y	55	14	69		
	11-15 Y	30	5	35		
	More than 15 Y	25	10	35		
	Total	241	87	328		

The result described in Table 4.41 show the most of participant's Things that a radiologist should learn in the field of artificial intelligence in radiology were Less than five years more than category . There are no statistically significant.

Table 4.42: The study sample according to expectations for the role of artificial intelligence in x-rays in the next five to ten years according to the Years of experience.

Item	Years of experience	No	Yes	Total	Sig	Chi-square
Interpretation of many radiological examination	Less than five years	115	74	189	0.035	8.597
	5-10 Y	55	14	69		
	11-15 Y	24	11	35		
	More than 15 Y	21	14	35		

Do more interventional radiology	Less than five years	151	38	189		
	5-10 Y	57	12	69		
	11-15 Y	30	5	35	0.279	3.846
	More than 15 Y	24	11	35		
Alleviate the workload during night shifts	Less than five years	86	103	189		
	5-10 Y	14	28	69		
	11-15 Y	20	15	35	0.193	4.721
	More than 15 Y	17	18	35		
Spend more time with patients	Less than five years	170	19	189		
	5-10 Y	62	7	69		
	11-15 Y	31	4	35	0.984	0.159
	More than 15 Y	32	3	35		
Reducing the time for interpreting examinations and diagnosing diseases	Less than five years	116	73	189		
	5-10 Y	48	21	69		
	11-15 Y	20	15	35	0.298	3.679
	More than 15 Y	18	17	35		
Decrease the risk of imaging related medical error	Less than five years	77	112	189		
	5-10 Y	40	29	69		
	11-15 Y	19	16	35	0.038	8.446
	More than 15 Y	20	15	35		

The result described in Table 4.42 show the most of participant's Expectations for daily practice from an AI-based solution. Were Less than five years more than category. There are no statistically significant except item (1), (6).

Table 4.43: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the Years of experience.

Item	Years of experience	NO	YES	Total	Sig	Chi-square
Automatic detection of lesions	Less than five years	102	87	189	0.106	6.110
	5-10 Y	49	20	69		
	11-15 Y	21	14	35		
	More than 15 Y	20	15	35		
Patient dose optimization	Less than five years	83	106	189	0.032	8.829
	5-10 Y	43	26	69		
	11-15 Y	15	20	35		
	More than 15 Y	13	22	35		
Suggestion of imaging protocol	Less than five years	122	67	189	0.050	7.812
	5-10 Y	56	13	69		
	11-15 Y	27	8	35		
	More than 15 Y	23	12	35		
Automatic interpretation with validation by radiologist	Less than five years	100	89	189	0.598	1.880
	5-10 Y	43	26	69		
	11-15 Y	20	15	35		
	More than 15 Y	20	15	35		
Automatic interpretation without validation by radiologist	Less than five years	149	40	189	0.818	0.932
	5-10 Y	56	13	69		
	11-15 Y	30	5	35		
	More than 15 Y	28	7	35		

The result described in Table 4.43 show the most of participant's Expected technical features of artificial intelligence (AI)-based tools were Less than five years more than category. There are no statistically significant except in item (2),(3).

Participant's expectations about the impact of AI applications in the field of radiology in the next five to ten years.

Table 4.44: Study sample according to expectations about the impact of AI in the next five to ten years according to their job's category.

Jobs	No expect	Yes, job positions will increase	Yes, job positions will be reduced	Total	Chi-square	Sig
Radiologist	9	7	40	56	24.284	0.000
Technologist	22	10	59	91		
Technician	30	22	37	89		
Student /intern	7	13	72	92		
Total	68	52	208	328		

The result described in Table 4.44 show the most of participant's expectation about the impact on professional radiologist's life in terms of amount of job positions in the next 5–10 years that were Yes, job positions will reduced by (72) in Technician .There are statistically significant.

Table 4.45: Study sample according to expectations about the impact of AI in the next five to ten years according to their job's category.

Jobs	Increase	Decrease	Unchanged	Total	Chi-square	Sig
Radiologist	24	13	19	56	32.807	0.000
Technologist	28	39	24	91		
Technician	33	31	25	89		
Student /intern	30	43	19	92		
Total	115	126	87	328		

The result described in table 4.45 show the most of participant's expectation in the next 5–10 years, the use of AI-based applications will make radiologists' duties that the radiology staff will be decrease, by (43) in Student /intern. There are statistically significant.

Table 4.46 Study sample according to expectations about the impact of AI in the next five to ten years according to their jobs category.

Jobs	No, radiologists will be more focused on radiology subspecialties	Yes, radiologists will be less focused on radiology subspecialties	The rate of dedication to subspecialties will remain unchanged	Total	Chi-square	Sig
Radiologist	24	13	19	56	9.939	0.127
Technologist	28	39	24	91		
Technician	33	31	25	89		
Student /intern	30	43	19	92		
Total	115	126	87	328		

The result described in table 4.46 show the most of participant's expectation think that, in the next 5–10 years, the use of AI-based applications will help to report also examinations outside the field of subspecializing will be more Yes, radiologists will be less focused on radiology subspecialties by (43) in Student /intern. There are not statistically significant.

Table 4.47: Study sample according to expectations about the impact of AI in the next five to ten years according to their jobs category.

Jobs	No	Yes, it will increase	Yes, it will be reduced	Total	Chi-square	Sig
Radiologist	13	11	32	56	21.988	0.001
Technologist	18	13	60	91		
Technician	33	15	41	89		
Student /intern	9	16	67	92		
Total	73	55	200	328		

The result described in table 4.47 show the most of participant's expectation foresee an AI impact on professional radiologist's life in terms of total reporting workload in the next 5–10 years will be more Yes; it will be reduced by (67) in Student /intern. There are not statistically significant.

Table 4.48: Study sample according to expectations about the impact of AI in the next five to ten years according to their jobs category.

Jobs	Radiologists	Other physicians	Developers of AI applications	Insurance companies	Total	Chi-square	Sig
Radiologist	13	7	35	1	56	26.521	0.002
Technologist	14	5	70	2	91		
Technician	13	1	74	1	89		
Student /intern	13	2	68	9	92		
Total	53	15	247	13	328		

The result described in table 4.48 show the most of participant's expectation In the next 5–10 years, who will take the legal responsibility of AI-system output will be

Developers of AI applications by (74) in Technician. There are not statistically significant.

Table 4.49: Study sample according to expectations about the impact of AI in the next five to ten years according to their job's category.

Jobs	Yeas	No	Difficult to estimate at present	Total	Chi-square	Sig
Radiologist	2	31	23	56	25.751	0.000
Technologist	12	33	46	91		
Technician	6	56	27	89		
Student /intern	14	29	49	92		
Total	34	149	145	328		

The result described in table 4.49 show the most of participant's expectation in the next 5–10 years, will patients mostly accept a report from AI applications without supervision and approval by a physician will be more no by (56) in Technician. There are not statistically significant.

Table 4.50: Study sample according to expectations about the impact of AI in the next five to ten years according to their jobs category.

