

Knowledge and Practices of Radiographers Regarding Occupational Hazards and Protective Measures

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Abstract: The radiographers expose to several hazards in the hospitals. This effect includes statistic and deterministic effect.

The aim of the study was to assess knowledge and practices of radiographers regarding occupational hazards and protective measures.

Design: Descriptive design was utilized to conduct this study.

Setting: This study was conducted at all radiology department in all governmental hospitals within all Benha University Hospital, Health Insurance Hospital, Fever Hospital, Teaching Hospital and Chest's Disease Hospital.

Sample: All available radiographers who are working with X-Ray devices in the above-mentioned settings. (55 in Benha University Hospital, 10 in Health Insurance Hospital, 11 in Fever Hospital, 20 in Teaching Hospital, 4 in Chest's Disease Hospital). The total sample were 100 radiographers.

Tools: Data was collected by using two tools, Structured interviewing questionnaires to assess radiographers' knowledge about radiation hazards and protective measures, and observation checklist to assess radiographers' practices regarding protective measures.

Result: one third of radiographers their ages were 20 to less than 25 and had less than five years of work experiences, around three quarter of studied radiographer didn't receive training courses, Less than half of studied radiographers had satisfactory knowledge about radiation hazards and protective measures, about two third of studied radiographer had satisfactory practices regarding radiation hazard and it's protective measures.

Conclusion: Less than half of studied radiographers had satisfactory knowledge about radiation hazard and its protective measures, about two thirds of studied radiographer had satisfactory practices regarding radiation hazards and using protective measures

Recommendations: Health educational programs should be delivered and implemented to increase radiographers' knowledge and practices regarding radiation hazards and protective measures. Further researches should be done to assess radiographers' knowledge and practices regarding radiation hazards and protective measures.

Key Words: Radiographers, Occupational hazards, Protective measures.

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I. Introduction

Occupational health and safety are relevant to all branches of lives. the primary goal of occupational health is to improve health and safety and prevent injury at work. Delivery of this services to achieve this goal include risk assessment of hazard and control, monitoring work place, Intervention applied to reduce these hazards as modification of work condition so that the exposure is reduced [1]

Ionizing radiation is used in hospitals for diagnostic radiology; therefore, it is important for its users to be familiar with its effects. Exposure to ionizing radiation in hospitals is one of the major and most serious physical hazards that can result in severe irreversible damages among professional radiation workers. effects of ionizing radiation depend on several factors several factors as types of radiation, radiation dose and duration of exposure These effects are classified based on their nature and timing after exposure into stochastic or deterministic into stochastic or deterministic.[2]

Radiation protection is one of the most important issues in nuclear medicine, for staff protection, there are several rules that must be respected: adequate dose monitoring, continuous education and training, implement-tation of local hospital rules, informing the supervisor as soon as a pregnancy fundamental is

confirmed, employer must undertake risk assessment. three principles of radiation protection that include time and distance and shielding must be follow by radiographers. [3]

Occupational health nursing is the specialty practice that focuses on preventive healthcare, health promotion, and monitoring of the workers' health and healthy environment. Occupational health nursing increases the knowledge of healthcare workers about potential adverse health effects of ionizing radiation and applying the methods of safe work practice to protect them as periodic medical examination and follow-up investigation of hematological parameters is of great importance in addition to wearing personal protective equipment and dosimeter for individual dose assessment [4],[5],[6]

II. Significance of the study

Worldwide, 160 million of workers suffer from occupational diseases, more than 270 million suffer from occupational injuries and physical hazards as radiation, and about 2 million workers die prematurely every year from occupational illnesses such as, occupational poisonings, cancers. and 16% of Occupational hazard radiation come from artificial sources, mainly medical exposures, so this study was conducted to assess occupational hazards among radiographers in at Benha city [7],[8]

1.1 Aim of The Study

This study aimed to assess knowledge and practices of radiographers regarded occupational hazards and protective measures.

Assessing radiographers' knowledge about occupational hazards and protective measures.

