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Radiology Department Workers' Knowledge Regarding COVID-19: A Cross-Sectional Study

Husham Hussain Abdul-Ra'aoof[1], Wedad Amer Mizher[2], Ali Malik Tiryag[3*], Amina Abdul-Rhman Hanoun[4], Mohamed Hassan Hafed[5]

1 Community Health Nursing Department, College of Nursing, University of Basrah, Basrah, Iraq
E-mail: husham197476@gmail.com

2 Al-Kawther Primary Health Care Center, Basrah Health Directorate, Basrah, Iraq
MBChB-FIBMS-Family Medicine Specialist E-mail: Wedadamer76@gmail.com

3 Fundamentals of Nursing Department, College of Nursing, University of Basrah, Basrah, Iraq
E-mail: ali.malik@uobasrah.edu.iq

4, 5 College of Nursing, University of Basrah, Basrah, Iraq
Corresponding Author Email: ali.malik@uobasrah.edu.iq

Abstract. Background: Because radiology department employees are thought to be more susceptible to infection, they must understand infection control procedures and receive the necessary training to wear personal protective equipment. Objectives: The purpose of this study is to evaluate radiology department employees' knowledge of COVID-19 and determine how that knowledge relates to the employees' sociodemographic information. Methods: Between February 25 and March 16, 2021, 85 employees of hospitals in the Thi-Qar governorate's radiology departments participated in a descriptive cross-sectional study. To gather the information needed to meet the study's objectives, a unique questionnaire was created. The data was statistically analyzed using the Social Science Statistics software version 23, and the findings were presented as percentages and frequencies. The correlation between the various variables was evaluated using the mean score and significance. Results: Fifty-four (63.9%) and 31 (36.5%) of the 85 participants were men and women, respectively; 28 (32.9%) were in the 20–30 age range; 61 (71.8%) were married; 45 (52.9%) had a diploma; 46 (54.1%) were employed at X-ray units; approximately half (42, 49.4%) were radiographers; and 43 (50.6%) had been employed in the radiology department for 1–10 years. Conclusion: In summary, 78 (91.7%) and 7 (8.4%) individuals, respectively, had high and medium levels of overall knowledge regarding COVID-19 among radiology department employees; no discernible correlation was found between the study population's features and overall expertise.

Highlights:
1. Most radiology department workers demonstrated high knowledge about COVID-19.
2. No significant link was found between knowledge levels and sociodemographic factors.
3. Strongest knowledge was in infection prevention and clinical characteristics.

Keywords: COVID-19, Radiology Department, Knowledge, Infection Prevention, Cross-Sectional Study

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Introduction

Coronaviruses are a broad category of respiratory tract viruses that can cause everything from minor illnesses like the common cold to more serious pulmonary conditions. The Middle East respiratory syndrome coronavirus (MERS-CoV) and severe acute respiratory syndrome coronavirus (SARS-CoV) have emerged in the past 20 years, resulting in a number of human diseases [1,2]. The novel coronavirus that is currently affecting the lungs and airways is called SARS-CoV-19 [3,4]. Since its initial discovery in Wuhan, China, in the final month of 2019, it has quickly expanded around the globe [5,6]. On January 30, 2020, the World Health Organization (WHO) deemed COVID-19 a public health emergency of worldwide concern [7,8]. The SARS-CoV-19 virus, COVID-19, can target the respiratory system by influencing the lower respiratory tract (trachea, bronchi, and lungs) or the upper respiratory tract (sinuses, nose, and throat) [9,10].

Many healthcare workers (HCWs) around the world, primarily in China, have been impacted by the COVID-19 pandemic [11,12]. This is because their work requires them to have intimate contact with diseased clients during examinations and in a contaminated environment [13,14]. Employees in radiology departments are thought to be more susceptible to contracting COVID-19 because imaging tests are crucial in identifying and treating suspected, and sometimes laboratory-confirmed, cases of the virus [15,16]. As a result, they must be knowledgeable about infection control procedures and well educated to use PPE [17,18].

