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KNOWLEDGE AND AWARENESS LEVEL REGARDING THE HAZARD OF RADIO INTRAVENOUS INJECTION CONTRAST AGENTS'

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Abstract

Background: The use of intravenous (IV) contrast, which is injected directly into the vein of the patient immediately prior to the radiotherapy planning (RTP) CT scan, improves the visibility of target volumes and surrounding organs that are at risk, simplifying and improving the precision of the process of defining radiotherapy target volumes and organs at risk. To assess knowledge and awareness level regarding hazard of radio intravenous injection contrast against usage among radiology healthcare provider in Saudi Arabia.
Methodology: From July to December 2024, radiology healthcare providers in Saudi Arabia part in this cross-sectional survey. An anonymous, self-administered English questionnaire served as the survey instrument. It asked questions on knowledge regarding the risks associated with employing radio contrast, diseases that contrast media can cause, symptoms that contrast media can cause, the bare minimum of responses required to generate a sample that is representative of the entire population was determined through sample size calculations. Using the Raosoft sample size calculator, the sample size was determined. Assuming a 0.50 indication percentage, a 5% margin of error, and a 95% confidence interval (CI), 384 was the determined sample size. The final version of the questionnaire included 21 classified questions divided into many sections and was distributed online.
Results: The study included 400 participants, 83.5% of participants had no prior medical condition affecting their perception of radio intravenous injections' hazards. About 29.5% had undergone a radiographic investigation, and 65.5% were aware of potential risks. However, 16.5% reported no adverse effects after administering IV contrast. Most participants agreed that breastfeeding should be discontinued after procedures, and 39% could not tell if MRI dyes were more painful than CT or ultrasound.
Conclusion: The study reveals that most of participants have limited understanding of radio intravenous injection risks, and 29.5% have limited exposure to contrast-related radiographic investigations, highlighting the need for increased public awareness.

Keywords: Knowledge, Awareness, Hazard of radio interference injection contrast Saudi Arabia.

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Introduction:

A class of medications known as radiographic contrast media is used in imaging procedures that rely on X-rays, such as computed tomography (CT) and radiography, to enhance the visibility of internal organs and structures [1]. Utilization of radiologic contrast media has increased significantly over the past few decades due to the sharp rise in medical imaging usage [2]. Their widespread everyday use in imaging departments across the globe has long served as evidence of their value [3]. Contrast medium (CM)-related serious or deadly reactions are unforeseen but thankfully uncommon [4]. An important part of the radiographic evaluation for many radiological modalities is the use of intravenous contrast [5]. One of the most often used medications in the world is intravenous contrast media, which is frequently required for the best possible clinical imaging [6]. Intravenous contrast media use in magnetic resonance imaging (MR) has been a well-established clinical practice over the past ten years [7]. Additionally, the use of intravenous (IV) contrast, which is injected straight into the patient's vein just before the radiotherapy planning (RTP) CT scan, enhances the ability to see target volumes and nearby organs that are at risk, making the process of defining radiotherapy target volumes and organs at risk simpler and more precise One [8]. Even though CT technology has advanced, the method for administering intravenous contrast media in CT scans has been continuously discussed and improved [9]. There are four categories for contrast media reactions: anaphylactoid, vasomotor, severe or life-threatening, and deadly [10]. Using these materials may have a variety of negative effects, from brief, minor ones like nausea, vomiting, mild urticaria, pallor, and pain in the injected extremity to serious, potentially fatal ones like pulmonary edema, cardiac arrhythmia, cardiac arrest, circulatory collapse, and unconsciousness [11]. Since contrast media are utilized in greater quantities and overall dosages than any other intravascular medication, it is not surprising that these products cause a range of negative side effects [12]. Patients who have more than one risk factor may experience an increased frequency of adverse events [13]. Over the past ten years, there has been a notable rise in the frequency of non-immediate hypersensitivity reactions while the incidence of immediate reactions has dropped. As a result, non-immediate reactions are now more common than instant reactions [14]. It is important to understand that a variety of factors are taken into account in clinical practice when deciding whether or not to administer intravenous contrast media (such as the likelihood and necessity of an accurate diagnosis, alternate methods of diagnosis, risks of misdiagnosis, expectations regarding kidney functional recovery, and risk of allergic-like reaction) [15]. The objective of this study is to assess the knowledge and perceptions of radiology healthcare providers in Saudi Arabia regarding knowledge related to risks associated with the use of radiological contrast, diseases that can be caused by contrast media, and symptoms that can be caused by contrast media.