Assessing radiographers' practices to prevent radiation hazards and using protective measures.

1.2 Research Question

- 1- What is the level of radiographers' knowledge regarding radiation hazards?
- 2- What are the protective practices among radiographers?
- 3- Is there a relation between socio-demographic characteristics of radiographers and their knowledge and practice regarding radiation hazards?

III. Subject and Method

2.1 Research design:

A descriptive research design was utilized to conduct this study.

2.2 Setting:

The study was conducted at all governmental hospitals with radiology department in Benha City including Benha University Hospital, Health Insurance Hospital, Fever Hospital, Teaching Hospital and Chest Disease Hospital.

2.3 Sampling:

All available radiographers who are working with X-Ray devices in the above-mentioned settings. The total sample were 100 radiographers (55 in Benha University Hospital, 10 in Health Insurance Hospital, 11 in Fever Hospital, 20 in Teaching Hospital, 4 in Chest Disease Hospital).

2.4 Tools of data collection

Two tools were used.

2.4.1 Structured interviewing questionnaires was developed by investigator and it consists of two parts:

Part I: Socio- demographic characteristics: It consisted of ten items related to age, sex, work place, marital status, family members, monthly income, experience years, working hours and training courses.

Part III: Assessment of radiographer's knowledge: it consists of two parts.

Part A: Radiographer's knowledge about radiation hazards: it consists of 15 question related to definition of radiation, sources of radiation, types of radiation, uses of radiation, uses of radiotherapy, method of tumor treatment types of radiotherapy, definition of radiation hazards, types of radiation hazards, effect of radiation on skin, eye, reproductive health, reproductive female health, blood count.

Part B: Radiographer's knowledge about protective measures of radiation hazards exposure: it consists of 10 question related to occupational safety definition, protective measure of radiation room, safety measure of radiation device, personal protective equipment workplace survey, rate of radiation exposure measurement, periodic medical checkup, performance of protective measure at workplace, protective guidelines at radiation department and sources of knowledge and protective measure at workplace.

Scoring system: items was scored 2 for complete answer, 1 for incomplete answer and 0 for don't know correct answer. The total knowledge score was considered good if the score of the total knowledge [23 point for radiation hazards, 14 point for protective measures.] while considered average if equal [15-23 point for radiation hazards, 9-14point for protective measures], and considered poor if total knowledge scoreless [<15 point for radiation hazards, <9) point for protective measures].

2.4.2 Observational checklist composed of two parts:

Part I: observational checklist for protective measures to assess workers 'uses of PPE. It includes 8 items e.g. personal dosimeter, wearing of lead apron, presence in radiation room during work, following protective principles, close x-ray room, wearing thyroid collar, wearing eye protect and wearing gloves.

Scoring system: The scoring system is ranged from 0 -2 it was scored 2 for Done, 1 for No done and 0 for Not available

The total practices score was considered satisfactory if the score of the total practices >80% (>13) point and considered unsatisfactory if it is <80% (< 13) point

2.5 Pilot study:

A pilot study was conducted to assess clarity and applicability. It has also served in estimating the time needed for filling the form of the study and detecting any possible obstacles that might face the investigator and interfere with data collection. There were no modification based on pilot study finding. It represented 10% of the sample (10 workers) they were included in the study sample.

2.6 Field work:

Official letter from Dean of faculty of Nursing – Benha University were delivered to director of each hospitals. A full explanation about the aim of the study was explained. Workers consent was obtained before starting collecting data. Data were collected throughout the period from beginning of May, 2019 to the end of august, 2019. The investigator visited the selected hospital from from 9 am to 12 pm, three days per week (Sunday, Tuesday, Thursday) about 3-4 radiographer per day, 30:45minutes for filling each tool. The field work was performed in the following sequence: study aim and importance were clarified to director of each hospital selected and department directors to gain their support and cooperation. In each sampled department, the investigator explained the study purpose to the workers.

2.7 Validity:

The tools validity was done by five of Faculty's Staff nursing experts from the Community Health Nursing Specialties who reviewed the tools for clarity, relevance comprehensiveness, and applicability.