The majority of radiology departments now aim to support their role in diagnosing COVID-19 and ensure the safety of healthcare workers and the public. The WHO and the Centers for Disease Control have released guidelines for health care workers about the prevention and control of COVID-19. Although the WHO has made online resources and a number of training courses available to raise awareness among healthcare workers on prevention, it is currently unclear how much of this information can be applied in clinical practice to stop the spread of COVID-19 in radiology departments [19,20]. As more people become infected, the most crucial clinical action is to stop the spread of COVID-19 in radiology departments [21,22].

Clinical manifestation of COVID-19

Increased body temperature, coughing, dyspnea, exhaustion, chilliness, headache, sneeze, congestion-nasal discharge, pharyngitis, nausea, loss of taste or smell, diarrhea,

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and maybe shaking are some of the clinical signs of COVID-19. Additionally, some people experience paroxysmal blood clots in their arteries, lungs, and lower limbs. Depending on the disease's incubation period, symptoms might appear anywhere from two to fourteen days after exposure and vary from subject to subject [23,24].

Modes of transmission

Contact and respiratory droplets are the two ways that COVID-19 is spread from one person to another. A patient is at a significant risk of getting exposed to highly infectious respiratory droplets when they are near another person who is exhibiting respiratory symptoms. This is known as droplet transmission [25,26]. Additionally, fomites in the immediate surroundings or around the afflicted individual may spread the infection. Thus, the disease can spread either directly through contact with people who are sick or indirectly through contact with nearby surfaces or patient-use objects (such as thermometers and stethoscopes) [27,28]

Methods of prevention

Being unaffected initially is the strongest defense against the coronavirus. Although there are a number of COVID-19 vaccines, there are not many available. We can reduce the risk of contracting or spreading the disease by doing the following: Avoid touching your face, wash your hands often and thoroughly with soap and water or hand sanitizer, and wear a face mask; staying at home; social distancing from other people (leave at least 6 feet) in public places; staying indoors if you are ill; covering your mouth with your elbow when coughing or sneezing; or wiping and disinfecting areas and items you handle frequently with a kerchief [29,30].

Diagnosis of COVID-19

Analysis using reverse transcription-polymerase chain reaction of a nasopharyngeal swab or sputum sample is the current diagnostic technique for COVID-19 [31,32]. Nevertheless, this has a limited sensitivity for early sickness detection, and the RT-PCR test's accessibility limitations and lengthy turnaround time are significant concerns during a crisis. As a result, several recent studies have proposed using lung imaging techniques (computerized tomography and traditional chest radiography) to detect and identify the anticipated COVID-19 patients [33,34].. Serology, which detects antibodies created as an immunological response to the infection, is one potential diagnostic technique for chronic

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infections [35].

Imaging:

Although they are not suitable for routine screening, when there is clinical suspicion of COVID-19, Pleural effusions are typically not seen on imaging in COVID-19 patients [36]. According to a Chinese study, chest CT is quicker and more sensitive than PCR for detecting infections, although it is less specific [37].

Treatment:

Most COVID-19 patients can recover at home by taking drugs to treat fever, cough, congestion, and pain, as well as by obtaining adequate sleep and drinking plenty of water [38]. The drug Remdesivir, which is administered intravenously in hospitals, was approved by the Food and Drug Administration (FDA) in October 2020 as the first COVID-19 treatment. Monoclonal antibody drugs, such as Bamlanivimab, Casirivimab, and Imdevimab, which aid the body in mounting an immunological defense against foreign-made substrates like viruses, were also given emergency use authorization (EUA) by the FDA in November 2020. A few treatments, like convalescent plasma, have also received EUAs from the FDA. Since the beginning of the outbreak, numerous physicians have been using corticosteroids to treat extremely sick COVID-19 patients [39].

Complications of COVID-19:

Novel coronavirus-infected pneumonia is the most serious issue associated with COVID-19; many of these patients are at risk and require treatment in the respiratory care unit. Potential difficulties for clients with COVID-19 include the following: severe muscle soreness, exhaustion, abrupt myocardial infarction or heart damage, acute respiratory distress syndrome, irregular heartbeat, cardiac shock, or renal failure [40,41].

Objectives of the study:

1. To evaluate radiology department staff members' comprehension of COVID-19.
2. To determine the connections between the workers' sociodemographic information and their knowledge.