Materials and Methods:

Study design: This is a cross-sectional study conducted between July 2024 and December 2024 based on a structured questionnaire to assess the knowledge and perceptions of radiology healthcare providers in Saudi Arabia regarding knowledge related to risks associated with the use of radiological contrast, diseases that can be caused by contrast media, and symptoms that can be caused by contrast media.

Sample size:

The sample size was estimated to be at least 38 participants, using the Raosoft calculator with a confidence level of 95% and margin error determined as 5%. The Sample size was appraised by the

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formula: n= P (1-P) * Zα 2 / d 2 with a confidence level of 95%.
n: Calculated sample size
Z: The z-value for the selected level of confidence (1- a) = 1.96.
P: An estimated prevalence of knowledge
Q: (1 – 0.50) = 50%, i.e., 0.50
D: The maximum acceptable error = 0.05.
So, the calculated minimum sample size was:
n = (1.96)2 X 0.50 X 0.50/ (0.05) 2 = 384.

Study setting: participants, recruitment, and sampling procedure:
The study population consisted of all persons requiring radiology, radiologists, medical physicists, radiologic technologists, radiographers, and radio-diagnosis residents.

Inclusion and Exclusion Criteria:
The inclusion requirements were satisfied by all radiologists, medical physicists, radiologic technologists, radiographers, and radio-diagnosis residents. The exclusion criteria were participants, interns, and students who were not present or unable to provide data.

Method for data collection and instrument (Data collection Technique and Tools):
A self-administered online questionnaire was used as a research tool. This tool was created after reviewing relevant articles [4] There was a total of 21 categorised questions divided into three parts: five questions regarding the general characteristics of the participants were presented in the first section, nine questions regarding the participants' knowledge and understanding of the IV Contrast agents, its risks and symptoms were presented in the second section. Six questions regarding awareness of the risks and side effects of the IV Contrast agents were included in the third section.

Scoring system:
Part one covers participants' knowledge and understanding of the risks and side effects of IV Contrast agents. This section contains nine questions, each with two or more options. A correct answer received one point, while incorrect answers received zero points. Bloom's original cutoff values of 80.0%-100.0%, 60.0%-79.0%, and 0.0%-59.0% were modified and used to classify the results into three levels: 1. High level: ≥ 8 points; 2. Moderate level: 6-7 points; 3. Low level: ≤ 5 points.
Part two covers participants' awareness of the risks and side effects of IV Contrast agents. This section contains six questions, each with two or more options. A correct answer received one point, while an incorrect answer received zero points. Bloom's original cutoff points 80.0%-100.0%, 60.0%-79.0%, and 0.0%-59.0% were modified and used to classify the results into three levels: 1. High level: ≥9 points; 2. Moderate level: 7-8 points; and 3. Low level: ≤ 6points.

Analyzes and entry method:
To collect and enter the data, a Windows computer running Microsoft Excel (2016) was utilized. The data was then loaded into the Statistical Package for the Social Sciences (SPSS) software, version 20, for statistical analysis.

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Results:

Table (1) displays various demographic parameters of the participants with a total number of (400). At 24.7 years of mean age, participants who were younger than 24 years of age were almost 57.5 per cent. Our gender distribution is very strong female with 63% and that could have implications going forward for studies or for initiatives within the community for gender. Additionally, the majority of the sample's participants were Saudi nationals (92.5%) and the geographic distribution supports more concentration of participants residing in the region of the western province of Saudi Arab (30.5%). In particular, the number of single persons constitutes an important portion of 88%, implying a demographic tradition of later marriage. They are notably educated, over half have a bachelor's degree. Yet, about half of the participants claim no job experience, potential opportunities for skill development emerge. Further, income levels show economic difficulties as 38 percent of the people earn below the 1,000 Saudi Riyal mark.

