Pharmacophore

ISSN-2229-5402

Journal home page: http://www.pharmacophorejournal.com

Pharmacophore
an International Journal
ISSN 2229-5402

OCCUPATIONAL RADIATION DOSE FOR MEDICAL WORKERS IN DIAGNOSTIC RADIOLOGY AND NUCLEAR MEDICINE IN MAKKAH HOSPITALS

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ARTICLE INFO

Received:
27 May 2019
Received in revised form:
28 Nov 2019
Accepted:
03 Dec 2019
Available online:
28 Dec 2019

Keywords:Occupational exposure, Radiation dose, Nuclear medicine (NM), diagnostic radiology(DR)

ABSTRACT

Background: Radiation exposure poses hazards for health-care suppliers and patients in health-care facilities (HCFs). Photography imaging is very valuable as a diagnostic tool, however, radiation and computed axial tomography (CT) scans carry well-known potential risks. Personnel and radiation safety observation is a very important safety precaution within apply of radiography, in drugs, research, education, industry, and agriculture field. The mixture of improved health services related to the aging population has resulted in increased use of radionuclides and radiation in designation and treatment.One of the hazards of working in a department of nuclear medicine (NM) or diagnostic radiology (DR) is the possibility of long-term exposure to low-level radiation and any associated biological effects. Evidence of reversible and irreversible genotoxic effects during periods of radiation exposure has been reported The massive variation in exposure among employees operating with radiation in departments of NM and DR has been attributed to the character of the work the individual carries out.The as low as reasonably achievable (ALARA) principle, which emphasizes utilizing techniques and procedures to keep exposure to a level as low as reasonably achievable, should be followed to minimize the risk of radiation exposure to medical professionals. Personnel shielding options (e.g., two-piece wraparound aprons, thyroid shields, and eye protection) should be used to effectively attenuate scattered x-ray levels. From the basic safety standards (BSS) recommendation the equivalent doses limits ought to apply, i) to the full-body, as drawn by the operational amount power unit; and ii) to the extremities via the operational amount power unit (0.07). The researchers calculable that the cancer risk incidence directly will increase with the absorbed dose. it's vital, for this low radiation dose to determine a model to determine the malignant neoplastic disease effects for that dose . the target of the Radiological is to produce a system and helpful standards for radiation protection as well as medical, activity, environmental, and exposure through tomography accidents while not unduly limiting the helpful practices giving rise to radiation exposure .**Aim of the study**: to assess, analyze and discuss the occupational exposure and safety protection radiation doses for medical workers from two departments of (NM) and (DR) in Makkah hospital during 2017 and 2018 to compare the mean doses received with the limit of 20 mSv/year of the International Commission of Radiological Protection (ICRP) .**Method**: The radiation exposure of each staff member working in departments of NM and DR is routinely monitored using thermo luminescent dosimeter (TLD). Generally, 2 dose quantities, i.e. Hp(10) and the Hp(0.07), are reported for each staff member . **Results:** the majority of participant from MAK, AL Noor . H department were constitutes (48.1%) In the Distribution of the annual average Hp(10) andHp(0.07)were calculated for each group .is no significant relation between Hp(10) and Hp(0.07) in the Sum 2018 where T= 0.993 and p-value 0.322. Distribution of the change in 2017 and 2018 in Dosimeter Use of Hp(10) and Hp(0.07) and data , paired of T-test were calculated for each group is a significant relation between Hp(10) in the Sum 2017 and Sum 2018 were difference increase from 2017 to 2018 T= 9.500 and p-value <0.001**Conclusion**:The annual dose Hp(10) were well below the international recommended dose limit of the ICRP. Another attention-grabbing conclusion is that the low level of overall data of radio graphical procedures among the nursing employees. Further studies should be conducted to highlight different aspects of radiation exposure dose and safety protection tools.

ToCiteThisArticle: Hani A. Alhazmi, Adel S. Alsirwani, Meteb N. Aldaadi, Faisal A. Alharthy, Mohammed A. Tashkandi, Esam A. Jahri,(2019), "Occupational Radiation Dose For Medical Workers In Diagnostic Radiology And Nuclear Medicine In Makkah Hospitals",***Pharmacophore, 10(6)****,62-73.*

Introduction

The occupational exposures arise from the radiation exposure to individuals at work from natural and semisynthetic sources as a result of operations inside a withen a workplace. Except for exposures excluded from the standards and exposures from practices or sources exempted by standards [1].

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The safety of patients and employees may be a priority of each diagnostic or therapeutic procedure involving radiation. Medical employees up to date with radiation should proceed in accordance with the As Low As affordable possible (ALARA) principles [2]. This includes performing the scans with probably lowest doses of radiation permitting to get the specified diagnostic impact .The number of studies concerning the attention of imaging protection problems in medical employees no matter position is low .Radiation exposure poses hazards for health-care providers as well as patients in health-care facilities (HCFs). Radiographic imaging is extremely valuable as a diagnostic tool in medicine, but ionizing radiation and computed tomography (CT) scan carry well-known potential risks. Personnel and radiation safety monitoring is an important safety precaution in the practice of radiography [3].

The good information of the total spectrum of radiation effects among the staff of radiology departments isn't eligible because of their specialist back ground. Of note is that the comparatively they are thrown awareness of tomography protection among emergency departments, Regardless of position (physician, nurse, auxiliary staff). It seems that this can be because of the frequent contacts of those professionals with imagingof the diseases labs, leading to higher understanding of tomography procedures [4].