Jobs	Low interactive	More interactive	Unchanged	Total	Chi-square	Sig
Radiologist	41	9	6	56	10.463	0.106
Technologist	52	16	23	91		
Technician	43	21	25	89		
Student /intern	55	19	18	92		
Total	191	65	72	328		

The result described in Table 4.50 show the most of participant's expectation relationship between the radiologist and the patient because of AI introduction will be more Low interactive by (55) in Student /intern. There are not statistically significant.

Table 4.51: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the jobs category

Item	Jobs	NO	Yes	Total	Chi- square	Sig
Cardiac and chest imaging	Radiologist	28	28	56	0,608	0.895
	Technologist	46	45	91		
	Technician	45	44	89		
	Student /intern	42	50	90		
Head and neck Imaging	Radiologist	40	16	56	1.682	0.641
	Technologist	67	24	91		
	Technician	71	18	89		
	Student /intern	71	21	91		
Interventional and Angiography	Radiologist	31	25	56	1.280	0.734
	Technologist	47	44	91		
	Technician	41	48	89		
	Student /intern	46	46	92		
Oncologic	Radiologist	29	27	56	1.642	0.650
	Technologist	48	43	91		
	Technician	51	38	89		
	Student /intern	44	48	92		

Musculoskeletal imaging	Radiologist	31	25	56	7.932	0.027
	Technologist	63	28	91		
	Technician	69	20	89		
	Student /intern	62	30	92		
Abdominal imaging	Radiologist	42	14	56	1.514	0.679
	Technologist	74	17	91		
	Technician	74	15	89		
	Student /intern	74	18	92		
Breast	Radiologist	43	13	56	0.560	0.905
	Technologist	69	22	91		
	Technician	71	18	89		
	Student /intern	73	19	92		

The result described in table 4.51 show the most of participant's expectation Which radiological subspecialties do you foresee will be more influenced by AI in the next 5–10 years were Technologist and Student /intern more than category. There are not statistically significant.

Table 4.52: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the jobs category.

Item	Jobs	NO	Yes	Total	Chi- square	Sig
Conventional x-ray	Radiologist	36	20	56	4.126	0.248
	Technologist	71	20	91		
	Technician	69	20	89		
	Student /intern	69	23	92		
MRI &CT	Radiologist	29	27	56	5.516	0.138
	Technologist	34	57	91		
	Technician	29	60	89		
	Student /intern	37	55	92		
Ultrasound	Radiologist	46	10	56	3.249	0.355
	Technologist	74	17	91		
	Technician	73	16	89		
	Student /intern	67	25	92		
DXA	Radiologist	39	17	56	4.232	0.238
	Technologist	76	15	91		
	Technician	69	20	89		
	Student /intern	74	18	92		
Nuclear medicine	Radiologist	28	28	56	3.938	0.268
	Technologist	51	40	91		
	Technician	58	31	89		
	Student /intern	57	35	92		

Interventional and angiography	Radiologist	39	17	56	2.416	0.491
	Technologist	55	36	91		
	Technician	60	29	89		
	Student /intern	55	37	92		

The result described in table 4.52 show the most of participant's expectation which techniques do you foresee will be the most important fields of AI-applications in the next 5–10 years were Technologist and Student /intern more than category. There are not statistically significant.

Table 4.53: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the jobs category

Item	Jobs	No	Yes	Total	Chi- square	Sig
Imaging protocol optimization	Radiologist	22	34	56	1.642	0.650
	Technologist	44	47	91		
	Technician	44	45	89		
	Student /intern	44	48	92		
Image post-processing	Radiologist	19	37	56	11.412	0.010
	Technologist	19	37	56		
	Technician	49	40	89		
	Student /intern	52	40	92		
Detection of early diseases	Radiologist	43	13	56	25.111	0.000
	Technologist	46	45	91		
	Technician	57	32	89		
	Student /intern	35	57	92		

Detection of incidental findings	Radiologist	50	6	56	8.620	0.035
	Technologist	70	21	91		
	Technician	70	19	89		
	Student /intern	83	9	92		
Determine the stage of the disease	Radiologist	43	13	56	5.624	0.131
	Technologist	57	34	91		
	Technician	68	21	89		
	Student /intern	62	30	92		
Quantitative imaging and measurement of vital signs	Radiologist	41	15	56	0.381	0.944
	Technologist	69	22	91		
	Technician	66	23	89		
	Student /intern	71	21	92		

The result described in Table 4.53 show the most of participant's expectation Which of the following AI applications you think are more relevant as aids to radiological profession were Technologist and Student /intern more than category . There are not statistically significant except item 2, 3, 4.

Table 4.54: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the jobs category.

Item	Jobs	No	Yes	Total	Chi-square	Sig
Help in task definition	Radiologist	80	42	122	0.509	0.917
	Technologist	91	41	132		
	Technician	34	26	60		
	Student /intern	8	6	14		
	Total	213	115	328		

Develop AI-based application	Radiologist	90	32	122	3.114	0.374
	Technologist	106	26	132		
	Technician	48	12	60		
	Student /intern	8	6	14		
	Total	252	76	328		
Non	Radiologist	103	19	122	4.773	0.189
	Technologist	113	19	132		
	Technician	48	12	60		
	Student /intern	13	1	14		
	Total	277	51	328		
Supervise all stages needed to develop an AI-based application in the field of radiology	Radiologist	60	62	122	1.955	0.582
	Technologist	56	76	132		
	Technician	35	25	60		
	Student /intern	6	8	14		
	Total	157	171	328		

The result described in table 4.54 show the most of participant's expectation what will be the role of radiologists in developing/validation AI applications to medical imaging were Radiologist and Technologist more than category. There are not statistically significant.

Table 4.55: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the jobs category.

Item	Jobs	NO	YES	Total	Chi-square	Sig
Advantages and limitations of AI applications	Radiologist	18	38	56	2.421	0.490
	Technologist	38	53	91		
	Technician	38	51	89		
	Student /intern	41	51	92		
Supervision of artificial intelligence application	Radiologist	30	26	56	2.279	0.556
	Technologist	52	39	91		
	Technician	58	31	89		
	Student /intern	53	39	92		
Clinical use of AI application	Radiologist	27	29	56	3.020	0.389
	Technologist	49	42	91		
	Technician	55	34	89		
	Student /intern	48	44	92		
How to avoid the use of AI application	Radiologist	157	32	189	0.403	0.940
	Technologist	58	11	69		
	Technician	30	5	35		
	Student /intern	27	8	35		
How to survive the artificial intelligence revolution	Radiologist	47	9	56	10.762	0.013
	Technologist	77	14	91		
	Technician	73	16	89		
	Student /intern	75	17	92		

Programming radiological and medical imaging machines	Radiologist	50	6	56	4.352	0.226
	Technologist	72	19	91		
	Technician	63	26	89		
	Student /intern	80	12	92		

The result described in Table 4.55 show the most of participant's expectation should radiologists be educated on were Technologist and Student /intern more than category. There are not statistically significant except item 5.

Table 4.56: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the jobs category.

