

# Awareness and Knowledge of Ionizing Radiations among Al Arab Medical University Students

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## Abstract

### Objective

Ionizing radiations are proved effective in the diagnosis and treatment of medical problems in spite of their side effects. It is important to the university students to realize the advantages and disadvantages of ionizing radiation in its various aspects.

### Methods and Materials

This study was carried out by choosing a representative sample of 350 students derived from four different faculties (medicine, dentistry, pharmacy and public health) of Al- Arab Medical University (formally part of Garyounis University). A Survey was conducted by means of interviews

### Results

A large proportion of the sample was females. Proportionate representation was ensured for all faculties. A large proportion of the sample was reported to be aware of ionizing radiations. But regarding various techniques, their awareness was found to be low. The side effects of ionizing radiations were reported more than their advantages.

### Conclusions

The study shows a lesser awareness concerning the various techniques of ionizing radiations. The students should have a positive attitude in using the ionizing radiation as a tool in the diagnosis and treatment of diseases in medical practice.

**Keywords:** Ionizing radiations, awareness, side effects-uses, medical students

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## Introduction

Radiations that have potential to ionize atoms and molecules (removal of bound orbital electron)<sup>1</sup> through atomic interaction are often termed as ionizing radiations which are proved to be effective in diagnosis and treatment of various medical problems<sup>2</sup>. Despite such positive effects, a large chunk of the population in developing countries is pessimistic about its applications due to the side effects. It is important to build young scientists and medical professionals to facilitate scientific innovations using ionizing radiations for medical purposes (treatment & diagnosis)<sup>3,4</sup>. Increasing the awareness of the hazards associated with ionizing radiation and its consequent disorders and diseases requires more attention as a part of a comprehensive radiation safety program<sup>5</sup>. Tavakoli et al <sup>5</sup>, form a study on the knowledge of medical students on hazards of ionizing radiation revealed that females score higher than males. In general, knowledge of ionizing radiation among medical students was found inadequate. Janssen and Wellness<sup>6</sup> showed a poor knowledge about ionizing radiation among Limburger state university medical students. In the context of building knowledge base among university students, a study on their awareness and knowledge on ionizing radiation was entertained. The objectives of the study were to:

1. Evaluate the awareness and knowledge of ionizing radiation among students, which might help in developing educational initiatives.
2. Identify the level of understanding regarding the uses of ionizing radiation.

## Methodology

This study was conducted on students of Al -Arab Medical University - faculties of Medicine, Dentistry, Pharmacy and Public Health. A cross sectional study was conducted with the sample of 350 first- year students derived from the above-mentioned faculties<sup>7</sup>. Selection of first year students is made to understand the knowledge level imparted during school days non-medical education. Samples were drawn using a simple random sampling method. Questionnaires

were built to seek personal information and awareness, knowledge, uses and side effects of ionizing radiation. It also included queries types of ionizing radiation known to the sample. Questionnaires were submitted to selected students with a request for co-operation in this study. The data obtained through the survey was edited, coded and entered into MS Excel Software. Further, the data was exported to SPSS 10 for analysis. Analyses were performed by means of simple frequency, bivariate cross tabulations and cross tabulation by using controlling variables. The mean of age factor was also calculated. As this study was conducted through a quick survey, a small sample was drawn. The survey was conducted in Arabic language to which the students are more familiar to.

A large proportion of the sample was females 248 (70.9%) while males were 102 (29.1%). This higher proportion had resulted from the higher proportion of girls joined this university.

## Results

### 1- Profile of sample

Proportionately, higher proportions of students included in the sample were from faculty of medicine 105 (30%) and from the faculty of dentistry 105 (30%) whereas the faculty of pharmacy and faculty of public health were slightly least 70 (20% each) as shown in (Table-1).

**Table 1: Profile of Sample**

	Number	Percent
<b>Gender</b>		
Male	102	29.1
Female	248	70.9
Total	350	100.0
<b>Faculty</b>		
Medicine	105	30.0
Dentistry	105	30.0
Pharmacy	70	20.0
Public Health	70	20.0
Total	350	100.0
<b>Age</b>		
Less than 18 years	40	11.4
19 years	100	28.6
20 years	71	20.3
21+ above	38	10.9
No data	101	28.9
Total	350	100.0

Age wise, a larger proportion of these students were aged between 19 - 20 years. It might be noted here that a large majority of the students have not reported their age 101 (28.9%). Overall, the mean students' age in the sample was 19.5 years.

### 2- Awareness and knowledge

One of the aims of the study was to measure awareness of students to ionizing radiations. Such a method of questioning was incorporated into this study as it was hypothesized that students might show their tendency to say 'yes' to the first question even though they have not heard of it (Table-2).. Expectedly, a large share of students reported to be aware of ionizing radiations 320 (91.4%).