Table (1): Sociodemographic characteristics of participants (n=400)

Parameter		***No.***	***Percent (%)***
Age (Mean: 24.7, STD: 7.1)	21 or less	104	26.0
	22 to 23	126	31.5
	24 to 25	88	22.0
	More than 25	82	20.5
Gender	Female	252	63.0
	Male	148	37.0
Nationality	Non-Saudi	30	7.5
	Saudi	370	92.5
Residential area	Northern region	72	18.0
	Southern region	98	24.5
	Center region	66	16.5
	Eastern region	42	10.5
	Western region	122	30.5
Marital status	Single	352	88.0
	Married	40	10.0
	Divorced	8	2.0
Educational qualification	High school	10	2.5
	College student	170	42.5
	Diploma	14	3.5
	Bachelor	192	48.0
	Master	6	1.5
	Doctorate	8	2.0
Experience years	No experience	188	47.0
	1-3 years	116	29.0
	4-7 years	62	15.5
	More than 7	34	8.5
Income	Less than 1000 Saudi riyal	152	38.0
	1000 - 5000	106	26.5

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	5001 - 10000	74	18.5
	10001 - 15000	34	8.5
	More than 15000 Saudi riyal	34	8.5

As shown in figure 1, Insights into human experiences with radiographic investigations involving contrast agents are presented with data in this paper. Among the 400 respondents, 29.5 per cent, or 118 people, had reported having already undergone such procedures. In particular, 20 (5%) responded that they had been offered the opportunity for a radiographic investigation with contrast with the opportunity of declining it. However, the majority comprised 65.5 percent (262 people) that they do not participate in a radiographic investigation with contrast.

Figure (1): Illustrates experience with radiological contrast material among participants.

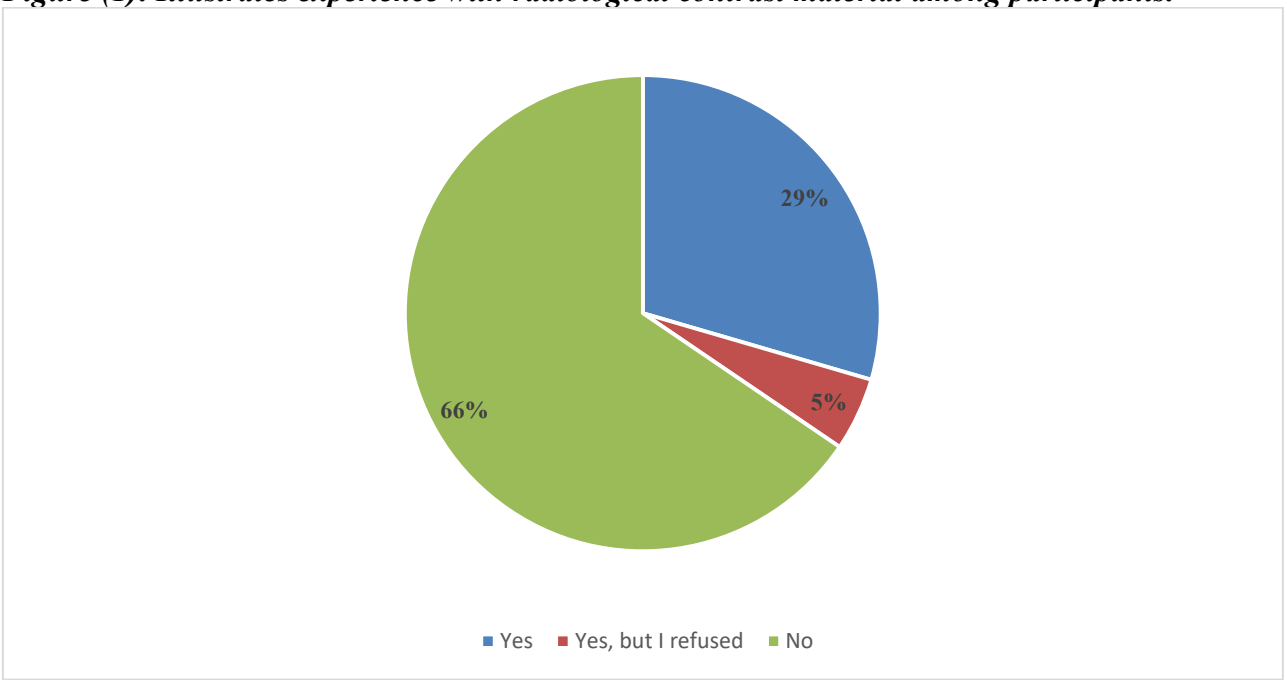

Table 2 reveals insights from the knowledge level and experience of individuals regarding the hazards of radio intravenous injection, those are 400 participants. An 83.5 percent of respondents had no previously identified medical condition that could create a perceptual bias on IV contrast safety. About 29.5% of participants had previously undergone a radiographic investigation with contrast and 65.5% reported having been told of the potential risk of IV contrast agents. A moderate to high awareness of the topic, 57% rated their self-reported knowledge level as good or better, while 8.5% were weak. It's important to note that, of those with side effects after administering IV contrast, 16.5 percent suffered from such and most reported no adverse effects.