Medical diagnostic X-ray workers are one occupational group that has exposure to continuous low doses of external radiation over their working lifetimes [5]. With the wide application of radiation withen the field of medicine, human exposure to radiation has been unendingly increasing. On a worldwide scale, medical radiation has become the most supply of artificial radiation, because it is liable for one-fifth of the annual collective effective dose of artificial radiation. The country had progressively paid more attention to radiation protection for radiation diagnostic and treatment [6]. One of the hazards of working in a department of (NM) or (DR) is the possibility of long-term exposure to low-level radiation and any associated biological effects. Evidence of reversible and irreversible genotoxic effects during periods of radiation exposure has been reported. [7]. Today the stress on radiation management in diagnostic radiology has shifted back to protection of patients .the low doses of x-radiation utilized in routine diagnostic procedures might lead to little incidence of latent harmful fetuses are sensitive to x-ray radiation early in pregnant [8]. Critically ill patients are frequently transported to the CT scan as well as digital subtraction angiography suites for diagnostic and therapeutic procedures such as angiography, embolization and stenting. In most situations, the intensive care unit (ICU) team is responsible for the transport and management of the patient in the radiology department for these procedures [9].

Very difficult to explain the low level of knowledge of the properties of ionizing radiation among oncology staff. This is all the more surprising that patients referred to diagnostic examinations from oncology units constitute a high percentage of all patients being diagnosed in every medical institution. [10].

Recommendations for limits of exposure and dose. The biological effects of radiation rely on the quantity of energy absorbed by the cells and wherever withen the cell the energy is absorbed. Biological effects are divided into deterministic effects and stochastic effects. Deterministic effects detail the following: erythroderma, organic phenomenon, cataracts, attenuated white blood count, organ atrophy, pathology and sterility [11].

Maximum Permissible Dose Limits to Radiation Workers.

Maximum permissible dose limits for adult radiation staff (listed below) apply to any combination of dose received from external or internal exposure. These limits don't apply to doses received from background signal or from medical procedures. An adult radiation employee is outlined as a personal eighteen years old or older.child labor lawa prohibit individuals below the age of eighteen from operating with bound styles of radioactive materials or in certain areas wherever activity radiation exposure might occur. It's the policy of EHS that minors aren't commonly permissible to figure with sources of radiation [12].

Annual Maximum Permissible Dose Limits		
mrem	rem	
5,000	5	Whole Body Deep Dose Equivalent (Head, trunk, active blood-forming organs & reproductive organs)
50,000	50	Whole Body Shallow Dose Equivalent (Skin of the whole body
15,000	15	Lens of Eye Dose Equivalent
50,000	50	Extremities (Hands, forearms, feet and ankles)

Radiological investigations and therapeutics have become an integral part of the management of critically ill patients in the (ICU). Patients admitted to the ICU routinely undergo bedside imaging procedures such as chest radiographs for diagnosing heart, lung and other pathology, and for confirmation of the position of devices like endotracheal tubes, nasogastric tubes, central venous catheters and intercostal drains[13]. Monitoring of staff's radiation exposure in medicine is an important radiation protectiontask. [4]the probability of biological effect increases with increasing dose, but the intensity of the effect is not a function of the absorbed dose. For example, a cancer produced by 100 rads is no worse than the same cancer induced by 10 rads[14]. among ICU patients, up to of daily chest radiographs and of chest (CT) scans reveal significant or unsuspected abnormalities that may lead to a change in the patient's management [15].

Brief description of the research:
To assess, analyze and discuss the Occupational radiation doses for medical workers from two NMand DR in makkah hospital during 2017 and 2018 to compare the mean doses received with the limit of 20 mSv/year of the ICRP.

Rationale:
To date, little, review of literature showed that there were no data related to the occupational exposure and safety protection radiation doses for medical workers from two departments of NM and DR.

Aim of the study:
The study aimed to assess, analyze and discuss the occupational exposure and safety protection radiation doses for medical workers from two departments of NMand DR in makkah hospital during 2017 and 2018 to compare the mean doses received with the limit of 20 mSv/year of the ICRP.

Design:
The radiation exposure of each staff member working in departments of NM and DR is routinely monitored four times in year byusing TLD. Generally, 2 dose quantities, i.e. Hp(10) and the Hp(0.07), are reported for each staff member.

Purpose:
To assess, analyze and discuss the occupational radiation doses for medical workers from two departments of NM and DR in makkah hospital during 2017 and 2018 to compare the mean doses received with the limit of 20 mSv/year of the ICRP.The objective of the ICRP is to provide a system and useful standards for radiation protection including medical, occupational, environmental, and exposure through radiological accidents without unduly limiting the beneficial practices giving rise to radiation exposure.The term occupational exposures arise from the ionizing radiation exposure to people at work from natural and man-made sources as a result of operations withen a workplace except for exposures excluded from the standards and exposures from practices or sources exempted by standards.

Materials and Methods

The radiation exposure of each staff member working in departments of NM and DR is routinely monitored using TLD. Generally, 2 dose quantitieswhole-body dose or effective doseHp(10) and theskindoseHp(0.07), are reported for each staff member. The whole-body dose and the skin doseof the staff of departments of NM and DR in Makkah hospital for the period of 2017 and 2018 were taken from (Administration of radiation protection). Radiation workers grouped as Radiologist, Technician, medical physics and Nurse from two departments. The annual average Hp(10) and Hp(0.07) were calculated for each group and comparisons were made between the groups and years. We will Compare The mean Hp(10) with the limits of the ICRP.

Study setting:
Departmentsof NM and DR in Makkah hospital for the period of 2017 and 2018.

Inclusion criteria:
All staff working in departments of DR and NM in Makkah hospital.

Exclusion criteria:
1. TLD readings for pregnant woman working in Departments of NM and DR.
2. Staff who have TLD readings less than 4 times per year.

Statistical analysis.
The data were entered and analyzed by using Statistical Package for the Social Sciences (SPSS) software, version 21 (SPSS-Inc., Chicago, IL).

Data collection method:
Self-administered data collection

Questionnaire validity:
The researcher consultations of the consultants of different specialties who have enough experience and interest in the subject and some amendments were done, accordingly.

Pilot study:

A pilot study will be done on who meet the study's eligibility criteria. The pilot study will mainly help examine both the instrument's content validity and construct validity issues, alongside with other needed information, as follows: undergo necessary changes and modifications, accordingly.