**Table 2: Awareness of ionizing radiation in general and its specific techniques**

Awareness	Yes N = 350		Denominator N = 320	No		Total (N)
	Number	Percent	Percent	Number	Percent	
<b>Ionizing radiation in general</b>	<b>320</b>	<b>91.4</b>	<b>-</b>	<b>30</b>	<b>8.6</b>	<b>350</b>
<b>Beta ray</b>	<b>177</b>	<b>50.6</b>	<b>55.3</b>	<b>173</b>	<b>49.4</b>	<b>350</b>
<b>Gamma ray</b>	<b>176</b>	<b>50.3</b>	<b>55.0</b>	<b>174</b>	<b>49.7</b>	<b>350</b>
<b>X- ray</b>	<b>184</b>	<b>52.6</b>	<b>57.5</b>	<b>166</b>	<b>47.4</b>	<b>350</b>
<b>Alpha ray</b>	<b>156</b>	<b>44.6</b>	<b>48.8</b>	<b>194</b>	<b>55.4</b>	<b>350</b>

X-ray was the mostly known technique to the sample students 184 (52.6%), whereas (57.5% of students were aware of ionization radiations or have heard of it). The most known sources of ionizing radiation known to the sample students were: nuclear power 240 (75%) and artificial sources 138 (43.1%) (Table-3), and only a small proportion 53 (16.6%) mentioned natural sources.

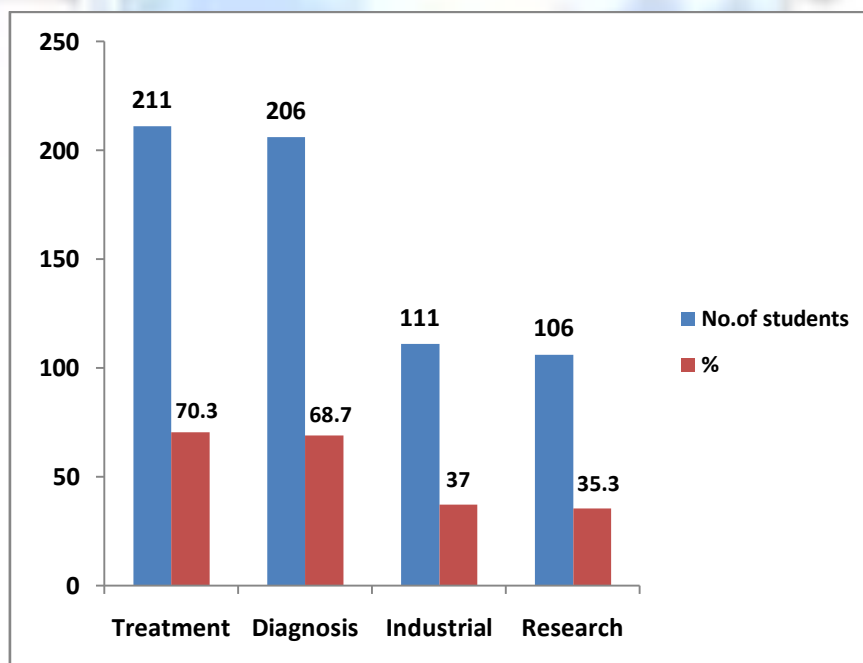
### 3- Uses and side effects

It is striking that the majority, out of those who are aware of ionization radiations, have knowledge of its benefits and side effects. High percentage of students has reported to have knowledge of the side effects 310 (96.9%) than benefits 297 (92.8%) (Table-3).

**Table 3: Knowledge about Ionizing radiation in terms of its benefits, side effects and sources**

	Yes		No		No data		Total
	Number	Percent	Number	Percent	Number	Percent	
Knowledge on benefits	297	92.8	18	5.6	5	1.69	320
Knowledge on side effects	310	96.9	9	2.8	1	0.3	320
<b>Knowledge on sources</b>							
Agriculture	36	11.3	284	88.8	-	-	320
Nuclear power	240	75.0	80	25.0	-	-	320
Industrial/artificial	138	43.1	182	56.9	-	-	320
Natural	53	16.6	267	83.4	-	-	320
Medical examination	124	38.8	196	61.3	-	-	320

The reported known medical uses of ionizing radiation were diagnosis and treatment. A low percentage of students have shown knowledge about its uses for industrial 111 (37%) and research purposes 106 (35.3%) (Fig-1).



**Fig -1- Knowledge of uses of ionizing radiation**

Similarly, a large percentage of students have reported the side effects of ionizing radiations, mostly the carcinogenic effects, deformation in uterus, cataract, and cell damage and so on (Fig-2).