2.8 Reliability of the tool:

Reliability of the tool was applied by the investigator for testing internal consistency of the tool. The reliability for knowledge was 0.71 for 25 question and for practices the reliability was 0.63 for 8 question.

2.9 Ethical consideration:

Oral consent was obtained from each radiographer before conducting the interview and given a brief orientation to purpose of the study. They were also reassured that all information gathered would be confidential and used only for purpose of the study. No names were required on the form to ensure anonymity and confidentiality.

2.10 Statistical design:

Data were analyzed using the Statistical Software Package for Social Science (SPSS) version. Qualitative data were expressed as percentage. Chi-square was used to examine the relation between qualitative variable. Person correlation (r) was used to detect association between quantitative variables.

IV. Results

Table (1): shows that 33%of the radiographers were aged from 20 to less than 25 years. While 27% of them were aged from 25 to less than 30 years. As well as 76% of radiographers were male, concerning the marital status 56% of radiographers were married, as well as 56%of the radiographers have children. As regards monthly income, 52%of radiographers don't have enough monthly income and 40% of radiographers have only enough monthly income.

Table (2): shows that 33% of radiographers have got less than 5 years of work experience, 30% of radiographers have got less than 10 years of work experience, 62% of radiographers are working 8hour/day. Regarding training courses, 72%of radiographers mention that they didn't received training courses, while 11%

of radiographers received training courses about first aid, 6% received training courses about infection control and 16% of radiographers received training courses about occupational safety.

Table (3): illustrates 44% of radiographers had complete correct answer about radiation hazard. Regarding radiation effect on skin, 42% of them had correct answer, 39% of them didn't know effect on the eye. Concerning reproductive health, 36% of them hadn't knowledge regarding radiation exposure effect on the reproductive health, 38% of them had the correct answer regarding effect on female reproductive health and 43% of them had the correct answer regarding hematological disease caused by radiation.

Table (4): The total knowledge score of the studied radiographers regarding protective measures of radiation were 50%. 42% of them hadn't knowledge regarding occupational health definition. 39% of them didn't aware knowledge about safety measures of radiation rooms, while 52% of them had correct answer about personal protective measures. Regarding workplace survey; 39% of them had the correct answer, while 39% of them had incorrect answer about rate of radiation exposure. Concerning periodic medical checkup; 42% of them had correct answer.

Figure (1): The study result illustrates that; 46% of the studied radiographers had good knowledge score about radiation hazards and protective measures, while 30% of them had poor knowledge about radiation hazards and protective measures

Table (5): The study result shows that; the personal dosimeter was not available for 100% of the studied radiographers, 56% of them wear apron during work. Regarding presence in radiation room; 51% of them didn't follow it while 84% of them following protective principles of time to limit exposure. Regarding close radiation room door; 95% of them followed it. Also, 91% of the studied radiographers had wear thyroid collar, while 73% of them didn't wear eye protective, and 65% of them didn't wear gloves.

Table (6): The study result show that; there were statistically significant difference between the studied radiographers' total knowledge score and their sex, their experience and training courses. ($p < 0.05$).

V. Discussion

Regarding socio demographic characteristic of the studied radiographers (Table 1) it was clear that; slightly less than two thirds of the studied radiographers aged 20 to less than 25 years. This result agrees with **Ali et al** [9] they studied "Evaluation of Ionizing Radiation Protection among Radiation Workers in X-ray departments in Erbil City", found that; 46.4% of radiographers aged between 21 - 30 years.

According to the studied radiographers' sex, the present study indicated that; about three quarter of the studied sample were male. This finding agrees with **Dauda et al.** [10] they studied "Occupational Radiation Monitoring in Tertiary Health Institutions of Northwestern Nigeria" and found that; 88.7% of radiation workers were male.