Methods

From February 25 to March 16, a descriptive study was conducted to evaluate radiology

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department staff members' understanding of COVID-19 at Thi-Qar Governorate Teaching Hospitals. The Thi-Qar health office has granted written consent for this study to be conducted. The researchers use an assessment instrument to gauge radiology department employees' familiarity with COVID-19. Following completion, the questionnaire was given out and given to a group of specialists for their comments. There are two components to the final study tool:

Part one: Seven factors make up the sociodemographic and Workplace attributes: sex, age, marital status, and educational attainment, radiology subunit, job description (kind of employment), and length of time spent working in radiology departments.

Part two: questions about general virus knowledge, methods for preventing infections, treating and monitoring illnesses, developing immunity, and employment in radiology departments that assessed participants' comprehension of COVID-19.

The current investigation was conducted from February 25 to March 16, 2021, in a few hospitals in Thi-Qar. Al Hussein Teaching Hospital, Al-Habobubi Hospital, Al-Shatra Hospital, and Al-Rifai General Hospital are these medical facilities. 85 randomly chosen employees from the radiology departments of the participating institutions made up the study sample.

The Package for Social Statistical Software, version 23, was used for all statistical analyses, and frequency and percentage were used to express the data. The correlation between the various variables was evaluated using the mean score and significance.

Results

This study contained 85 participants in total, forming the study sample. Of these, 31 (36.5%) were female and 54 (63.9%) were male.

Table 1: Study population characteristics

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Characteristic	Categories	Frequency	Percentage
Age (years)	20 - 30	28	32.9%
	31 - 40	25	29.5%
	41 - 50	21	24.7%
	51 - 60	7	8.2%
	61 - 70	4	4.7%
	Total	85	100%
Marital status	Single	24	28.2%
	Married	61	71.8%
	Total	85	100%
Educational attainment	Primary	3	3.5%
	Intermediate	5	5.9%
	Preparatory	3	3.5%
	Diploma	45	52.9%
	Bachelor	26	30.7%
	Other	3	3.5%
	Total	85	100%
Radiology subunit	X-ray	46	54.1%
	Ultrasound	12	14.1%
	CT	21	24.7%
	MRI	5	5.9%
	Other	1	1.2%
	Total	85	100%
Nature of the work	Radiographer	42	49.4%
	Device operator	21	24.7%
	Reception	8	9.4%
	Services	4	4.7%
	Other	10	11.8%
	Total	85	100%
	1-10	43	50.6%
	11- 20	27	31.7%
	21- 30	12	14.1%
	31- 40	2	2.4%

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	41- 50	1	1.2%
	Total	85	100%

The distribution of the five age groups was as follows: 28 (32.9%) in the 20–30 age group. Sixty-one (71.8%) of the 85 participants were married. In terms of educational achievement, 45 people (52.9%) hold a diploma. The participants were split up as follows based on the radiology departments' subunits: There were 46 (54.1%) X-ray units. 42 (49.4%) of the participants were radiographers, which is the type of work they do in radiology departments. 43 (50.6%) of those in the 1–10-year group had worked in radiology departments for a certain amount of time.

Table 2: General Knowledge of Coronavirus Information

NO.	Question	True	False	MS	LOK
1	The coronavirus that causes COVID-19 is a member of the vast virus family that we are already familiar with.	64	21	0.75	H
2	The same coronavirus that caused SARS and MERS in the past is the same one that causes COVID-19.	46	39	0.54	M
3	The virus takes one to fourteen days to incubate.	78	7	0.92	H
4	Animals are primarily affected by the virus.	21	64	0.25	L
5	The novel coronavirus can survive for five to seven days on a dry surface.	44	41	0.52	M
GMS				0.596	M

Five questions about general information about the coronavirus were given to each participant. Methods for preventing infections, treating and monitoring illnesses, and developing immunity, and how long the new coronavirus survives on dry surfaces, and low about the virus's relationship to animals. The level of generic coronavirus knowledge was mediocre.