Item	Jobs	No	Yes	Total	Chi-square	Sig
Interpretation of many radiological examination	Radiologist	43	13	56	12.387	0.006
	Technologist	66	25	91		
	Technician	58	31	89		
	Student /intern	48	44	92		
Do more interventional radiology	Radiologist	45	11	56	0.278	0.964
	Technologist	72	19	91		
	Technician	70	19	89		
	Student /intern	75	17	92		
Alleviate the workload during night shifts	Radiologist	45	11	56	2.177	0.548
	Technologist	72	19	91		
	Technician	70	19	89		
	Student /intern	75	17	92		

Spend more time with patients	Radiologist	50	6	56	0.922	0.820
	Technologist	80	11	91		
	Technician	82	7	89		
	Student /intern	83	9	92		
Reducing the time for interpreting examinations and diagnosing diseases	Radiologist	36	20	56	1.673	0.643
	Technologist	51	40	91		
	Technician	56	33	89		
	Student /intern	59	33	92		
Decrease the risk of imaging related medical error	Radiologist	28	28	56	5.874	0.118
	Technologist	47	44	91		
	Technician	47	42	89		
	Student /intern	34	58	92		

The result described in Table 4.56 show the most of participant's expectation what are your expectations for daily practice from an AI-based solution were Technologist and Student /intern more than category. There are not statistically significant except item 1.

Table 4.57: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the jobs category.

Item	Jobs	NO	YES	Total	Chi-square	Sig
Automatic detection of lesions	Radiologist	41	15	56	12.781	0.005
	Technologist	59	30	89		
	Technician	48	43	91		
	Student /intern	44	48	92		

Patient dose optimization	Radiologist	28	28	56	3.698	0.296
	Technologist	42	47	89		
	Technician	48	43	91		
	Student /intern	36	56	92		
Suggestion of imaging protocol	Radiologist	37	19	56	4.885	0.180
	Technologist	70	19	89		
	Technician	61	30	91		
	Student /intern	60	32	92		
Automatic interpretation with validation by radiologist	Radiologist	23	33	56	6.017	0.111
	Technologist	53	36	89		
	Technician	54	37	91		
	Student /intern	53	39	92		
Automatic interpretation without validation by radiologist	Radiologist	49	7	56	2.326	0.508
	Technologist	70	19	89		
	Technician	71	20	91		
	Student /intern	73	19	92		

The result described in table 4.57 show the most of participant's expectation what are your expected technical features of artificial intelligence (AI)-based tools were Technician and Student /intern more than category. There are not statistically significant except item (1).

Table 4.58: Study sample according to expectations about the impact of AI in the next five to ten years according to their age group.

Age	No expect	Yes, job positions will increase	Yes, job positions will be reduced	Total	Chi-square	Sig
Less than 24Y	9	77	36	122	4.493	0.610
25-35Y	17	73	42	132		
36-45	7	30	23	60		
More than 45Y	1	8	5	14		
Total	34	188	106	328		

The result described in table 4.58 show the most of participant's expectation foresee an AI impact on professional radiologist's life in terms of amount of job positions in the next 5–10 years will be more Yes, job positions will increase by (77) in Less than 24Y . There are not statistically significant.

Table 4.59: Study sample according to expectations about the impact of AI in the next five to ten years according to their age group.

Age	Increase	Decrease	Unchanged	Total	Chi-square	Sig
Less than 24Y	13	88	21	122	17.723	0.007
25-35Y	23	84	25	132		
36-45	16	27	17	60		
More than 45Y	0	9	5	14		
Total	52	208	68	328		

The result described in Table 4.59show the most of participant's expectation in the next 5–10 years, the use of AI-based applications will make radiologists' duties will be more Decrease by (88) in Less than 24Y. There are statistically significant.

Table 4.60: Study sample according to expectations about the impact of AI in the next five to ten years according to their age group.

Age	No, radiologists will be more focused on radiology subspecialties	Yes, radiologists will be less focused on radiology subspecialties	The rate of dedication to subspecialties will remain unchanged	Total	Chi-square	Sig
Less than 24Y	33	62	27	122	15.200	0.019
25-35Y	52	44	36	132		
36-45	24	18	18	60		
More than 45Y	6	2	6	14		
Total	115	126	87	328		

The result described in table 4.60 show the most of participant's expectation think that, in the next 5–10 years, the use of AI-based applications will help to report also examinations outside the field of subspecializing will be on radiology subspecialties by (62) in Less than 24Y. There are statistically significant.

Table 4.61: Study sample according to expectations about the impact of AI in the next five to ten years to their age group.

Age	No	Yes, it will increase	Yes, it will be reduced	Total	Chi-square	Sig
Less than 24Y	19	21	82	122	7.217	0.301
25-35Y	37	23	72	132		
36-45	14	10	36	60		
More than 45Y	3	1	10	14		
Total	73	55	200	328		

The result described in table 4.61 show the most of participant's expectation foresee an AI impact on professional radiologist's life in terms of total reporting workload in the next 5–10 years will be more Yes; it will be reduced by (82) in Less than 24Y. There are not statistically significant.

Table 4.62: Study sample according to expectations about the impact of AI in the next five to ten years according to their age group.

Age	Radiologists	Other physicians	Developers of AI applications	Insurance companies	Total	Chi-square	Sig
Less than 24Y	17	5	90	10	122	15.515	0.078
25-35Y	22	6	102	2	132		
36-45	14	3	43	0	60		
More than 45Y	0	1	12	1	14		
Total	53	15	247	13	328		

The result described in Table 4.62 show the most of participant's expectation in the next 5–10 years, who will take the legal responsibility of AI-system output will be more Developers of AI applications by (102) in 25-35Y. There are not statistically significant.

Table 4.63: Study sample according to expectations about the impact of AI in the next five to ten years according to their age group.

Age	Yeas	No	Difficult to estimate at present	Total	Chi-square	Sig
Less than 24Y	20	44	58	122	19.587	0.003
25-35Y	7	60	65	132		
36-45	6	38	16	60		
More than 45Y	1	7	6	14		
Total	34	149	145	328		

The result described in table 4.63 show the most of participant's expectation in the next 5–10 years, will patients mostly accept a report from AI applications without supervision and approval by a physician will be more No by (60) in 25-35Y. There are not statistically significant.

Table 4.64: Study sample according to expectations about the impact of AI in the next five to ten years according to their age group.

Age	Low interactive	More interactive	Unchanged	Total	Chi-square	Sig
Less than 24Y	74	22	26	122	2.039	0.916
25-35Y	77	27	28	132		
36-45	31	13	16	60		
More than 45Y	9	3	2	14		
Total	191	65	72	328		

The result described in table 4.64 show the most of participant's expectation the relationship between the radiologist and the patient because of AI introduction will be more Low interactive by (77) in 25-35Y. There are not statistically significant.

Table 4.65: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the age group.