Ethical consideration:.

1. Necessary approval by regional ethical committee in general directorate of health affairs of Makkah region.
2. Data will be treated confidentially and will be used only for the purpose of research

Result

Table (1) the distribution of Socio-demographic data to the ionizing radiation exposure to people at work in study group(605) in medical

Department Name.
In our study, the majority of participant from MAK, AL Noor. H department were constitutes (48.1%) while the secondary department MAK, King .Aziz year represents (17.2 %) while the next department MAK, Hera .H were constitutes (13.2 %) followed by MAK, King Faisal were constitutes (12.6%) while the MAK, Kholes. H were constitutes (3.3%).

Table 1: The distribution of Socio-demographic data to the ionizing radiation exposure to people at work in study group (605) in medical

	N	%
Hospital Name		
MAK, Ajyad H.	16	2.6
MAK, AL Noor.H	291	48.1
MAK, IbnSina.H	18	3.0
MAK,Hera.H	80	13.2
MAK,Kholes.H	20	3.3
MAK,King Faisal	76	12.6
MAK,King.Aziz	104	17.2
work place		
X-ray	363	60.0
CT	164	27.1
Medical Physicis	45	7.4
Nuclear Medicine	8	1.3
ANG	16	2.6
Flouro	9	1.5
job title		
Technician	379	62.6
Radiologist	134	22.1
Medical Physicis	50	8.2
Nurse	42	6.9

Dosimeter Used.
The participant used dosimeter Hp(10) were constitutes (50.1%) while participant use Hp(0.07) were constitutes (49.9%).

Work place.
The majority of our participants were work at X-ray department were constitutes (60%) followed by CT department were constitutes (27.1%) while Medical Physicis department wereconstitutes (7.4 %) the ANG department were constitutes (2.6%) and Fluoroscopy department were constitutes (1.5 %) The Nuclear Medicine were constitutes (1.3%).

Job title.
The majority of our participants job title were Technician were constitutes (1) (62.6%) followed by Radiologist were constitutes (2) (22.1%) while Medical Physicis title were constitutes (3) (8.2 %) the title Nurse were constitutes (4) (6 .9%).
Table (2) Distribution of the annual average Hp(10) and Hp(0.07) were calculated for each group

Table 2: Distribution of the annual average Hp(10) and Hp(0.07)were calculated for each group.

	Dosimeter Used				T-test	
	Hp(10)		Hp(0.07)			
	Range	Mean ± SD	Range	Mean ± SD	t	P-value
1st Quarter	0.085 - 1.587	0.255 ± 0.154	0.081 - 1.699	0.242 ± 0.157	0.926	0.355
2nd Quarter	0.090 - 1.855	0.244 ± 0.160	0.081 - 1.729	0.233 ± 0.152	0.761	0.447
3rd Quarter	0.063 - 2.776	0.240 ± 0.181	0.058 - 1.239	0.230 ± 0.107	0.817	0.414
4th Quarter	0.109 - 1.135	0.242 ± 0.127	0.108 - 1.096	0.218 ± 0.116	2.306	0.021
Sum 2017	0.520 - 2.567	0.918 ± 0.247	0.578 - 2.349	0.872 ± 0.236	1.912	0.057
1st Quarter	0.100 - 1.973	0.250 ± 0.175	0.087 - 1.773	0.241 ± 0.177	0.657	0.512
2nd Quarter	0.117 - 0.895	0.238 ± 0.108	0.098 - 0.953	0.222 ± 0.099	1.786	0.075
3rd Quarter	0.073 - 1.879	0.397 ± 0.215	0.084 - 2.912	0.408 ± 0.276	-0.505	0.614
4th Quarter	0.125 - 1.397	0.362 ± 0.196	0.097 - 1.699	0.370 ± 0.193	-0.497	0.620
Sum 2018	0.578 - 2.933	1.139 ± 0.324	0.637 - 2.980	1.140 ± 0.346	-0.043	0.966
sum (2017+2018)	1.212 - 4.651	2.009 ± 0.468	1.266 - 4.604	1.956 ± 0.462	0.993	0.322

1st Quarter:

Show that is no significant relation between Hp(10) and Hp(0.07) in the 1st Quarter where T= 0.926 and p-value 0.355. While in the Hp(10) Ranged from (0.085to 1.587) the Mean±SD (0.255±0.154) . While in the Hp(0.07) Ranged from (0.081to 1.699) the Mean±SD (0. 242±0.157)

2nd Quarter

Show that is no significant relation between Hp(10) and Hp(0.07) in the 2nd Quarter where T= 0.761and p-value 0.447. while in the Hp(10) Ranged from (0.090to1.855) the Mean±SD (0.244±0.160) . While in the Hp(0.07) Ranged from (0.081to 1.729) the Mean±SD (0.233±0.152)

3rd Quarter

Show that is no significant relation between Hp(10) and Hp(0.07) in the 3rd Quarter where T= 0.817and p-value 0.414. While in the Hp(10) Ranged from (0.063to2.776) the Mean±SD (0.240±0.181). While in the Hp(0.07) Ranged from (0.058to1.239) the Mean±SD (0.230±0.107)

4th Quarter

Show that is no significant relation between Hp(10) and Hp(0.07) in the 4th Quarter where T= 2.306 and p-value 0.021. While in the Hp(10) Ranged from (0.109 to1.135) the Mean±SD (0.242 ±0.127). While in the Hp(0.07) Ranged from (0.108 to1.096) the Mean±SD (0.218 ±0.116) .

Sum 2017

Show that is no significant relation between Hp(10) and Hp(0.07) in the Sum 2017 where T= 1.912 and p-value 0.057. While in the Hp(10) Ranged from (0.520 to 2.567) the Mean±SD (0.918±0.247). While in the Hp(0.07) Ranged from (0.578 to 2.349) the Mean±SD (0.872±0.236).