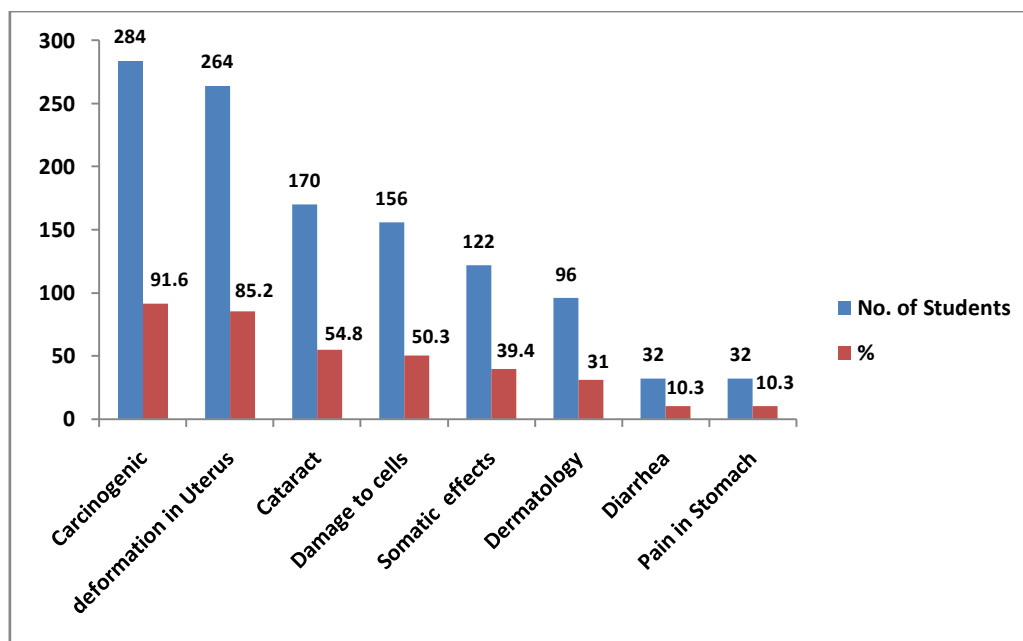


Fig -2: knowledge on side effects

### Discussions

The differences in proportion of males and females resulted from the existing proportional differences in terms of the total number of students in the faculties of the university. Among those students who have not reported age, more than two-thirds were females 69 (68.3%). The mean age of the sample is indicative of the age in Libya for a student to get enrolled in medical colleges. Awareness of students to ionizing radiations, a direct question (**have you heard about ionizing radiations?**) and a specific question showing a checklist (**have you heard of any of these techniques viz, beta ray, gamma ray, x-ray, alpha ray?**) were asked. Such a method of questioning was incorporated into this study as it was hypothesized that students might show their tendency to say 'yes' to the first question even though they have not heard off. Expectedly, a large proportion of students reported to be aware of ionizing radiations 320 (91.4%). Most of them were females 231 (72.2%). As compared with other faculties, a higher proportion of students from the faculty of public health were aware of ionizing radiations. As with an progress in age their awareness on ionizing radiations has also progressed. Among those who were reported unheard of ionizing radiations; the majority were also females (56.7% as against 43.3% among males) and they are from the faculty of dentistry. Their mean age was 20 years.

There was an inconsistency observation that a majority of students who were reported to be aware of ionizing radiations did not hear of even X-rays. It is doubted here for their knowledge regarding ionizing radiations. It is a human tendency to answer with 'yes' for an initial question. However, when people found cross questioning, under sheer anxiety, they start revealing themselves. Accepting the above hypothesis, it is indicative that students have poor knowledge of ionizing radiations. Sources of ionizing radiation are not very clear to this sample that only a few are aware of natural sources. Of course, the natural sources form nearly 85% of ionizing radiations<sup>8,9</sup> Most of the sample has known about ionizing radiation's use for diagnosis and treatment of diseases (68.7% and 70.3% respectively). On the side effects of ionizing radiation, the majority knows its carcinogenetic effects and uterus deformation (91.6% and 85.2% respectively) (Fig. 1 and Fig.2). The majority of students who were reported to have knowledge about the side-effects were females and from the faculty of medicine. Whereas most of the students who reported diagnostic and medical uses were females from the faculty of medicine

### Conclusions and Implications

This study shows that students as a whole have a poor knowledge about ionizing radiations, even though a great proportion reported to be aware of ionizing radiations. It might also be noted that students were more concerned about side effects of ionizing radiations than its benefits. This finding refers to the pessimistic attitude that develops in the minds of medical students, which might have serious implications on the application of such techniques for medical diagnosis and treatment. Efforts are needed to build knowledge regarding ionizing radiation. It is also of good concern that students at medical education level are still confused about ionizing and non-ionizing radiations; which might point out the curriculum of school. Efforts are needed to strengthen science education at school level.

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