Table (2): Parameters related to knowledge level regarding the hazard of radio intravenous injection (n=400).

Parameter		***No.***	***Percent (%)***
Do you have any medical conditions?	Chronic renal disease	6	1.5
	Diabetic Mellitus	32	8.0

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	Other	28	7.0
	No medical conditions	334	83.5
Did you have a radiographic investigation with contrast before?	Yes	118	29.5
	Yes, but I refused	20	5.0
	No	262	65.5
What type of radiographic investigation did you have?	US	20	5.0
	X-ray	116	29.0
	CT	52	13.0
	MRI	54	13.5
	Never done a radiological test with contrast	158	39.5
Have you received any information about IV contrast and its harms?	Yes	262	65.5
	No	78	19.5
	I do not remember	60	15.0
How would you rate your knowledge about the hazard of radio IV Contrast agents' usage?	Excellent	130	32.5
	Very good	98	24.5
	Good	92	23.0
	Acceptable	46	11.5
	Weak	34	8.5
Did you have any side effects after the IV contrast?	No	334	83.5
	Yes	66	16.5
What was the severity of the symptoms?	Mild	76	19.0
	Moderate	22	5.5
	Severe	16	4.0
	No symptoms	286	71.5
What side effects did you experience? *	- Irritation	38	9.5
	- Vomiting	46	11.5
	- Dizziness	64	16.0
	- Headache	34	8.5
	- High temperature	26	6.5
	- Diarrhoea	14	3.5
	- Other symptoms	48	12.0
	No side effects	258	64.5
Who provided you with the information?	College student	56	14.0
	Radiologist	108	27.0
	Radiology technician	122	30.5
	Doctor	102	25.5
	Nurses	12	3.0

Results may overlap

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As shown in figure (2), the data about breastfeeding and IV dyes is a mixed bag, mirroring how divided and unsure people are. Most participants (190 – 47.5%) agree that breastfeeding should be discontinued after the procedure, outnumbering the ones who disagree (89 – 22.2%), who argue that breastfeeding is not a risk factor for the dye. On the other hand, 23% (92 individuals) affirm that breastfeeding can be continued even safely, implying that there is a subset of population who either has trust in the medical advice offered or who know that dye has implications. In particular, 29.5 percent (118 respondents) either advanced "I don't know" or were unable to shake uncertainty.

Figure (2): Illustrates the relation between breastfeeding and IV contrast among participants.