Item	Age	NO	Yes	Total	Chi-square	Sig
Cardiac and chest imaging	Less than 24Y	55	67	122	6.789	0.079
	25-35Y	76	56	132		
	36-45	24	36	60		
	More than 45Y	6	8	14		
Head and neck imaging	Less than 24Y	91	31	122	0.365	0.947
	25-35Y	100	32	132		
	36-45	47	13	60		
	More than 45Y	11	3	14		
Interventional and Angiography	Less than 24Y	67	55	122	4.741	0.192
	25-35Y	65	67	132		
	36-45	24	36	60		
	More than 45Y	9	5	14		
Oncologic	Less than 24Y	60	62	122	3.529.	0.317
	25-35Y	67	65	132		
	36-45	35	25	60		
	More than 45Y	10	4	14		

Musculoskeletal imaging	Less than 24Y	83	39	122	0.079	0.994
	25-35Y	91	41	132		
	36-45	41	19	60		
	More than 45Y	10	4	14		
Abdominal imaging	Less than 24Y	95	27	122	1.998	0.573
	25-35Y	110	22	132		
	36-45	49	11	60		
	More than 45Y	10	4	14		
Breast	Less than 24Y	94	28	122	0.079	0.994
	25-35Y	109	23	132		
	36-45	44	16	60		
	More than 45Y	9	5	14		

The result described in Table 4.65 show the most of participant's expectation Which radiological subspecialties do you foresee will be more influenced by AI in the next 5–10 years were 25-35Y more than category. There are not statistically significant.

Table 4.66: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the age group.

Item	Age	NO	Yes	Total	Chi- square	Sig
Conventional x-ray	Less than 24Y	93	29	122	1.645	0.649
	25-35Y	96	36	132		
	36-45	47	13	60		
	More than 45Y	9	5	14		

MRI &CT	Less than 24Y	46	76	122	4,080	0.253
	25-35Y	59	73	132		
	36-45	21	39	60		
	More than 45Y	3	11	14		
Ultrasound	Less than 24Y	91	31	122	5.520	0.137
	25-35Y	113	19	132		
	36-45	45	15	60		
	More than 45Y	11	3	14		
DXA	Less than 24Y	99	23	122	2.614	0.455
	25-35Y	104	28	132		
	36-45	43	17	60		
	More than 45Y	12	2	14		
Nuclear medicine	Less than 24Y	77	45	122	2.616	0.455
	25-35Y	74	58	132		
	36-45	33	27	60		
	More than 45Y	10	4	14		
Interventional and angiography	Less than 24Y	77	45	122	3.548	0.315
	25-35Y	89	43	132		
	36-45	37	23	60		
	More than 45Y	6	8	14		

The result described in table 4.66 show the most of participant's expectation which techniques do you foresee will be the most important fields of AI-applications in the next 5–10 years were 25-35Y more than category. There are not statistically significant.

Table 4.67: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the age group.

Item	Age	No	Yes	Total	Chi-square	Sig
Imaging protocol optimization	Less than 24Y	66	56	122	1.188	0.756
	25-35Y	59	73	132		
	36-45	27	33	60		
	More than 45Y	8	6	14		
Image post-processing	Less than 24Y	66	56	122	2.277	0.517
	25-35Y	67	65	132		
	36-45	33	27	60		
	More than 45Y	10	4	14		
Detection of early diseases	Less than 24Y	55	67	122	10.074	0.018
	25-35Y	83	49	132		
	36-45	37	23	60		
	More than 45Y	6	8	14		
Detection of incidental findings	Less than 24Y	98	24	122	1.883	0.597
	25-35Y	114	18	132		
	36-45	50	10	60		
	More than 45Y	11	3	14		
Determine the stage of the disease	Less than 24Y	74	48	122	11,041	0.012
	25-35Y	105	27	132		
	36-45	42	18	60		
	More than 45Y	9	5	14		

Quantitative imaging and measurement of vital signs	Less than 24Y	90	32	122	0635	0.888
	25-35Y	102	30	132		
	36-45	44	16	60		
	More than 45Y	11	3	14		

The result described in table 4.67 show the most of participant's expectation which of the following AI applications you think are more relevant as aids to radiological profession were 25-35Y more than category. There are not statistically significant except 3, 4.

Table 4.68: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the age group.

Item	Age	No	Yes	Total	Chi-square	Sig
Help in task definition	Less than 24Y	80	42	122	3.126	0.373
	25-35Y	91	41	132		
	36-45	34	26	60		
	More than 45Y	8	6	14		
Develop AI-based application	Less than 24Y	90	32	122	4.923	0.178
	25-35Y	106	26	132		
	36-45	48	12	60		
	More than 45Y	8	6	14		
Non	Less than 24Y	103	19	122	1.973	0.617
	25-35Y	113	19	132		
	36-45	48	12	60		
	More than 45Y	13	1	14		

Supervise all stages needed to develop an AI-based application in the field of radiology	Less than 24Y	60	62	122	4.426	0.219
	25-35Y	56	76	132		
	36-45	35	25	60		
	More than 45Y	6	8	14		

The result described in table 4.68 show the most of participant's expectation will be the role of radiologists in developing/validation AI applications to medical imaging were 25-35Y more than category. There are not statistically significant.

Table 4.69: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the age group.

Item	Age	NO	YES	Total	Chi-square	Sig
Advantages and limitations of AI applications	Less than 24Y	56	66	122	1.849	0.604
	25-35Y	51	81	132		
	36-45	23	37	60		
	More than 45Y	5	9	14		
	Total	135	193	328		
Supervision of artificial intelligence application	Less than 24Y	74	48	122	3.470	0.325
	25-35Y	77	55	132		
	36-45	37	23	60		
	More than 45Y	5	9	14		
	Total	193	135	328		

Clinical use of AI application	Less than 24Y	60	62	122	2.574	0.462
	25-35Y	75	57	132		
	36-45	35	25	60		
	More than 45Y	9	5	14		
	Total	179	149	328		
How to avoid the use of AI application	Less than 24Y	101	21	122	0.383	0.944
	25-35Y	111	21	132		
	36-45	49	11	60		
	More than 45Y	11	3	14		
	Total	272	56	328		
How to survive the artificial intelligence revolution	Less than 24Y	96	26	122	1.271	0.736
	25-35Y	106	26	132		
	36-45	51	9	60		
	More than 45Y	12	2	14		
	Total	265	63	328		
Programming radiological and medical imaging machines	Less than 24Y	88	34	122	2..850	0.415
	25-35Y	96	36	132		
	36-45	44	16	60		
	More than 45Y	13	1	14		
	Total	241	87	328		

The result described in table 4.69 show the most of participant's expectation should radiologists be educated on were 25-35Y more than category. There are not statistically significant.

Table 4.70: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the age group.

Item	Age	No	Yes	Total	Chi-square	Sig
Interpretation of many radiological examination	Less than 24Y	72	50	122	3.960	0.266
	25-35Y	93	39	132		
	36-45	40	20	60		
	More than 45Y	10	4	14		
	Total	215	113	328		
Do more interventional radiology	Less than 24Y	100	22	122	1.525	0.767
	25-35Y	105	27	132		
	36-45	45	15	60		
	More than 45Y	12	2	14		
	Total	262	66	328		
Alleviate the workload during night shifts	Less than 24Y	60	62	122	0.658	0.883
	25-35Y	69	63	132		
	36-45	29	31	60		
	More than 45Y	6	8	14		
	Total	164	164	328		
Spend more time with patients	Less than 24Y	109	13	122	0.186	0.980
	25-35Y	119	13	132		
	36-45	54	6	60		
	More than 45Y	13	1	14		
	Total	295	33	328		

Reducing the time for interpreting examinations and diagnosing diseases	Less than 24Y	78	44	122	12.566	0.006
	25-35Y	90	42	132		
	36-45	30	30	60		
	More than 45Y	4	10	14		
	Total	202	126	328		
Decrease the risk of imaging related medical error	Less than 24Y	48	74	122	7.710	0.052
	25-35Y	64	68	132		
	36-45	35	25	60		
	More than 45Y	9	5	14		
	Total	156	172	328		

The result described in table 4.70 show the most of participant's expectation are your expectations for daily practice from an AI-based solution were 25-35Y more than category. There are not statistically significant except item 5.