1st Quarter:

Show that is no significant relation between Hp(10) and Hp(0.07) in the 1st Quarter where T= 0.657 and p-value 0.512. While in the Hp(10) Ranged from (0.100 to 1.973) the Mean±SD (0.250±0.175) . While in the Hp(0.07) Ranged from (0.087to 1.773) the Mean±SD (0.241±0.177).

2nd Quarter

Show that is no significant relation between Hp(10) and Hp(0.07) in the 2nd Quarter where T= 1.786 and p-value 0.075. While in the Hp(10) Ranged from (0.117 to 0.895) the Mean±SD (0.238±0.108) . While in the Hp(0.07) Ranged from (0.098to 0.953) the Mean±SD (0.222±0.099).

3rd Quarter

Show that is no significant relation between Hp(10) and Hp(0.07) in the 3rd Quarter where T= -0.505 and p-value 0.614. While in the Hp(10) Ranged from (0.073to 1.879) the Mean±SD (0.397±0.215). While in the Hp(0.07) Ranged from (0.084to 2.912) the Mean±SD (0.408±0.276).

4th Quarter

Show that is no significant relation between Hp(10) and Hp(0.07) in the 4th Quarter where T= -0.043 and p-value 0.620. While in the Hp(10) Ranged from (0.125 to 1.397) the Mean±SD (0.362±0.196). While in the Hp(0.07) Ranged from (0.097to 1.699) the Mean±SD (0.370±0.193).

Sum 2018

Show that is no significant relation between Hp(10) and Hp(0.07) in the Sum 2018where T= -0.043 and p-value 0.966 . While in the Hp(10) Ranged from (0.578to 2.933) the Mean±SD (1.139±0.324) . While in the Hp(0.07) Ranged from (0.637to 2.980) the Mean±SD (1.140±0.346).

Sum (2017+2018)

Show that is no significant relation between Hp(10) and HP(0.07) in the Sum 2018 where T= 0.993 and p-value 0.322. While in the Hp(10) Ranged from (1.212 to 4.651) the Mean±SD (2.009±0.468) . While in the Hp(0.07) Ranged from (1.266to 4.604) the Mean±SD (1.956±0.462).

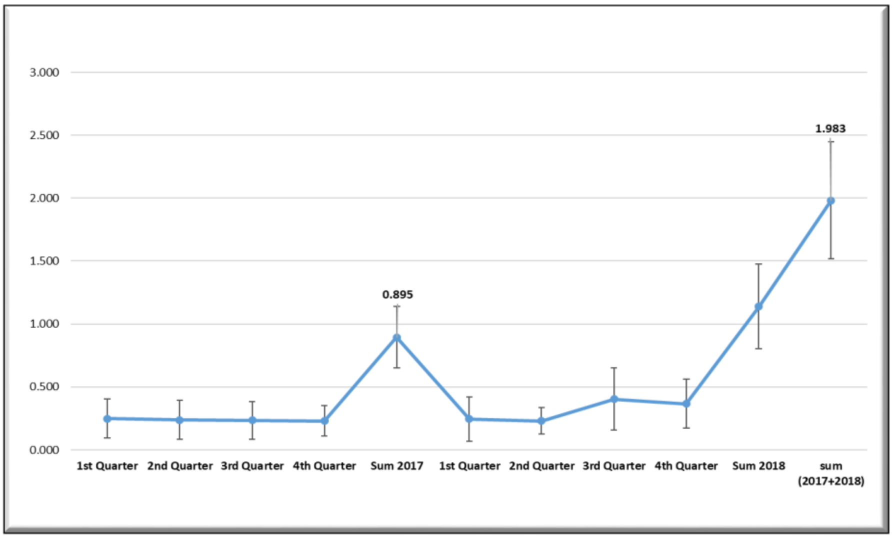

Figure 1: Distribution of the annual average Hp(10) and Hp (07) were calculated for each group

Table (3) Distribution of the change in 2017 and 2018 in Dosimeter Use of Hp(10) and Hp(0.07) and data , paired of T-test were calculated for each group

Table 3: Distribution of the change in 2017 and 2018 inDosimeter Use of Hp(10) andHp(0.07)and data , paired of T-test were calculated for each group

Dosimeter Used		Data			Difference			% of change	Paired T-test	
		Mean	**±**	**SD**	**Mean**	**±**	**SD**		**t**	**P-value**
Hp(10)	**Sum 2017**	0.904	±	0.235	0.201	±	0.273	22.244	9.074	<0.001*
	Sum 2018	1.105	±	0.303						
Hp(0.07)	**Sum 2017**	0.860	±	0.230	0.237	±	0.307	27.510	9.500	<0.001*
	Sum 2018	1.096	±	0.318						

Reading of Hp(10) in sum 2017 & 2018

Show that is a significant relation between Hp(10) in the Sum 2017 and Sum 2018 were difference increase from 2017 to 2018 where T= 9.074 and p-value <0.001 and the Mean±SD (0.904±0.235) While in the Hp(10) in the Sum 2017 the Mean±SD (1.139±0.324) butthe Hp(10) in the Sum 2018 Mean±SD (1.105±0.303) While the % of change (22.244)

Reading of Hp(0.07) in sum 2017 & 2018

Show that is a significant relation between Hp(10) in the Sum 2017 and Sum 2018 were difference increase from 2017 to 2018 T= 9.500 and p-value <0.001 and the Mean±SD (0.237±0.307) While in the Hp(10) in the Sum 2017 the Mean±SD (0.860±0.230) but the Hp(10) in the Sum 2018 Mean±SD (1.096± 0.318) While the % of change (27.510)