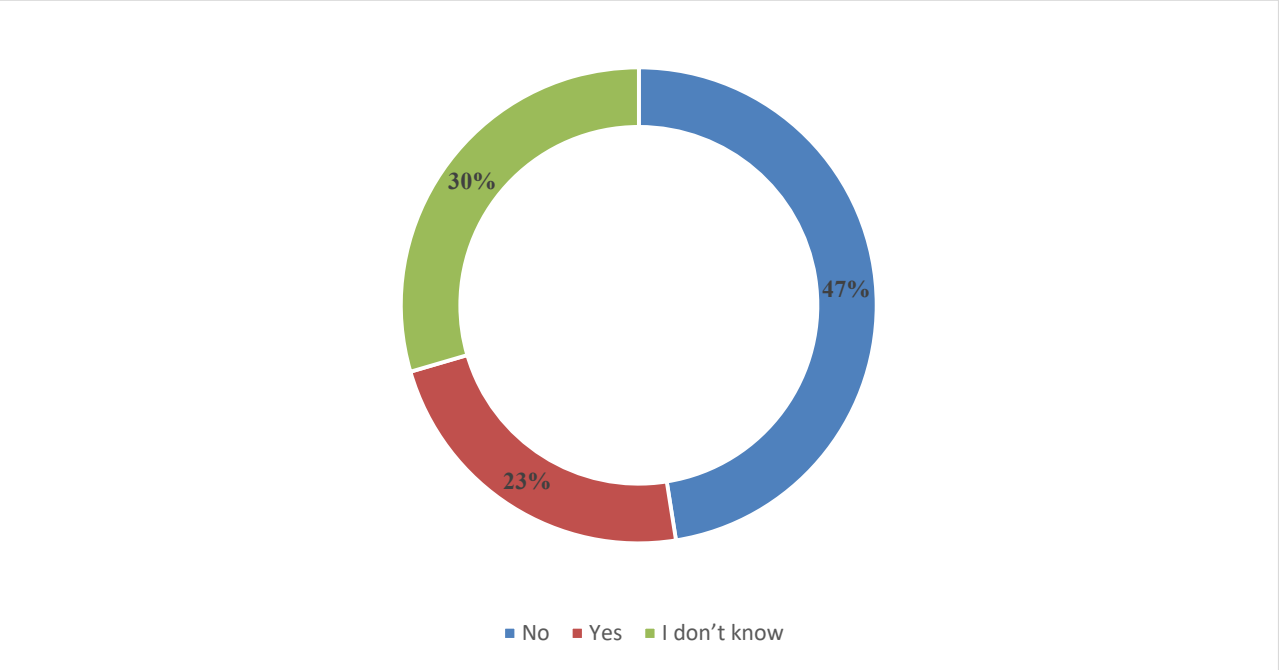

Table 3 shows that there is a concerning degree of overall awareness amongst participants of the hazards of intravenous (IV) contrast injections that are frequently used for MRI and CT imaging. Notably, significantly, 39% of respondents could not tell whether if intravenous dyes used in MRI are more painful than the ones used in CT or ultrasound. Furthermore, since a remarkable 47.5 percent of participants were wrong when they thought that the cessation of breastfeeding had to occur once an IV dye was given, an attitude exists among people who will impact how they may decide on maternal health decisions. It is interesting to note that 71% thought they needed to do medical preparation before administering the contrast agents, suggesting a better awareness of the ways of minimizing complications. Yet, when reactions regarding specific postoperative medication adjustments such as Metformin in diabetic patients are discussed by half of the participants, it appears that widespread uncertainty exists regarding them. Additionally, about 31.5% reported that allergy and renal patients were at increased risk for IV contrast side effects, while an even more worrying 21.5% didn't know about this.

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Table (3): participants' awareness level regarding the hazard of radio intravenous injection (n=400).

Parameter		***No.***	***Percent (%)***
Are intravenous dyes given by MRI more dangerous than dyes for CT and ultrasound?	No	170	42.5
	Yes	74	18.5
	I don't know	156	39.0
Can you continue breastfeeding after taking an IV dye?	No	190	47.5
	Yes	92	23.0
	I don't know	118	29.5
Do some patients need to be medically prepared before the contrast is administered to reduce complications?	No	44	11.0
	Yes	284	71.0
	I don't know	72	18.0
For diabetic patients using Metformin, do they need to stop the medication for a period after a CT scan?	No	74	18.5
	Yes	160	40.0
	I don't know	166	41.5
Which patients are at the highest risk of IV contrast side effects?	Allergy and asthma	16	4.0
	Allergy asthma and renal patients	126	31.5
	Allergy cardiac and renal	36	9.0
	Allergy cardiac asthma and renal	88	22.0
	Asthma and renal	16	4.0
	Asthma patients	18	4.5
	I don't know	86	21.5
	nothing	14	3.5
What are the potential side effects of IV contrasts? *	- Shortness of breath	192	48.0
	- Irritation	166	41.5
	- Nausea	182	45.5
	- Diarrhea	110	27.5
	- Death	58	14.5
	- Vomiting	170	42.5
	- Cough	80	20.0
	I don't know	80	20.0
	Other	46	11.5

****Results may overlap***

Table 4 presents the data that shows levels of knowledge of hazards pertaining to injections delivered via radio to a sample size of 400. Interestingly, 22, or 5.5%, of participants were found to have an extremely high level of knowledge, an imbalance in awareness of possible risks. The remaining 64 people (16.0% of the sample) revealed a moderate level of knowledge. Though, of concern is that a majority, 314 of 398 or 78.5% were very low knowledge levels.