As regards marital status of the studied radiographers, the result of the present study revealed that; slightly more than half of the studied radiographers were married. This result agrees with **Ibrahim** [11] who studied "Assessment of Knowledge of Occupational Health Hazards and Safety Practices among Radiographers in The Greater Accra Region, Ghana" who found that; 54.4% of radiographers were married.

The current study showed that, slightly more than half of studied radiographers had children. This finding disagrees with **Moonga** [12] who studied "Occupation Radiation Exposure on Radiographers and Radiologists: Levels and Risks at University Teaching Hospital and Cancer Disease Hospital, Lusaka Zambia" who founded that; 57% of radiographers hadn't children.

The present study revealed that about half of the studied radiographers had insufficient monthly income. These might be due to more than half of studied radiographers were married and had children.

Regarding to experience years of the studied radiographers (**table 2**), the present study revealed that; about one third of the studied radiographers their experience were less than five years. This result disagrees with **Dauda et al** [10] they found that; 50.80% of the studied sample had working experience less than five years.

As regards to studied radiographers' working hours, the present study revealed that; slightly less than two thirds of studied radiographers had work 8hrs /day. This finding disagrees with **Mohammed** [13] who studied "Ionizing Radiation Hazards and Protection Practices among Radiographers at Cairo University Hospitals" who found that; 70% of radiographers worked for 12 hours.

As regarding training courses, around three quarters of studied radiographers hadn't received any training course. This result disagrees with **Kargar et al** [14] they studied "Assessment of Radiographers' Awareness about Radiation Protection Principles in Hospitals of Bandar Abbas, Iran" and found that; 84% of radiographers received courses about radiation. Also, this result disagrees with **Paolicchi et al** [15] they studied "Assessment of Radiation Protection Awareness and knowledge about Radiological Examination Doses among Italian radiographers" they found that; 31.5% of radiographers didn't receive any radiation safety courses.

According to radiographer's knowledge regarding radiation hazards (Table 4), the present study revealed that; less than half of the studied radiographers had correct and complete knowledge regarding radiation exposure effect on the skin, regarding radiation exposure effect on the eye, more than one third of the

studied radiographers didn't know correct answer, more than one third of the studied radiographers didn't know correct answer regarding radiation exposure effect on the reproductive health, less than half of them had correct and complete knowledge regarding radiation exposure effect on the reproductive female health as fetal malformation and less than half of the studied radiographers were aware that exposure to radiation can cause cancer. These findings disagrees with **Yurt et al. (2014)** they studied "Evaluation of awareness on radiation protection and knowledge about radiological examinations in health care professionals who use ionizing radiation at work" and they found that; 93.5% of studied sample were aware that radiation cause cancer, 79.3% of participants were aware that radiation affect reproductive health and cause infertility, 76.1% were aware that radiation exposure cause premature senility, 59.8% were aware that radiation causes skin disorder and 52.2% of participant were aware that radiation can cause cataract. These might be due to high percentage of the studied radiographers who didn't receive training courses had no enough experience

Concerning the studied radiographer's knowledge regarding radiation protective measures (table 4), the present study revealed that; less than half of the studied radiographers didn't know the definition of occupational health. This finding disagreed with **Ibrahim** [11] who found that; 100% radiographers were aware of occupational health.

The present study revealed that; more than one third of the studied radiographers didn't know safety measures of radiation room. This finding disagreed with **Ahmed et al** [17] they studied "Knowledge and Performance of Radiographers towards Radiation Protection, Taif, Saudi Arabia" they mentioned that; 98.7% of radiographers had correct knowledge regarding radiation room safety measures and were aware that door, wall consist of lead for protection.

The current study showed that; slightly more than half of the studied radiographers had correct and complete knowledge regarding personal protective measures. This result agrees with **Sharma et al** [18] who studied "Evaluation of knowledge and Practice Towards Radiation Protection among Radiographers of Agra City" and found that; all radiographers were aware of use of personal protective measures. This result may be due to majority of the studied radiographers acquire their knowledge from studies and didn't receive update knowledge or refresh courses.