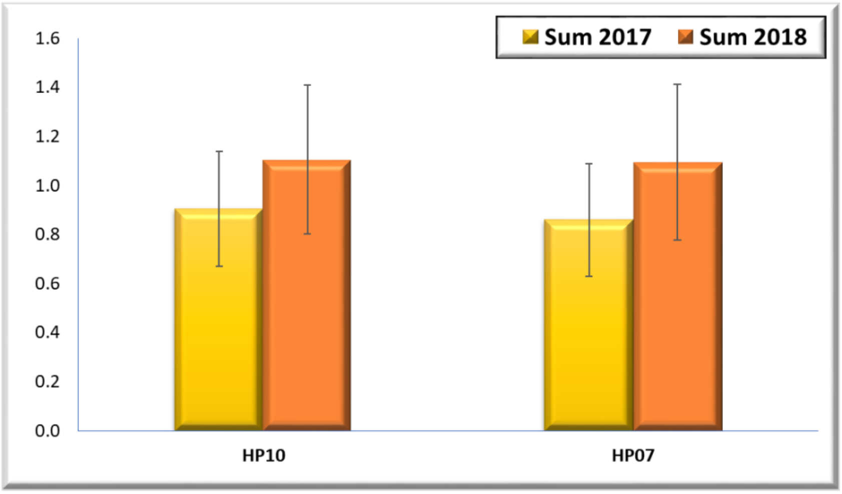

Figure 2: Distribution of the change in 2017 and 2018 in Dosimeter Use of Hp(10) and Hp(0.07) and data , paired of T-test were calculated for each group

Is a significant relation between Hp(10) in the Sum 2017 and Sum 2018 were difference increase from 2017 to 2018?

Table (4) Comparison of change in different hospitals in year 2017 & 2018 in effective dose of Hp(10)&Hp(0.07)

Sum 2017

Show that is a significant relation between hospitals in sum 2017 and Hp(10)where F= 6.379 and p-value <0.001 while increase in MAK, AL Noor .H were Mean±SD (1.011 ±0.260) followed by MAK, Hera .H Mean±SD (0.981±0.343) thenMAK ,King FaisalMean±SD (0.862±0.170) thenMAK, AjyadHMean±SD (0.817±0.098) thenMAK, IbnSina. HthenMAK, King .Aziz and MAK ,Kholes .H

On another hand Show that is a significant relation between hospitals in sum 2017 and Hp(0.07)where F= 3.454 and p-value 3.454 while increase in MAK, AL Noor .H were Mean±SD (0.943 ±0.242) followed by MAK ,Hera. H Mean±SD (0.900±0.347)thenMAK, King FaisalMean±SD (0.842 ±0.191) thenMAK, IbnSina . H Mean±SD(0.792 ±0.079)thenMAK, Ajyad H Mean±SD (0.740±0.063) thenMAK, Kholes .H and MAK ,King. Aziz .

Sum 2018

Show that is a significant relation between hospitals in sum 2018 and Hp(10)where F= 20.153 and p-value <0.001 while increase in MAK, AL Noor .H were Mean±SD (1.341±0.322) followed by MAK ,Hera .H Mean±SD (1.099±0.305) thenIbnSina .HMean±SD (1.055±0.187) then MAK,King. Aziz(0.966±0.121) MAK, AjyadHMean±SD (0.925±0.099) then and MAK, Kholes .H (0.921±0.072) then MAK ,King Faisal .

On another hand Show that is a significant relation between hospitals in sum 2018 and HP(0.07)where F=17.591 and p-value <0.001 while increase in MAK, AL Noor .H were Mean±SD (1.348±0.343) followed by MAK, IbnSina . H Mean±SD(1.092±0.177) thenMAK ,Hera. H Mean±SD (1.089± 0.342)thenMAK, King. AzizMean±SD (0.984±0.194) thenMAK, Kholes .H Mean±SD(0.889±0.095) thenMAK, King FaisalMean±SD (0.862 ±0.143) thenMAK, Ajyad H Mean±SD (0.855±0.116) .

Table 4: Comparison of change in in different hospitals in year 2017 & 2018 in effective dose of Hp(10)&Hp(0.07).

		Hp(10)			ANOVA		Hp(0.07)			ANOVA	
		Mean	**±**	**SD**	**F**	**P-value**	**Mean**	**±**	**SD**	**F**	**P-value**
Sum 2017	**MAK, Ajyad H.**	0.817	±	0.098	6.379	<0.001*	0.740	±	0.063	3.454	3.454*
	MAK, AL Noor.H	1.011	±	0.260			0.943	±	0.242		
	MAK, IbnSina.H	0.798	±	0.093			0.792	±	0.079		
	MAK,Hera.H	0.981	±	0.343			0.900	±	0.347		
	MAK,Kholes.H	0.754	±	0.086			0.734	±	0.110		
	MAK,King Faisal	0.862	±	0.170			0.842	±	0.191		
	MAK,King.Aziz	0.776	±	0.080			0.782	±	0.126		
	MAK, Ajyad H.	0.925	±	0.099			0.855	±	0.116		
	MAK, AL Noor.H	1.341	±	0.322			1.348	±	0.343		

		Hp(10) Mean ± SD	F	P-value	Hp(0.07) Mean ± SD	F	P-value
Sum 2018	**MAK, IbnSina.H**	1.055 ± 0.187	20.153	<0.001*	1.092 ± 0.177	17.591	<0.001*
	MAK,Hera.H	1.099 ± 0.305			1.089 ± 0.342		
	MAK,Kholes.H	0.921 ± 0.072			0.889 ± 0.095		
	MAK,King Faisal	0.862 ± 0.154			0.862 ± 0.143		
	MAK,King.Aziz	0.966 ± 0.121			0.984 ± 0.194		
sum (2017+2018)	**MAK, Ajyad H.**	1.731 ± 0.129	11.536	<0.001*	1.583 ± 0.135	10.386	<0.001*
	MAK, AL Noor.H	2.299 ± 0.486			2.239 ± 0.471		
	MAK, IbnSina.H	1.846 ± 0.273			1.843 ± 0.242		
	MAK,Hera.H	2.038 ± 0.472			1.934 ± 0.501		
	MAK,Kholes.H	1.656 ± 0.105			1.602 ± 0.163		
	MAK,King Faisal	1.719 ± 0.262			1.687 ± 0.232		
	MAK,King.Aziz	1.725 ± 0.146			1.743 ± 0.241		