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Table (4): Shows knowledge regarding the hazard of radio intravenous injection score results.

	Frequency	**Percent**
High Knowledge Level	22	5.5
Moderate knowledge	64	16.0
Low knowledge Level	314	78.5
Total	400	100.0

As can be seen from Table 5, the deceased population was very unaware of the hazards which could be associated with radio intravenous injection and are of serious concern. Less than a quarter (25%) of respondents, or 96 people, indicate a high awareness level which evidences a significant deficit of knowledge on a crucial medical procedure. However, 17% of participants, or 68 people, are moderately aware; meaning that while some knowledge is present, it is not enough to prevent these risks. Even more worryingly, a whopping 71% or 284 people of the respondents are on the low awareness band.

Table (5): Shows awareness regarding the hazard of radio intravenous injection score results.

	Frequency	**Percent**
High awareness level	48	12.0
Moderate awareness	68	17.0
Low awareness level	284	71.0
Total	400	100.0

Table (6) shows that knowledge level of the hazard of radio intravenous injection has statistically significant relation to residential region (P value=0.018). It also shows statistically insignificant relation to gender, age, nationality, marital status, educational qualification, experience years, and monthly income.

Table (6): Relation between knowledge level of the hazard of radio intravenous injection and sociodemographic characteristics.

Parameters		***Knowledge level***		***Total (N=400)***	***P value****
		High or moderate knowledge	**Low knowledge Level**		
Gender	Female	56	196	252	0.646
		65.1%	62.4%	63.0%	
	Male	30	118	148	
		34.9%	37.6%	37.0%	
Age	21 or less	28	76	104	0.110
		32.6%	24.2%	26.0%	
	22 to 23	22	104	126	
		25.6%	33.1%	31.5%	
	24 to 25	14	74	88	
		16.3%	23.6%	22.0%	

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	More than 25	22	60	82	
		25.6%	19.1%	20.5%	
Nationality	Non-Saudi	4	26	30	0.258
		4.7%	8.3%	7.5%	
	Saudi	82	288	370	
		95.3%	91.7%	92.5%	
Residential area	Northern region	16	56	72	0.018
		18.6%	17.8%	18.0%	
	Southern region	20	78	98	
		23.3%	24.8%	24.5%	
	Center region	22	44	66	
		25.6%	14.0%	16.5%	
	Eastern region	12	30	42	
		14.0%	9.6%	10.5%	
	Western region	16	106	122	
		18.6%	33.8%	30.5%	
Marital status	Single	72	280	352	0.368
		83.7%	89.2%	88.0%	
	Married	12	28	40	
		14.0%	8.9%	10.0%	
	Divorced	2	6	8	
		2.3%	1.9%	2.0%	
Educational Qualification	High school	0	10	10	0.554
		0.0%	3.2%	2.5%	
	Bachelor	44	148	192	
		51.2%	47.1%	48.0%	
	College student	36	134	170	
		41.9%	42.7%	42.5%	
	Diploma	2	12	14	
		2.3%	3.8%	3.5%	
	Master	2	4	6	
		2.3%	1.3%	1.5%	
	Doctorate	2	6	8	
		2.3%	1.9%	2.0%	
Experience year	1-3 years	32	84	116	0.124
		37.2%	26.8%	29.0%	
	4-7 years	16	46	62	
		18.6%	14.6%	15.5%	
	More than 7	6	28	34	
		7.0%	8.9%	8.5%	
	No experience	32	156	188	
		37.2%	49.7%	47.0%	
Monthly income	Less than 1000	34	118	152	0.236

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	Saudi riyal	39.5%	37.6%	38.0%	
	1000 - 5000	16	90	106	
		18.6%	28.7%	26.5%	
	5001 - 10000	20	54	74	
		23.3%	17.2%	18.5%	
	10001 - 15000	10	24	34	
		11.6%	7.6%	8.5%	
	More than 15000 Saudi riyal	6	28	34	
		7.0%	8.9%	8.5%	

P value was considered significant if ≤ 0.05.

Table (7) shows that awareness level of the hazard of radio intravenous injection has statistically significant relation to educational qualification (P value=0.004), experience years (P value=0.001), and monthly income (P value=0.0001). It also shows statistically insignificant relation to gender, age, nationality, residential region, and marital status.