The result of the current study revealed that; more than one third of the studied radiographers had correct and complete knowledge regarding workplace survey for radiation monitoring. This finding agrees with **Abo Zaid** [19] who mentioned that; 44.3% of radiology technicians were aware that there should be regular radiation survey for environmental radiation monitoring. These might be due to this survey wasn't actually applied in the hospitals regularly so they hadn't enough knowledge about it.

Regarding to radiographer's knowledge about rate of radiation exposure measurement, the present study showed that; more than one third of the studied radiographers had correct and incomplete knowledge regarding rate of radiation exposure measurement. This result incongruent with **Ahmed et al** [17] they found that; 98.7% of radiographers had correct knowledge regarding rate of radiation exposure measurement and were aware about radiation dose measurement. this might be due to hospital didn't supervise or provide these measurements at accurate time in addition lack of interest to have this knowledge.

Concerning periodic medical checkup; the current study showed that; less than half of the studied radiographers had correct and complete knowledge. This result in the same line with **University of Illinois at Urbana-Champaign** [20] which stated that; periodic medical examination is the examination that is performed at regular intervals as every 6 months and annually. These might be due to high percentage of the studied radiographers had insufficient monthly income.

According to personal practices of studied radiographers regarding radiation protective measures (Table 5), the present study showed that; the personal dosimeter was not available for all of the studied radiographers. This result disagrees with **Rostamzadeh et al** [21] they studied "Evaluation of the Level of Protection in Radiology Departments of Kermanshah, Iran" and mentioned that; 71.7% of radiographers used film badges. These might be due to lack of supervision of radiology protective commission.

Regarding studied radiographers' use of lead apron, the present study revealed that; more than half of studied radiographers worn intact lead apron during working hours. This result agrees with **ICRP** [22] which stated that; aprons should be worn by all staff working inside the x ray room the protective apron and the fit of protective is often more important to reduce radiation dose exposure.

In relation to personal practices of studied radiographers regarding radiation protective measures, the present study revealed that; Around half of them didn't stay in x-ray rooms during patient imaging. This result disagrees with **Mohamed** [13] who mentioned that; 34.4% of radiographers were observed inside X-ray rooms during imaging. This might be due to pressure of work and shortage of radiographers' number.

Concerning following protection principles, the current study showed that; the majority of the studied radiographer (84%) were followed this protection principles of time, distance and shielding to protect themselves. According **Saha** [23] who mentioned that; three basic strategies of radiation protection that include time, distance and shielding should be followed for dealing with radiation to minimize the external exposure or

internal absorption of radiation and hence to reduce the odds of cancers. This might be due to easy compliance with this protection principles that didn't require any effort or preparation.

Regarding to use of eye protection and close x-ray door during imaging, the present study showed that; slightly less than three quarter of studied radiographers didn't use eye protection, the majority of studied radiographers (95%) closed door of x-ray room. This result disagrees with **Dehaghi et al** [24] they studied "Radiation Protection in Radiology Departments of Ahvaz University of Medical Sciences Teaching Hospitals, Ahvaz, Iran" and found that; lead glass wasn't available and 57.1 of radiologist didn't close x-ray room during imaging. These might be due to there wasn't strict instruction focus on use this protective equipment and less strict supervision in following protection principles and lack of follow up regarding compliance with protective measures.

As regard use of thyroid collar, the current study showed that; most of the studied radiographers (91%) used thyroid collar during work. This result agrees with **Hoogeveen et al** [25] they studied "The value of thyroid shielding in intraoral radiography" and demonstrated that; the use of thyroid shield is to be advised when performing radiography and thyroid shield that result in an important dose reduction for the thyroid. This might be due to thyroid collar didn't interfere with radiographers' work.

Regarding to use of protective gloves, the result of this study showed that; about two thirds of the studied radiographers didn't use protective gloves. According Piciu [3] who mentioned that; wear gloves when handling with radioactive materials is essential aspect of radiation protection. These might be due lack of interest of radiographers to wear protective gloves and keep it.