Table 4.71: Study sample according to expectations about the role of artificial intelligence in x-rays in the next five to ten years according to the age group.

Item	Age	NO	YES	Total	Chi-square	Sig
Automatic detection of lesions	Less than 24Y	59	63	122	9.565	0.023
	25-35Y	89	43	132		
	36-45	36	24	60		
	More than 45Y	8	6	14		

Patient dose optimization	Less than 24Y	50	72	122	3.799	0.284
	25-35Y	70	62	132		
	36-45	28	32	60		
	More than 45Y	6	8	14		
Suggestion of imaging protocol	Less than 24Y	84	38	122	1.876	0.599
	25-35Y	90	42	132		
	36-45	42	18	60		
	More than 45Y	12	2	14		
Automatic interpretation with validation by radiologist	Less than 24Y	77	45	122	5..416	0.144
	25-35Y	66	66	132		
	36-45	34	26	60		
	More than 45Y	6	8	14		
Automatic interpretation without validation by radiologist	Less than 24Y	92	30	122	4.068	0.254
	25-35Y	111	21	132		
	36-45	50	10	60		
	More than 45Y	10	4	14		

The result described in table 4.70 show the most of participant's expectation you are expected technical features of artificial intelligence (AI)-based tools were 25-35Y more than category. There are not statistically significant except item 1.

4.2 Discussion

This cross-sectional descriptive study aimed assessment" Radiology staff" knowledge, perceptions and expectations regarding artificial intelligence in medical imaging the number of sample size 328 participants in Sana'a. In period from January to February 2023. From these 328 participants. The questionnaire includes (25) items related to the perceptions and expectations of radiology staff regarding artificial intelligence in medical imaging. The study sample according to the largest age group in this study was 25-35 years by (132) 37.2%; the higher gender in this study was male by (197) 60%. The job category was the largest was students by (92) 28% .The experience category the largest was less the five years by (189) 57.6%.

Table 4.5: We notice that the knowledge level of the participants is low. Table 4.6 we notice most of the participants agree with opinions about AI. Table 4.8 and Table 4.9 The percentage of knowledge and participants' opinions about artificial intelligence among men was higher than that of women; Table 4.10 the percentage of the knowledge among was 25-35 the higher then age group other , Table 4.11 the percentage of participants' opinions about artificial intelligence in were less 24 the higher than age group other. Table 4.12 and Table 4.13 the percentage of knowledge and participants' opinions about artificial intelligence in less 15 was the higher than experience group other. Table 4.14 the percentage of knowledge among Technician was the higher than that anther category job other. Table 4.15 the percentage of participants' opinions about artificial intelligence in Technologist was the higher than job group other. Table 4.16 Relationship between gender and participants expectations about the impact of AI applications. There are not statistically significant. Table 4.17 Relationship between gender and participants expectations about the impact of AI applications. There are statistically significant. Table 4.18 Relationship between gender and participants expectations about the impact of AI applications. There are not statistically significant. Table 4.19 Relationship between gender and participants expectations about the impact of AI applications. There are statistically significant. Table 4.20 Relationship between gender and participants expectations about the impact of AI applications. There are not statistically significant. Table 4.21 Relationship between gender and participants expectations about the impact of AI applications. There are statistically

significant. Table 4.22 Relationship between gender and participants expectations about the impact of AI applications. There are not statistically significant. Table 4.23 Relationship between gender and Participant's expectations about artificial intelligence. There are not statistically significant. Table 4.24 Relationship between gender and Participant's expectations about artificial intelligence. There are not statistically significant. Table 4.25 Relationship between gender and Participant's expectations about artificial intelligence. There are not statistically significant. 4.26 Relationship between gender and Participant's expectations about artificial intelligence. There are not statistically significant. 4.27 Relationship between gender and Participant's expectations about artificial intelligence. There are not statistically significant. 4.28 Relationship between gender and Participant's expectations about artificial intelligence. There are not statistically significant. 4.29 Relationship between gender and Participant's expectations about artificial intelligence. There are not statistically significant. 4.25 Relationship between gender and Participant's expectations about artificial intelligence. There are not statistically significant4.25 Relationship between gender and Participant's expectations about artificial intelligence. There are not statistically significant. Table 4.30 Relationship between Years of experience and participants expectations about the impact of AI applications. There are statistically. Table 4.31 Relationship between Years of experience and participants expectations about the impact of AI applications. There are statistically. Table 4.32 Relationship between Years of experience and participants expectations about the impact of AI applications. There are not statistically. Table 4.33 Relationship between Years of experience and participants expectations about the impact of AI applications. There are not statistically. Table 4.34 Relationship between Years of experience and participants expectations about the impact of AI applications. There are not statistically. Table 4.35 Relationship between Years of experience and participants expectations about the impact of AI applications. There are not statistically. 4.36 Relationship between Years of experience and participants expectations about the impact of AI applications. There are not statistically. Table 4.37 Relationship between Years of experience and Participant's expectations about artificial intelligence. There are not statistically Table 4.38 Relationship between Years of experience and Participant's expectations about artificial intelligence. There are not statistically. Table 4.39 Relationship between Years of experience and

Participant's expectations about artificial intelligence. There are not statistically. Table 4.39 Relationship between Years of experience and Participant's expectations about artificial intelligence. There are not statistically. Table 4.40 Relationship between Years of experience and Participant's expectations about artificial intelligence. There are not statistically. Table 4.41 Relationship between Years of experience and Participant's expectations about artificial intelligence. There are not statistically. Table 4.42 Relationship between Years of experience and Participant's expectations about artificial intelligence. There are not statistically. Table 4.43 Relationship between Years of experience and Participant's expectations about artificial intelligence. There are not statistically. Table 4.44 Relationship between Jobs and Participant's expectations about artificial intelligence. There are statistically. Table 4.45 Relationship between Jobs and Participant's expectations about artificial intelligence. There are statistically. Table 4.46 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically. Table 4.47 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically. Table 4.48 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically. Table 4.49 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically. Table 4.50 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically. Table 4.51 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically. Table 4.52 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically. Table 4.53 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically except item 2, 3, 4 Table 4.54 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically. Table 4.55 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically. Table 4.56 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically except item 1. Table 4.57 Relationship between Jobs and Participant's expectations about artificial intelligence. There are not statistically except item (1). Table 4.58 Relationship between age and Participant's expectations about

artificial intelligence. There are not statistically. Table 4.59 Relationship between age and Participant's expectations about artificial intelligence. There are statistically. Table 4.60 Relationship between age and Participant's expectations about artificial intelligence. There are statistically. Table 4.61 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically. Table 4.62 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically. Table 4.63 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically. Table 4.64 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically. Table 4.65 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically. Table 4.66 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically. Table 4.67 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically except 3, 4. Table 4.68 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically. Table 4.69 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically. Table 4.70 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically. Table 4.71 Relationship between age and Participant's expectations about artificial intelligence. There are not statistically except item 1.