Sum (2017+2018)

Show that is a significant relation increase between hospitals in sum (2017+2018) andHp(10)where F= 11.536 and p-value <0.001 while increase in MAK, AL Noor .H were Mean±SD (2.299±0.486) followed by MAK, Hera. H Mean±SD (2.038±0.472)thenIbnSina. H were Mean±SD (1.846±0.273)AjyadHMean±SD (1.731±0.129)then MAK,KingFaisalMean±SD (1.719±0.262) thenMAK,King.Aziz were Mean±SD (1.725±0.146)and MAK, Kholes. H were Mean±SD (1.656±0.105)On another hand Show that is a significant relation between hospitals in sum (2017 +2018) and Hp(0.07)where F=10.386 and p-value <0.001 while increase in MAK, AL Noor .H were Mean±SD (2.239 ±0.471) followed by MAK ,Hera. H Mean±SD (1.934±0.501)then,IbnSina. H Mean±SD(1.843±0.242)then MAK,King. Aziz .H Mean±SD (1.743±0.241) then MAK, King Faisal .H Mean±SD (1.687±0.232) thenthenMAK, Kholes.HANDMAKthenMAK, Ajyad H.

Table 5: Comparison of change in year 2017 & 2018 in mean levels of radiation exposure in effective dose of Hp(10)&Hp(0.07)

		Hp(10)	**ANOVA**		**Hp(0.07)**	**ANOVA**	
		Mean ± SD	**F**	**P-value**	**Mean ± SD**	**F**	**P-value**
Sum 2017	**X-ray**	0.925 ± 0.257	2.596	0.027*	0.882 ± 0.255	1.644	0.150
	CT	0.860 ± 0.159			0.827 ± 0.151		
	Medical Physicis	0.949 ± 0.302			0.882 ± 0.250		
	Nuclear Medicine	1.420 ±			1.191 ±		
	ANG	1.192 ± 0.367			1.072 ± 0.376		
	Flouro	0.841 ± 0.084			0.731 ± 0.044		
Sum 2018	**X-ray**	1.141 ± 0.288	3.719	0.003*	1.144 ± 0.297	2.859	0.016*
	CT	1.125 ± 0.357			1.134 ± 0.407		
	Medical Physicis	1.016 ± 0.164			1.004 ± 0.211		
	Nuclear Medicine	1.291 ± 0.008			1.346 ± 0.230		
	ANG	1.744 ± 0.794			1.603 ± 0.775		
	Flouro	0.928 ± 0.001			0.894 ± 0.059		
sum (2017+2018)	**X-ray**	2.046 ± 0.458	5.184	<0.001*	1.997 ± 0.441	4.533	0.001*
	CT	1.894 ± 0.340			1.857 ± 0.364		
	Medical Physicis	1.841 ± 0.228			1.790 ± 0.268		
	Nuclear Medicine	2.717 ±			2.375 ±		
	ANG	3.069 ± 1.375			2.937 ± 1.452		
	Flouro	1.808 ± 0.072			1.625 ± 0.079		

Sum 2017

Show that is a significant relation between levels of radiation exposure in the year sum 2017 and Hp(10)where F= 2.596 and p-value 0.027 while increase in ANG.

WereMean±SD (1.192±0.367) followed by Nuclear Medicine were Mean±SD (1.420±)then Medical Physicis were Mean±SD (0.949±0.302)then X-ray were Mean±SD (0.925 ±0.257) then CT were Mean±SD (0.860±0.159) then FlourowereMean±SD (0.841±0.084).

On another hand Show that is no significant relation between levels of radiation exposure inthe year sum 2017 and Hp(0.07)where F= 1.644 and p-value 0.150 while increase in Nuclear Medicine were Mean±SD (1.191±)followed by ANG WereMean±SD (1.072±0.376) then Medical Physicis were Mean±SD (0.882 ±0.250) then X-ray were Mean±SD (0.882±0.255) then CT were Mean±SD (0.827±0.151) then FlourowereMean±SD (0.731±0.044).

Sum 2018

Show that is a significant relation between levels of radiation exposure in the year sum 2018 and Hp(10)where F= 3.719 and p-value 0.003 while increase in ANG

WereMean±SD (1.744±0.794) followed by Nuclear Medicine were Mean±SD (1.291±0.008)then X-ray were Mean±SD (1.141±0.288) then CT were Mean±SD (1.125±0.357) then Medical Physicis were Mean±SD (1.016±0.164) then FlourowereMean±SD (0.928±0.001).

On another hand Show that is a significant relation between levels of radiation exposure in the year sum 2018 and Hp(0.07)where F= 2.859 and p-value 0.016 while increase in ANG WereMean±SD (1.603±0.775) followed by Nuclear Medicine were Mean±SD (1.346±0.230) then X-ray were Mean±SD (1.144±0.297) then CT were Mean±SD (1.134±0.407) then Medical Physicis were Mean±SD (1.004±0.211) then FlourowereMean±SD (0.894±0.059).

Sum 2017+2018

Show that is a significant relation between levels of radiation exposure in sum 2017+2018 andHp(10)where F=5.184 and p-value <0.001 while increase in ANG

WereMean±SD (3.069 ±1.375) followed by Nuclear Medicine were Mean±SD (2.717±)then X-ray were Mean±SD (2.046 ±0.458) then CT were Mean±SD (1.894±0.340) then Medical Physicis were Mean±SD (1.841 ±0.228) then FlourowereMean±SD (1.808 ±0.072).