The current study revealed that; there were statistically relation between radiographers' total knowledge score and their sex, their experience and training courses ($p < .05$) (table 6), the younger radiographers, the experience less than five years, the higher knowledge score. This result disagrees with Ibrahim [11] who reveal that; there was no significant association between any of the sociodemographic variables and their total knowledge score. These results in the same line with Kargar et al [14] they mentioned; the participation in the radiation training courses was significantly correlated with the radiographers' awareness regarding the radiation hazards ($P=0.022$). These might be due to as they still remember their knowledge from academic and had training courses, this made effect on their knowledge level.

VI. Tables and Figures

Table (1): Frequency distribution of the studied radiographers regarding socio demographic characteristics (n=100)

Socio demographic characteristics	%
Age	
20 -	33.0
25 -	27.0
30 -	15.0
35 -	9.0
40 +	16.0
Sex	
Male	76.0
Female	24.0
Marital status	
Single	39.0
Married	56.0
Divorced	4.0
Widower	1.0
Have children	
Yes	56.0
No	44.0
Income	
Enough and can save	8.0
Enough only	40.0
Insufficient	52.0

Table (2): Frequency distribution of the studied radiographers regarding job characteristics (n=100)

Radiographers job characteristics	%
Experience	
1 year <5 years	33.0
5 years < 10	30.0
10 years < 20	22.0
20 years and more	15.0
Work hours	
8hours	62.0
12 hours	32.0

24 hours	6.0
Receiving training courses	
Yes	28.0
No	72.0

Table (3): Frequency distribution of the studied radiographers regarding their knowledge about radiation and its hazards (n=100)

Radiographers knowledge about radiation hazard	Complete Answer	Incomplete answer	Don't know
	%	%	%
Radiation meaning	44.0	43.0	13.0
Types of radiation	52.0	27.0	21.0
Uses of radiation	56.0	23.0	21.0
Uses of radiotherapy	39.0	32.0	29.0
Methods of tumor treatment	36.0	31.0	33.0
Types of radiotherapy	42.0	13.0	45.0
Mechanism of radiation therapy	41.0	29.0	30.0
Radiation hazards definition	55.0	24.0	21.0
Types of radiation hazards	39.0	21.0	40.0
Radiation effect on skin condition	42.0	27.0	31.0
Radiation effect on eye's problems	36.0	25.0	39.0
Radiation effect on reproductive health	31.0	33.0	36.0
Radiation effect for reproductive female health	38.0	33.0	29.0
Hematological disease caused by radiation	43.0	16.0	41.0
Radiation effect on blood and urine analysis	0.41	0.17	0.42
Total	44.0	25.0	31.0

Table (4): Frequency distribution of the studied radiographers regarding their knowledge about radiation protective measures (n=100)

Radiographers knowledge about Radiation protective measures	Correct answer	Incorrect answer	Don't Know
	%	%	%
Definition of occupational health	41.0	17.0	42.0
Protective measures of radiation devices	42.0	27.0	31.0
Safety measures of radiation room	36.0	25.0	39.0
Personal protective measures of the radiographers	52.0	23.0	25.0
Comprehensive workplace survey	39.0	38.0	23.0
Rate of radiation exposure measurement of workers at the workplace	31.0	39.0	30.0
Periodic medical checkups	42.0	28.0	30.0
Protective measure at work place are performed by	26.0	27.0	47.0
Protective guidelines at radiation department	42.0	12.0	46.0
Total	50.0	22.0	28.0

Figure (1): Frequency distribution of the studied radiographers regarding their total knowledge about radiation hazards and protective measures (n=100).