Singapore radiographers ' The participant's online focus groups were conducted with 22 radiographers from the three public healthcare clusters in Singapore 22.They result participants demonstrated limited knowledge of Al . Their perceptions of Al were mixed, recognizing its benefits in increasing efficiency and improving patient care, but also aware of its limitations in accuracy and bias. On how patients may perceive Al , participants left that patients would accept Al if they felt it improves their care but may reject it once they lose trust in it Expectations wise , participant envisioned several applications in preperi and post - procedural workflows including order vetting , patient positioning language translation , and artefact removal . On radiographer's role and career opportunities, some participants see an opportunity for radiographers to specialize in Al, becoming involved in algorithm development and its clinical implementation.

Ireland 2022. S.coakley a.R.young a. They result familiarity with Al most participants believed that radiographers should embrace, adopt, and adapt to technology (85-96). Forty participants did not understand the difference between macgine learning, deep learning and Al.Opinions on Al seventy - eight participants believed it was unlikely that Al would replace radiographers. Most participants believed Al had an essential role in the sector (61-96) and were excited about Al (79-96), Only 28 participants were apprehensive about introducing Al, but 55 were concerned about ethical issues surrounding its integration

A cross-sectional online survey of registered Ghanaian radiographers was conducted within a 3-month period (February-April, 2020). The survey sought information relating to demography, general perspectives on AI and implementation issues. A response rate of 64.5% (151/234) was achieved. Majority of the respondents (n = 122, 80.8%) agreed that AI technology is the future of medical imaging. A good number of them (n = 131, 87.4%) indicated that AI would have an overall positive impact on medical imaging practice. However, some expressed fears about AI-related errors (n = 126, 83.4%), while others expressed concerns relating to job security (n = 35, 23.2%). High equipment cost, lack of knowledge and fear of cyber threats were identified as some factors hindering AI implementation in Ghana.

CHAPTER 5

5.1 Conclusion

The advancement of AI technologies and implementation should be accompanied by proportional training of end-users in radiography and beyond. There are many benefits of AI-enabled radiography workflows and improvement on efficiencies but equally there will be widespread disruption of traditional roles and patient-centred care, which can be managed by a well-educated and well-informed workforce. The largest age group in this study was between 25 and 35 years with 132 participants (37.2%), The most participants in this study were males by 197 participants (60%). The largest job category were students by 92 participants (28%). The largest experience category group were less than five years 189 participants (57.6%). The results illustrated that the knowledge level of participants was low, and the most of the participants have positive opinions about AI in radiology. The mean of participants' knowledge and opinions about artificial intelligence among men was higher than that of women; the knowledge of age group between 25 and 35 was the best comparing with other age groups, while the participants' opinions about artificial intelligence of age group less than 24 was higher than other age groups. The knowledge and opinions about artificial intelligence of experience group less than 15 was higher than other experience groups**.** The knowledge among Technician was more than others jobs while the Technologists' opinions about artificial intelligence was higher than job group

5.2 Recommendation

1-Sufficient time to conduct similar research in the future.

2-Oblige the state to provide supply the mechanisms of artificial intelligence.

3-Strategic thinking and direction, focusing efforts on health care institutions, and then identifying the obstacles facing the workflow about Providing seminars and programs that encourage learning to obey AI.

4-Raising awareness about the importance of artificial intelligence in medicine imaging.

5-The interest of university and educational institutions in training specialists in the field of artificial intelligence.

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APPENDX

إستبيان حول

معرفة منتسبي أقسام الأشعة التشخيصية فيما يتعلق بتطبيقات الذكاء الاصطناعي (Artificial Intelligence) في مجال الأشعة التشخيصية وتوقعاتهم لدورها المستقبلي

الافاضل : منتسبي اقسام الاشعة 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:

الوظيفة: ◯ طبيب أشعة ◯ تكنولوجي أشعة ◯ فني أشعة ◯ طالب اشعة م4/ خريج

العمر: ◯ أقل من 24 عام ◯ 25 – 35 عام ◯ 36 – 45 عام ◯ أكبر من 45 عام

سنوات الخبرة: ◯ أقل من 5 سنوات ◯ 5 – 10 سنوات ◯ 11- 15 سنة ◯ اكثر من 15 سنة

الجنس: ◯ ذكر ◯ انثى

فقرات الاستبيان

أ- أي من الإستخدمات /التطبيقات التالية للذكاء الإصطناعي في مجال الأشعة لديك معرفة عنها أو فكرة عنها ؟

الرقم	أستخدامات الذكاء الاصطناعي في مجال الاشعة	مدى معرفتك عنها			
		لم اسمع عنها ابدا	سمعت عنها فقط	مالوفة لدي الى حد ما	مالوفة جدا واستخدمها
1	فرز الصور لنقل المرضى الاشد حرجا الى المراجعة أولا				
2	تحسين سير العمل من أجل الإنتاج الافضل				
3	الأتمتة الجزئية في تحليل الصور الطبية				
4	تقديم الدعم للقرار الطبي				
5	تحسين جودة التصوير الطبي والاشعاعي				