Table 3: Knowledge about COVID-19 clinical characteristics and infection techniques

NO.	Question	True	False	MS	LOK

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1	Through the air, coronavirus can spread.	53	32	0.62	M
2	Droplets released from the lips and nose when coughing or sneezing can spread the virus from one person to another.	82	3	0.96	H
3	Humans can contract the sickness from an animal source.	45	40	0.53	M
4	Most frequently impacts the human respiratory system	83	2	0.98	H
5	The most typical signs of the sickness include fatigue, fever, and dry cough.	84	1	0.99	H
6	Children's infection symptoms differ from adults' symptoms.	66	19	0.78	H
GMS				0.81	H

Each participant was given six questions on this axis of knowledge, and their responses were evaluated based on their true or false answers, mean score, and level of knowledge. They had a moderate understanding of how the coronavirus spreads through the air and from animals to people, but a high understanding of how the virus spreads from person to person through droplets, how the respiratory system is primarily impacted, and how the symptoms of infection differ in children and adults. Overall, there was a high level of understanding of COVID-19 clinical characteristics and infection strategies.

Table 4: Knowledge on infection prevention

NO.	Question	True	False	MS	LOK
1	Medical equipment aids employees in carrying out their duties.	82	3	0.96	H
2	A face mask protects against infection	76	9	0.89	H
3	People should not touch them faces	77	8	0.91	H
4	Wash your hands for 20 to 30 seconds with soap and water.	80	5	0.94	H
5	Use disposable tissues while sneezing	82	3	0.96	H

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6	Steer clear of unwell folks who have flu-like symptoms.	80	5	0.94	H
GMS				0.93	H

Each participant was given six questions in this knowledge segment, and their responses were evaluated based on their true or false answers, mean score, and degree of knowledge. In every question about using medical equipment to perform tasks safely, wearing a face mask to prevent infection, avoiding touching their faces, washing their hands for a long time with soap and water, using disposable tissues when sneezing, and avoiding sick people who have flu-like symptoms, they demonstrated a high level of knowledge. Overall, there was a good level of understanding about infection prevention.

Table 5: Information on the disease's therapy

NO.	Question	True	False	MS	LOK
1	There is a cure for the disease	17	68	0.20	L
2	The same person can be infected more than once	76	9	0.89	H
3	Antibiotics are useful in treating patients	68	17	0.80	H
4	Antivirals are useful in treating infected people	69	16	0.81	H
5	Regular screening of employees in an environment where COVID-19 patients are present	76	9	0.89	H
6	Without therapy, the human immune system cannot recover from COVID-19 in a healthy state.	62	23	0.73	H
7	If I get better, I'll be immune to infections once more	39	46	0.46	M
GMS				**0.68**	**H**

Each participant was given seven questions in this knowledge segment, and their answers were assessed according to their degree of knowledge, mean score, and true or false replies. When asked about the disease's cure, their knowledge was poor; when asked about building immunity after infection, their knowledge was medium; and when asked about infection recurrence and the efficacy of antibiotics and antivirals in treating infected people, their knowledge was high, the need for regular screening of employees who come into contact with afflicted patients, and the connection between immunity and disease recovery. The table (4-5) below displays all of the information on disease therapy.

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Each participant was given four questions in this knowledge segment, and their answers were assessed according to their degree of knowledge, mean score, and true or false replies. When questioned about how well chest CT diagnoses diseases in comparison to medical swabs, their knowledge was rated as medium. They also reported that they had a high level of knowledge regarding the high risk of infection for radiology department employees, that they have adequate knowledge about how to treat the disease, and that they are the group most at risk of contracting COVID-19. Overall, there was a good level of understanding about disease therapy.

Table 6: Knowledge Assessment Overall

Items	Frequency	Percentage	Mean	S. D	Assessment
Poor	0	0	22.18	1.916	High
Moderate	7	8.2			
High	78	91.8			
Total	85	100.0			

S.D.: standard deviation

Regarding all of the previously listed knowledge sections, 78 (91.8%) participants had high overall knowledge, 7 (8.2%) participants only had medium overall knowledge, and none of the participants had low overall knowledge.