On another hand Show that is a significant relation between levels of radiation exposure in sum 2017+2018 and HP(0.07) where F=4.533 and p-value <0.001 while increase in ANG Were Mean±SD (2.937±1.452) followed by Nuclear Medicine were Mean±SD (2.375±±) then X-ray were Mean±SD (1.997±0.441) then CT were Mean±SD (1.857 ±0.364) then Medical Physicis were Mean±SD (1.790±0.268) then Flouro were Mean±SD (1.625 ±0.079).

Table 6: Comparison of change in year 2017 & 2018 about distribution of the annual dose for different specialists of the workers at radiology department of exposure in dose of Hp(10)&Hp(0.07).

		Hp(10)			ANOVA		HP(0.07)			ANOVA	
		Mean	±	SD	F	P-value	Mean	±	SD	F	P-value
Sum 2017	Technician	0.906	±	0.255	0.795	0.498	0.869	±	0.253	0.537	0.658
	Radiologist	0.956	±	0.213			0.898	±	0.195		
	Medical Physicis	0.955	±	0.302			0.886	±	0.252		
	Nurse	0.859	±	0.079			0.800	±	0.061		
Sum 2018	Technician	1.127	±	0.307	1.598	0.191	1.127	±	0.322	2.006	0.114
	Radiologist	1.207	±	0.409			1.208	±	0.439		
	Medical Physicis	1.024	±	0.170			1.001	±	0.211		
	Nurse	1.186	±	0.293			1.243	±	0.328		
sum (2017+2018)	Technician	1.992	±	0.448	1.447	0.231	1.956	±	0.440	1.137	0.336
	Radiologist	2.161	±	0.627			2.065	±	0.630		
	Medical Physicis	1.878	±	0.305			1.803	±	0.304		
	Nurse	1.988	±	0.236			1.921	±	0.219		

Table (6) Comparison of change in year 2017 & 2018 about distribution of the annual dose for different specialists of the workers at radiology department of exposure in dose of Hp(10)&Hp(0.07)

Sum 2017

Show that is no significant relation between the annual dose for different specialists workers at radiology in sum 2017 and Hp(10)where F=0.795and p-value 0.498 while increase in Radiologist WereMean±SD (0.956±0.213) followed by Medical PhysiciswereMean±SD (0.955±0.302) then Technician were Mean±SD (0.906±0.255) then nurse were Mean±SD (0.859±0.079)

On another hand Show that is no significant relation between the annual dose for different specialists workers at radiology in sum 2017 andHp(0.07)where F=0.537and p-value 0.658 while increase in Radiologist WereMean±SD (0.898±0.195) followed by Technician were Mean±SD (0.869±0.253) then nurse were Mean±SD (0.800±0.061) .

Sum 2018

Show that is no significant relation between the annual dose for different specialists workers at radiology in sum 2018 and Hp(10)where F=1.598 and p-value 0.191while increase in Radiologist WereMean±SD (1.207± 0.409) followed by nurse were Mean±SD (1.186±0.293) then Technician were Mean±SD (1.127±0.307) Medical PhysiciswereMean±SD (1.024±0.170)

On another hand Show that is no significant relation between the annual dose for different specialists workers at radiology in sum 2018 andHp(0.07)where F=2.006 and p-value 0.114 while increase in nurse were Mean±SD (1.243±0.328) thenRadiologist WereMean±SD (1.208±0.439) followed by Technician were Mean±SD (1.127±0.322) then Medical PhysicisWereMean±SD (1.001±0.211)

Sum (2017+2018)

Show that is no significant relation between the annual dose for different specialists workers at radiology in sum (2017+2018) and Hp(10)where F=1.447 and p-value 0.231while increase in Radiologist WereMean±SD (2.161±0.627) followed by Technician were Mean±SD (1.992±0.448) nurse were Mean±SD (1.988±0.236) then Medical PhysiciswereMean±SD (1.878±0.305)

On another hand Show that is no significant relation between the annual dose for different specialists workers at radiology in sum 2017+2018 andHp(0.07)where F=1.137 and p-value 0.336 while increase in Radiologist WereMean±SD (2.065±0.630) followed by Technician were Mean±SD (1.956 ±0.440) then nurse were Mean±SD (1.921±0.219) then Medical PhysicisWereMean±SD (1.803±0.304)

Discussion

The obtained results provided fascinating data on the information, experience and convictions of medical professionals as regards radiation protection[16].

In the absence of non-public dose-monitoring knowledge, additional comprehensive indirect data (workload, operation standing and protecting measures, etc.) the general public health system in KAS serves a population, activity in excess range of population NM and DR imaging procedures each year[17].

In our study the according to is the majority of participant from MAK, AL Noor. H department were constitutes (48.1%) while the secondary department MAK, King .Aziz year represents (17.2 %) while the next department MAK, Hera .H were constitutes (13.2 %) followed by MAK, King Faisal were constitutes (12.6%) while the MAK, Kholes. H were constitutes (3.3%)The effective dose of whole body Hp(10) (50.1%) while the skin dose Hp(0.07)(49.9%).(Shows the detailed data table 1)

The everyday clinical observe and incorrect, and typically contradictory provided by the medical employees have instigated to try to see the radiation protection awareness among the medical staff of hospitals[18]. Most employees in hosptialdon't wear lead aprons throughout work, however those in radioscopy and interventional procedures wear lead aprons, thyroid shields, and gloves [19]. In the study Distribution of the annual average Hp(10) and Hp(0.07)were calculated for each group the rang of the increased the annual average Hp(10) with sum (2017+2018) and also in Hp(0.07) in with sum (2017+2018) Show that is no significant relation between Hp(10) and Hp(0.07) in the Sum 2018 where T= 0.993 and p-value 0.322. TLD has two chips for measure Hp(10) and other for Hp(0.07) While in the Hp(10) Ranged from (1.212To 4.651) the Mean±SD (2.009±0.468) . While in the Hp(0.07) Ranged from (1.266to 4.604) the Mean±SD (1.956±0.462) . (Shows the detailed data table 2)