ب- آراء المشاركين حول الذكاء الاصطناعي في مجال الأشعة التشخيصية

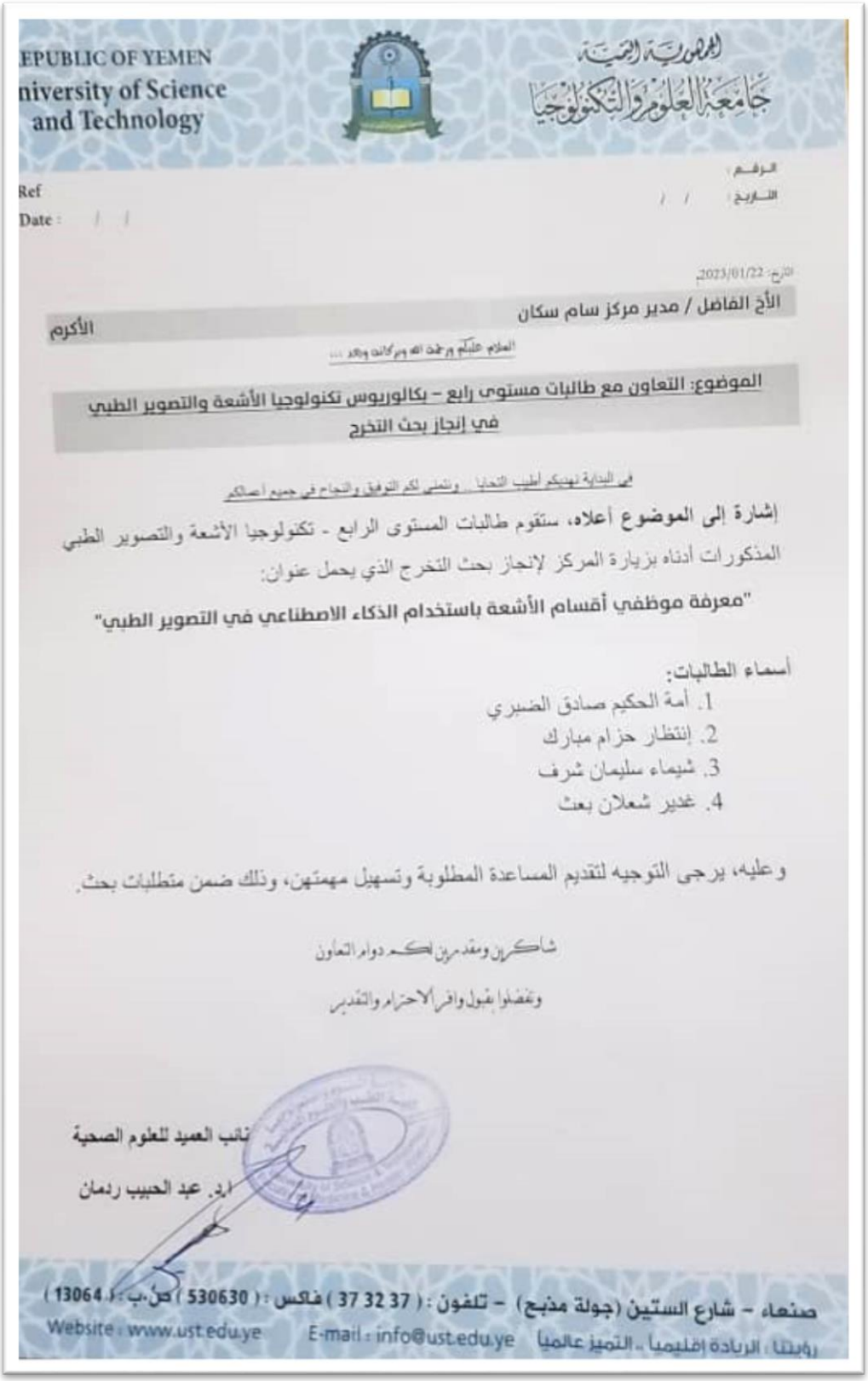
الرقم	العبارة	لا أوافق	ليس لدي رأي	أوافق
1	أعتقد أن تطبيق الذكاء الإصطناعي سيسمح بتوسيع دور موظفي الأشعة			
2	انا متحمس لتقدم دور الذكاء الإصطناعي في مجال الاشعة الطبية			
3	اعتقد أن رعاية المرضى ستتحسن مع استخدام تطبيقات الذكاء الإصطناعي			
4	سأكون مهتمًا بالدورات الممكنة حول الذكاء الإصطناعي في مجال الاشعة			
5	اعتقد ان الذكاء الإصطناعي يلعب بالفعل دورًا مهمًا في قطاع الأشعة			
6	أنا متخوف من إدخال الذكاء الإصطناعي في مجال التصوير الإشعاعي			

جـ - توقعاتك حول تأثير تطبيقات الذكاء الإصطناعي في مجال الاشعة (في السنوات الخمس إلى العشر القادمة):-

1	هل تتوقع تأثير الذكاء الاصطناعي على أخصائي الأشعة من حيث عدد المناصب الوظيفية ؟ نعم ستزيد الفرص الوظيفية ◯ نعم سيقل عدد فرص الوظائف ◯ لا أتوقع اي تاثير
2	إستخدام التطبيقات القائمة على الذكاء الاصطناعي سيجعل واجبات اختصاصي الأشعة تزداد ◯ تقل ◯ دون تغيير
3	هل استخدام تطبيقات الذكاء الاصطناعي سيساعد أخصائي الأشعة في كتابة تقارير خارج مجال تخصصه الفرعي/ الدقيق؟ ◯ لا، حيث سيزيد تركيز اخصائي الاشعة على تخصصه الفرعي / الدقيق ◯ نعم، حيث سيقل تركيز اخصائي الاشعة على تخصصه الفرعي ◯ معدل تركيز اخصائي الاشعة على التخصصات الدقيقة سيبقى دون تغيير
4	هل تتوقع تأثير الذكاء الاصطناعي على حياة أخصائي الأشعة المحترف من حيث إجمالي أعباء عمل التقارير؟ لا ◯ نعم سوف تزداد الاعباء ◯ نعم سوف تقل الاعباء
5	من تتوقع سيتحمل المسؤولية القانونية عن مخرجات انظمة وتطبيقات الذكاء الاصطناعي في مجال الاشعة؟ أخصائي الأشعة ◯ الأطباء الآخرون ◯ مطوري تطبيقات الذكاء الاصطناعي ◯ شركات التامين
6	هل تتوقع قبول المرضى تقريرًا طبيا من تطبيقات الذكاء الاصطناعي دون إشراف وموافقة الطبيب؟ نعم ◯ لا ◯ من الصعب تقديرذلك في الوقت الحاضر
7	كيف ستكون العلاقة بين أخصائي الأشعة والمريض عند استخدام تطبيقات الذكاء الاصطناعي؟ اقل تفاعلية ◯ اكثر تفاعلية ◯ لن تتغير

د- توقعاتك لدور الذكاء الاصطناعي في الاشعة (في السنوات الخمس إلى العشرالقادمة) يمكنك اختيار اكثر من إجابة فيما يلي:

1	ماهي التخصصات الفرعية في مجال الاشعة التشخيصية التي تتوقع أنها ستتأثر بدرجة أكبر بالذكاء الاصطناعي خلال السنوات الخمس الى العشر (5- 10) القادمة ؟ تصويرالقلب والأوعية الدموية ◯ تصوير الراس والعنق ◯ الاشعة التدخلية تصوير الاورام ◯ تصوير العظام والمفاصل ◯ تصوير البطن ◯ تصوير الثدي
2	ما هي التقنيات التي تتوقع انها ستكون أهم مجالات تطبيقات الذكاء الاصطناعي في السنوات 5- 10 القادمة؟ الاشعة السينية الاعتيادي ◯ التصويرالرنين المغناطيسي ◯ التصوير بالموجات فوق الصوتية تصوير هشاشة العظام ◯ الطب النووي ◯ تصوير الاوعية
3	أي من تطبيقات الذكاء الاصطناعي التالية تعتقد أنها مفيدة و أكثر صلة بمهنة الأشعة ؟ تحسين بروتوكول التصوير ◯ معالجة الصور ◯ الكشف المبكر للامراض الكشف عن النتائج العرضية ◯ تحديد مرحلة المرض ◯ التصوير الكمي وقياس المؤشرات الحيوية
4	ماهو توقعك لدور اختصاصي الأشعة في تطوير / التحقق من صحة تطبيقات الذكاء الاصطناعي في الاشعة ؟ المساعدة في تحديد المهام ◯ تطوير تطبيقات الذكاء الصناعي ◯ لا شيء الإشراف على جميع المراحل اللازمة لتطوير تطبيقات الذكاء الاصطناعي في مجال الاشعة
5	ما هي الاشياء التي يجب على اختصاصي الاشعة تعلمها في مجال الذكاء الاصطناعي في الاشعة ؟ مميزات وعيوب تطبيقات الذكاء الاصطناعي ◯ الاشراف على تطبيقات الذكاء الاصطناعي الاستخامات الطبية للذكاء الاصطناعي ◯ كيفية تجنب استخدام تطبيقات الذكاء الاصطناعي كيف ينجو من ثورة الذكاء الاصطناعي ◯ برمجة الات التصوير الاشعاعي والطبي
6	ما هي توقعاتك من الممارسات اليومية للحلول القائمة على الذكاء الاصطناعي؟ تفسير الكثير من الفحوصات الاشعاعية ◯ القيام بالمزيد من الأشعة التداخلية تخفيف عبء العمل أثناء المناوبات الليلية ◯ قضاء المزيد من الوقت مع المرضى تقليل وقت تفسير الفحوصات وتشخيص الامراض ◯ تقليل اخطاء التصوير والخطأ طبي المرتبط بها
7	ما هي الميزات التقنية المتوقعة من تطبيقات الذكاء الاصطناعي ؟ الكشف التلقائي للامراض ◯ تقليل الجرعة الاشعاعية للمريض ◯ اقتراح نوعية التصوير المناسب التفسير التلقائي للصورة مع تحقق أخصائي الأشعة ◯ التفسير التلقائي للصورة دون تحقق أخصائي الأشعة