Table (7): Relationship between Overall Knowledge and Sociodemographic and Occupational Features

Items	Classes	Knowledge			Signature
		Poor	Moderate	High	
Age	20-30	0	2	26	P-value = 0.376 D.f = 4 N. S
	30-40	0	3	22	
	40-50	0	0	21	
	50-60	0	1	6	
	60-70	0	1	3	
	Total	0	7	78	

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Gender	Male	0	4	50	P-value = 0.714 D.f = 1 N. S
	Female	0	3	28	
	Total	0	7	78	
Marital Status	Single	0	1	23	P-value = 0.392 D.f = 1 N.S.
	Married	0	6	55	
	Total	0	7	78	
Educational attainment	Primary	0	0	3	P-value = 0.164 D.f = 5 N.S
	Intermediate	0	1	4	
	Preparatory	0	1	2	
	Diploma	0	1	44	
	Bachelor	0	4	22	
	Other	0	0	3	
	Total	0	7	78	
Radiology Subunit	X-ray	0	2	44	P-value = 0.541 D.F= 4 N.S
	Ultrasound	0	2	10	
	CT	0	2	19	
	MRI	0	1	4	
	Other	0	0	1	
	Total	0	7	78	
Nature of the Work	Radiographer	0	1	41	P-value = 0.257 D.F= 4 N.S
	Device operator	0	3	18	
	Reception	0	1	7	
	Services	0	0	4	
	Other	0	2	8	
	Total	0	7	78	
Duration of the Work	1-10	0	5	38	P-value = 0.798 D.F=4 N.S
	11-20	0	1	26	
	21-30	0	1	11	
	31-40	0	0	2	
	41-50	0	0	1	
	Total	0	7	78	

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D.F: Degree of freedom, P: Probability value, N.S: Not Significant

It was discovered that the participants' overall knowledge of COVID-19 was not significantly correlated with their demographic and occupational characteristics (gender, age, marital status, educational attainment, working place-radiology subunit, nature of work, and length of time spent in radiology departments) (P-value > 0.05).

Discussion

Since its initial definition in Wuhan, China, in December 2019, COVID-19 has quickly expanded throughout the world [3]. The WHO designated COVID-19 as a public health emergency of worldwide concern on January 30, 2020 [4]. Through contact routes and respiratory droplets, COVID-19 is spread from person to person [12]. The most typical symptoms include coughing, fever, and dyspnea [5]. When it comes to diagnosis, RT-PCR analysis of the extract from a saliva or mucus swab sample is now the gold standard [15]. Additionally, radiographic chest exams (CT and X-ray) are crucial for identifying and monitoring probable COVID-19 patients [14]. It is anticipated that healthcare workers in radiography departments will be more susceptible to infection [18]. To stop the spread of illness, health care workers in radiology departments should be trained in the use of personal protective equipment and informed of infection control procedures [9]. The purpose of this study was to evaluate radiology department staff members' awareness of COVID-19 at Thi-Qar teaching hospitals.

This section discusses the findings from statistical analyses, and surveys were used to gauge the program's effectiveness. The study population's characteristics (age, marital status, educational achievement, radiology subunit, type of employment, and length of work) are displayed in Table 1, and the various outcomes demonstrate how the study sample was selected at random.

The participants' knowledge was evaluated along five different axes, and the results indicate that they had a high level of knowledge in each of these areas: general information about the corona virus, knowledge about the clinical features and methods of infection of COVID-19, knowledge about infection prevention, knowledge about disease treatment, and, finally, knowledge about radiology department workers. These findings can be explained by the fact that, like other health care providers, radiology department workers acquired high levels of general knowledge about the disease through social media, workshops, lectures, training programs, and other channels.

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The table displayed the relationship between general knowledge and the research population's characteristics [8], which demonstrates a non-significant correlation between the study population's knowledge level and any of its characteristics (P-value greater than 0.05). This can be explained by the fact that all radiology department employees participated in COVID-19 education activities, with a focus on those employees who are at a high risk of infection.

Conclusions

1. High knowledge among radiology department employees, including general knowledge about the coronavirus, knowledge about COVID-19 infection mechanisms and clinical characteristics, knowledge about infection prevention, knowledge about disease treatment, and knowledge among radiology department employees.
2. Employees in radiology departments had a high level of general understanding regarding COVID-19.
3. There was no significant relationship between the study population's characteristics and radiology department employees' awareness of COVID-19.

Recommendations

1. To maintain high levels of knowledge, promote additional COVID-19 education for radiology department employees.
2. Conduct comparable research for additional medical professionals who are more susceptible to infection.
3. Promote more learning opportunities for other medical professionals.

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