The extent of the annual radiation exposure of the workers depends on several factors withen the workplace. These factors include, but are not limited to, the annual workload, the distribution of the workload among workers, the radiation protection practices followed by the workers, and the radiation safety facilities provided by the employers[20].

in the study show Distribution of the change in 2017 and 2018 in reading of Hp(10) and Hp(0.07) and data , paired of T-test were calculated for each group in the Dosimeter Use of Hp(10) in sum 2017 & 2018 Show that is a significant relation between Hp(10) in the Sum 2017 and Sum 2018 were difference increase from 2017 to 2018 where T= 9.074 and p-value <0.001 and the Mean±SD (0.904±0.235) While in the Hp(10) in the Sum 2017 the Mean±SD (1.139±0.324) but the Hp(10) in the Sum 2018 Mean±SD (1.105±0.303) While the % of change (22.244) also Dosimeter Use of Hp(0.07) in sum 2017 & 2018Show that is a significant relation between Hp(0.07) in the Sum 2017 and Sum 2018 were difference increase from 2017 to 2018 T= 9.500 and p-value <0.001 and the Mean±SD (0.237±0.307) While in the Hp(10) in the Sum 2017 theMean±SD (0.860±0.230) but the (HP0.07)in the Sum 2018 Mean±SD (1.096±0.318) While the of change (27.510%) (Shows the detailed data table 3) In our study Comparison of change in in different hospitals in year 2017 & 2018 in effective dose of Hp(10)&Hp(0.07)Show that is a significant relation increase between hospitals in sum (2017+2018) and Hp(10)where F= 11.536 and p-value <0.001 while increase in MAK, AL Noor .H were Mean±SD (2.299±0.486) followed

by MAK, Hera. H Mean±SD (2.038±0.472)thenIbnSina. H were Mean±SD (1.846±0.273)AjyadHMean±SD (1.731±0.129)then MAK ,King FaisalMean±SD (1.719±0.262) thenMAK,King.Aziz were Mean±SD (1.725±0.146)and MAK, Kholes. H were Mean±SD (1.656±0.105).
On another hand Show that is a significant relation between hospitals in sum (2017 +2018) and Hp(0.07)where F=10.386 and p-value <0.001 while increase in MAK, AL Noor .H were Mean±SD (2.239 ±0.471) followed by MAK ,Hera. H Mean±SD (1.934±0.501)then,IbnSina. H Mean±SD(1.843±0.242)then MAK ,King. Aziz .H Mean±SD (1.743±0.241) then MAK, King Faisal .H Mean ±SD (1.687±0.232) thenMAK, Kholes .H AND MAKthenMAK, Ajyad H (Shows the detailed data table 4).
Also show in the Comparison of change in year 2017 & 2018 Show that is a Show that is a significant relation between levels of radiation exposure in sum 2017+2018 and Hp(10)where F=5.184 and p-value <0.001 while increase in ANG WereMean±SD (3.069±1.375) followed by Nuclear Medicine were Mean±SD (2.717±)then X-ray were Mean±SD (2.046±0.458) then CT were Mean±SD (1.894±0.340) then Medical Physicis were Mean±SD (1.841±0.072).On another hand Show that is a significant relation between levels of radiation exposure in sum 2017+2018 and Hp(0.07) where F=4.533 and p-value <0.001 while increase in ANG Were Mean±SD (2.937±1.452) followed by Nuclear Medicine were Mean±SD (2.375±±) then X-ray were Mean±SD (1.997±0.441) then CT were Mean±SD (1.857±0.364) then Medical Physicis were Mean±SD (1.790±0.268) then Flouro were Mean±SD (1.625±0.079).
(Shows the detailed data table 5)
Comparison of change in year 2017 & 2018 about distribution of the annual dose for different specialists of the workers at radiology department of exposure in dose of Hp(10)&Hp(0.07)(2017+2018)
Show that is no significant relation between the annual dose for different specialists workers at radiology in sum (2017+2018) andHp(10)where F=1.447 and p-value 0.231while increase in Radiologist WereMean±SD (2.161±0.627) followed by Technician were Mean±SD (1.992±0.448) nurse were Mean±SD (1.988±0.236) then Medical PhysiciswereMean±SD (1.878±0.305).
On another hand Show that is no significant relation between the annual dose for different specialists workers at radiology in sum 2017+2018 andHp(0.07)where F=1.137 and p-value 0.336 while increase in Radiologist WereMean±SD (2.065±0.630) followed by Technician were Mean±SD (1.956±0.440) then nurse were Mean±SD (1.921±0.219) then Medical PhysicisWereMean±SD (1.803±0.304) (Shows the detailed data table 6).The study enclosed non-physicians (i.e. nurses, medical technicians and auxiliary employees' members). This was because of the frequent contact of those medical professionals with patients before and through procedures involving radiation. The study cluster ought to even be numerous in terms of the place and length of service [21].

Conclusion

In the era of accelerating pro-health awareness at intervals the society similarly as of more and more common claims filed against medical personnel, an improved data of radiation protection problems becomes a crucial part of skilled experience of not only radiologists and radiation therapists, however also different specialists similarly as medium-level or auxiliary employees.
Despite the passing of over a hundred and twenty years from Roentgen’s breakthrough discovery, protection against radiation continues to be a very important drawback in everyday follow of all medical professionals. Though radiation medicine is a very important and broadly speaking used a part of the therapeutic method, protection-related problems are typically addressed during a rather offhand manner.Must increase attention should be paid to thorough and systematic education of all tending professionals with relevance imaging protection.
Another attention-grabbing conclusion is that the low level of overall data of radio graphical procedures among the nursing employees. it's significantly curious within the context of care they supply to hospitalized patients and to their active participation in preparation for scheduled imaging examinations. The annual dose Hp(10) were well below the international recommended dose limit of the ICRP.

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