Table (7): Awareness level of the hazard of radio intravenous injection in association with sociodemographic characteristics.

Parameters		***Awareness level***		***Total (N=400)***	***P value****
		High or moderate awareness	**Low awareness level**		
Gender	Female	66	186	252	0.106
		56.9%	65.5%	63.0%	
	Male	50	98	148	
		43.1%	34.5%	37.0%	
Age	21 or less	22	82	104	0.108
		19.0%	28.9%	26.0%	
	22 to 23	40	86	126	
		34.5%	30.3%	31.5%	
	24 to 25	32	56	88	
		27.6%	19.7%	22.0%	
	More than 25	22	60	82	
		19.0%	21.1%	20.5%	
Nationality	Non-Saudi	8	22	30	0.770
		6.9%	7.7%	7.5%	
	Saudi	108	262	370	
		93.1%	92.3%	92.5%	
Residential area	Northern region	22	50	72	0.958
		19.0%	17.6%	18.0%	
	Southern region	28	70	98	
		24.1%	24.6%	24.5%	
	Center region	18	48	66	

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		15.5%	16.9%	16.5%	
	Eastern region	14	28	42	
		12.1%	9.9%	10.5%	
	Western region	34	88	122	
		29.3%	31.0%	30.5%	
Marital status	Single	106	246	352	0.150
		91.4%	86.6%	88.0%	
	Married	10	30	40	
		8.6%	10.6%	10.0%	
	Divorced	0	8	8	
		0.0%	2.8%	2.0%	
Educational Qualification	High school	2	8	10	0.004
		1.7%	2.8%	2.5%	
	Bachelor	74	118	192	
		63.8%	41.5%	48.0%	
	College student	34	136	170	
		29.3%	47.9%	42.5%	
	Diploma	2	12	14	
		1.7%	4.2%	3.5%	
	Master	2	4	6	
		1.7%	1.4%	1.5%	
	Doctorate	2	6	8	
		1.7%	2.1%	2.0%	
Experience year	1-3 years	34	82	116	0.001
		29.3%	28.9%	29.0%	
	4-7 years	30	32	62	
		25.9%	11.3%	15.5%	
	More than 7	4	30	34	
		3.4%	10.6%	8.5%	
	No experience	48	140	188	
		41.4%	49.3%	47.0%	
Monthly income	Less than 1000 Saudi riyal	34	118	152	0.0001
		29.3%	41.5%	38.0%	
	1000 - 5000	34	72	106	
		29.3%	25.4%	26.5%	
	5001 - 10000	30	44	74	
		25.9%	15.5%	18.5%	
	10001 - 15000	16	18	34	
		13.8%	6.3%	8.5%	
	More than 15000 Saudi riyal	2	32	34	
		1.7%	11.3%	8.5%	

P value was considered significant if ≤ 0.05.

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Discussion:

Currently, the use of imaging technology in the medical field has been fundamental to confirm, correctly assess, and document the development of many diseases, as well as assess the effectiveness of treatment [16]. Intravenous contrasts have been used in radiographic examinations for years and are usually well accepted [17]. It is employed in a varied scale of radiologic investigations to examine and estimate blood vasculature and describe lesions in soft tissue [18]. While they are helpful in distinguishing between normal and pathological areas, they can cause side effects ranging from a mild inconvenience, such as itching, to a life-threatening emergency [19].

Our study was conducted among 400 participants from them 29.5% had reported having previously undergone radiographic investigations including contrast agents and the majority included 65.5% that they do not participate in a radiographic investigation with contrast. This study aims to assess knowledge and awareness of IV contrast hazards among healthcare providers in Saudi Arabia.