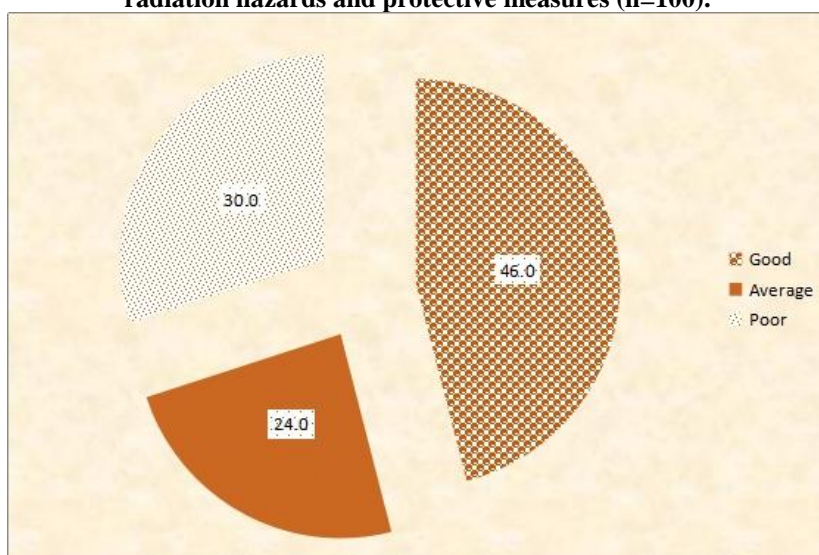


Table (5): Frequency distribution of the studied radiographers regarding their practices about radiation protective measures (n=100)

Radiographers practices about radiation protective measures	Done	Not done	Not available
	%	%	%
Use appropriate personal dosimeter	0.0	0.0	100.0
Wear of intact lead apron during working hours	56.0	44.0	0.0
Presence in the radiation room only during preparation of patient image	49.0	51.0	0.0
Follow protection principles of times to limit exposure	84.0	16.0	0.0
Close x-ray door during imaging	95.0	5.0	0.0
Wear thyroid collar	91.0	9.0	0.0
Wear eye protection	6.0	73.0	21.0
Wear suitable gloves	14.0	65.0	21.0

Table (6): Relation between the studied radiographers' total knowledge score and their socio-demographic characteristics (n=100)

Socio-demographic characteristics	Poor (n=30)	Average (n=24)	Good (n=46)	X ²	p-value
	%	%	%		
Age					
20 -	26.7	29.2	39.1	3.06	0.93
25 -	26.7	25.0	28.3		
30 -	20.0	12.5	13.0		
35 -	10.0	12.5	6.5		
40 +	16.7	20.8	13.0		
Sex					
Male	73.3	83.3	73.9	0.93	0.01*
Female	26.7	16.7	26.1		
Marital status					
Single	33.3	33.3	45.7	4.789	0.571
Married	63.3	58.3	50.0		
Divorced	3.3	4.2	4.3		
Widower	0.0	4.2	0.0		
Income					
enough and can save	10.0	4.2	8.7	3.137	0.535
Enough only	46.7	29.2	41.3		
Insufficient	43.3	66.7	50.0		
Experience					
1 year <5 years	26.7	25.0	41.3	3.324	0.027*
5 years < 10	33.3	29.2	28.3		
10 years < 20	23.3	25.0	19.6		
20 years and more	16.7	20.8	10.9		
Received training courses					
Yes	26.7	33.3	26.1	0.449	0.039*
No	73.3	66.7	73.9		

*A statistically significant difference (P ≤ 0.05)

VII. Conclusion

Based on the results of the present study and research questions, the study concluded that around one thirds (33%) of radiographers age ranged between 20 -25years. Less than half of radiographers had good knowledge regarding radiation hazards and protective measures, more than half of radiographers had satisfied practices regarding radiation protective measures. There were statistically significant relation between the radiographers' total knowledge score and their sex, years of experience and training courses. Also, there were statistically significant relation between the studied radiographer's total practices score and their age, year of experience. In addition, there were positive correlation between total knowledge score of the studied radiographers and their total practices score regarding radiation hazards and protective measures.

VI. Recommendations

Based on the findings and conclusion of the current study the following recommendation are suggested:

- 1- Health educational programs and continuing training courses on regular basis to increase radiographers' knowledge and practices regarding radiation hazards and protective measures.
- 2-Further researches in large sample to assess radiographers' knowledge and practices regarding radiation hazards and protective measures.

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