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جامعة العلوم والتكنولوجيا

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Date : / /

التاريخ: 2023/01/22م

الأخ الفاضل / مدير مركز سام سكان

الأكرم

السلام عليكم ورحمة الله وبركاته وبعد ...

الموضوع: التعاون مع طالبات مستوى رابع – بكالوريوس تكنولوجيا الأشعة والتصوير الطبي في إنجاز بحث التخرج

في البداية تهديكم أطيب التحايا ، ونتمنى لكم التوفيق والنجاح في جميع أعمالكم

إشارة إلى الموضوع أعلاه، ستقوم طالبات المستوى الرابع - تكنولوجيا الأشعة والتصوير الطبي المذكورات أدناه بزيارة المركز لإنجاز بحث التخرج الذي يحمل عنوان:

"معرفة موظفي أقسام الأشعة باستخدام الذكاء الاصطناعي في التصوير الطبي"

أسماء الطالبات:

1. أمة الحكيم صادق الصبري
2. إنتظار حزام مبارك
3. شيماء سليمان شرف
4. غدير شعلان بعث

وعليه، يرجى التوجيه لتقديم المساعدة المطلوبة وتسهيل مهمتهن، وذلك ضمن متطلبات بحث.

شاكرين ومقدرين لكم دوام التعاون

وتفضلوا بقبول وافر الاحترام والتقدير

نائب العميد للعلوم الصحية

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تقييم المعارف والتصورات والتوقعات لدى طلبة وموظفي اقسام الأشعة التشخيصية تجاه الذكاء الاصطناعي وتطبيقاته في الاشعة والتصوير الطبي

ملخص البحث: خلفية البحث: بدأت تقنيات الذكاء الاصطناعي فعليا في التأثير على الممارسة الطبية السريرية عبر مختلف البيئات في جميع أنحاء العالم بما في ذلك مهنة التصوير الشعاعي. وتحاول هذه الدراسة استكشاف واقع تطبيقات الذكاء الاصطناعي في اليمن وتوقعات المتخصصين في مجال الاشعة والتصوير الطبي حولها..

هدف البحث: تقييم معرفة طلبة وموظفي الأشعة وتصوراتهم وتوقعاتهم فيما يتعلق بالذكاء الاصطناعي وتطبيقاته في الاشعة التشخيصية والتصوير الطبي..

منهج البحث: أجريت الدراسة في مستشفيات ومراكز الأشعة والجامعات في صنعاء. حيث كانت عبارة عن دراسة وصفية تحليلية أجريت على طواقم الأشعة والطلبة والمتدربين في الامتياز. حيث بلغ حجم العينة ٣٢٨ مشاركاً وتم جمع البيانات بواسطة استبيان صمم لذلك..

النتائج: أظهرت بيانات عينة البحث ان الفئة العمرية الأكبر في هذه الدراسة تراوحت أعمارهم ما بين ٢٥ و٣٥ سنة بعدد ١٣٢مشاركاً ٣٧,٢) %)، كما كان معظم المشاركين في هذه الدراسة من الذكور بواقع ١٩٧ مشاركاً ٦٠) %). وكانت أكبر فئة وظيفية من الطلبة بواقع ٩٢ مشاركاً ٢٨) %)، كما كانت أكبر فئة من حيث الخبرة أقل من خمس سنوات بعدد ١٨٩ مشاركاً ٥٧,٦) %). كما أوضحت النتائج أن مستوى معرفة المشاركين كان منخفضاً، وكان لدى معظم المشاركين اتجاهات إيجابية حول الذكاء الاصطناعي وتطبيقاته في مجال الأشعة. أيضا كان متوسطات معرفة واتجاهات المشاركين حول الذكاء الاصطناعي بين الذكور أعلى منها لدى الاناث؛ كما كانت معرفة الفئة العمرية بين٢٥ و٣٥ عاماً هي الأفضل مقارنة بالفئات العمرية الأخرى، بينما كانت آراء المشاركين حول الذكاء الاصطناعي للفئة العمرية أقل من ٢٤ عاماً أعلى من الفئات العمرية الأخرى. وكانت المعرفة والآراء حول الذكاء الاصطناعي لفئة سنوات الخبرة الأقل من ١٥ عاماً أعلى من فئات الخبرة الأخرى. إضافة الى ذلك كانت المعرفة بين فنيي الاشعة أكثر من منتسبي الوظائف الأخرى بينما كانت اتجاهات تقنيي الاشعة والتصوير الطبي حول الذكاء الاصطناعي وتطبيقاته أعلى من بقية الفئات الوظيفية الأخرى ضمن عينة البحث..

الخلاصة: يجب أن يكون التقدم في تقنيات الذكاء الاصطناعي وتطبيقاته في الاشعة التشخيصية مصحوباً بتدريب العاملين في مجال الاشعة والتصوير الطبي. حيث ان هناك العديد من الفوائد لمجالات عمل الأشعة والتصوير الطبي المدعومة بالذكاء الاصطناعي وتحسين الكفاءات، كما سيكون هناك ايضاً تعطيل واسع النطاق للأدوار التقليدية وتعديل في الرعاية التي تركز على المريض والتي يمكن إدارتها من قبل قوى عاملة جيدة التعليم والخبرة..

الجمهورية اليمنية
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كلية الطب وعلوم الصحة
برنامج تكنولوجيا التشخيصية للأشعة

تقييم المعارف والتصورات والتوقعات لدى طلبة وموظفي أقسام الأشعة التشخصية تجاه الذكاء الاصطناعي وتطبيقاته في الاشعة والتصوير الطبي

من إعداد:

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انتظار حزام مبارك
شيماء سليمان شرف
غدير بعثر شعلان
هاجر محمد الرجوي

تحت أشراف

د/. عبد الله طاهر

أستاذ مساعد في الطب الطبيعي وعلوم الإشعاع

بحث مقدم لاستيفاء متطلبات درجة البكالوريوس في الأشعة التشخيصية وتكنولوجيا التصوير الطبي

٢٠٢٣