Kings, et al. reported in his study that physicians and other health professionals, require to be aware of radiation hazards and protection techniques so as to get the wanted benefits from radiation while decreasing the related risks [20]. The results of our study showed that 57% rated their self-reported knowledge level as good or better, while 8.5% were weak. However, the knowledge regarding the hazard of radio intravenous injection score results show that only 5.5% of participants have an extremely high level of knowledge, and the remaining (16.0% of the sample) exposed a moderate level of knowledge. Although, of worry is that a majority, 78.5%, were very low knowledge levels. According to awareness regarding the hazard of radio intravenous injection score results, less than a quarter (25%) of respondents reveal a high awareness level which proves a significant deficit of knowledge on an important medical procedure. But 17% of participants, are moderately aware; indicating that while some knowledge is present, it is not enough to prevent these risks. Even more worryingly, an enormous 71% of the respondents are on the low awareness band. In Saudi Arabia, another cross-sectional quantitative study conducted online via an online questionnaire among 9,912 participants reported that, in contrast to our results, only 13.2% of participants thinking that their knowledge was sufficient, while 45.7% did not know about it [21]. Another study conducted by Redan et al. [22] which assessed 509 radiologists in ten European countries, either online or over the phone reveled that the level of awareness was varying between radiologists and suggested improving efforts to better train radiologists to reduce the risk of undergo contrast media [22]. Another study was conducted among 197 Kenyan non-radiological clinicians with experience in use of contrast media in their routine practice the results show that the mean scores from study show a lack of knowledge concerning contrast agents in addition to adverse reaction risk among clinicians and that the general knowledge of the clinicians needs to be enhanced [23]. In Brazil, another study was conducted among 203 non-radiologist clinicians in with different levels of experience reported that non-radiologist clinicians had an acceptable level of knowledge toward adverse reactions of intravenous contrasts [24]. In Anatolia Turkey a cross-sectional questionnaire survey was conducted among 156 cooperative outpatients found that (42.3%) of participants had no idea about intravascular contrast materials (IVCMs), only 5.1% had sufficient knowledge about intravascular contrast materials [25]. Even though statistics on contrasts' benefits and hazards are fairly adequate, data are inadequate about the public's knowledge toward the use of intravenous contrasts, specifically in Saudi Arabia [26].

Regarding to relation between knowledge level of the hazard of radio intravenous injection and sociodemographic characteristics, our results show that there was statistically significant relation to residential region (P value=0.018), but it shows statistically insignificant relation to gender, age, nationality, marital status, educational qualification, experience years, and monthly income. As regards awareness level relation it was statistically significant relation to educational qualification (P

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value=0.004), experience years (P value=0.001), and monthly income (P value=0.0001) and reported statistically insignificant relation to gender, age, nationality, residential region, and marital status. Another study conducted in Saudi Arabia found that female gender (p-value = 0.001), Saudi residents (p-value < 0.001), responders living in the Eastern area (p-value < 0.001), those with no medical conditions (p-value < 0.001), those who did not have any radiographic investigation with contrast, and those who got their information from their doctors (p-value < 0.001), all had a significantly better level of knowledge about IV contrasts [21]. Another study carried out by Mutala et al. [23] assessed the factors affecting knowledge level which determined that the level of experience and training were the most serious factors significantly affecting clinician knowledge (p=0.05). Results from another study conducted in Turkey revealed that there was a significant relation between knowledge level scores about IVCMs and the patients who had previous information about IVCMs (P = 0.000), patients with history of trials with IVCM injections compared to those who did not (P = 0.021) [25]. Also, education level was a significant factor in obtaining sufficient knowledge about IVCM (P =0.000), While the relation was statistically insignificant, men seemed to know more about IVCM than did women (P = 0.054) and the jobless group got lower knowledge scores compared to patients with different jobs (P = 0.001) [25].

Conclusion:

In conclusion, participants appear to lack understanding of various dangers that go with radio intravenous injections. However, since only one third of the 400 interviewees had one or more medical conditions that could show a bias in favour of, or against the medication, only a relatively moderate percentage of 57% had a satisfactory understanding of these risks at moderate to high level. It also emerged that a small number of the participants limited personal exposure to radiographic investigations involving contrast (29.5 %). But still there are questions to what contrast agents mean tolerable higher amount of pain so thus the area needs more work.

Population also influences awareness, for example, less than a quarter of a population of the deceased shows high awareness regarding the risks by IV injections. Also, regarding attitudes towards the practice of breastfeeding after IV contrast, 56% of the participants should cease this, 23% continue to believe that it was safe and therefore even when additional education is needed, carries a level of confidence. The facts depict he urgently need to increase the awareness of the public for the use of intravenous contrast in imaging and additionally, the safety measures should be increased on the use of the products.

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Ethical approval:

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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Informed consent:

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Data and materials availability:

All data associated with this study are present in the paper.

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