

# ASSESSMENT OF KNOWLEDGE, ATTITUDE, AND PRACTICE OF HEALTH CARE PROFESSIONALS REGARDING COVID-19 VIRUS



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Submitted: 15/2/2022; Accepted: 1 /7/2022; Published: 21/9/2022

## ABSTRACT

### *Background*

COVID-19 is a highly expanding pandemic caused by a novel human coronavirus; it can be transmitted from person to person by close contact via respiratory secretions in coughs or sneezes or by touching virus-contaminated surfaces or objects. So, inadequate knowledge between information and practice and incorrect attitudes among health care professionals can directly influence practical issues and lead to delayed diagnosis, poor infection control practice, and much more spread of disease.

### *Objectives*

The main aim of this study was to assess health care providers regarding knowledge, attitude, and practice regarding the COVID19 outbreak in two special hospitals for Corona disease in Sulaimani City-Kurdistan region of Iraq, which are (Shahid Aso Hospital and Shahid Hemin hospital) from the period of Jun 26 up to 14th of September 2021.

### *Methods*

In a quantitative design, a descriptive study (non-probability purposive sample) of (127 male and female nurses and physicians), data collection of the study instrument was constructed of a total (of 57) items. The instrument's content validity was determined through a panel of (7) experts. Data were collected through interview techniques, then organized and coded into computer files. Statistical approaches were used for data analysis by (SPSS version 25).

### *Results*

Fifty-one percent (51%) of the sample was between the ages of 20 and 30. (63.8 %, 58.3 %, 59.1 %, 61.4 %) were married female government employees who had graduated from the institute of nursing. They most of them were nurses (96.1%). Nearly half of them had (1-5) years of experience. (52%) of them were trained. Only (24% and 13%) of them had a high level of knowledge and practice during their duty, respectively. Nevertheless, the result was significant with the level of education, position, and source of information on the COVID19 virus at a p-value less than 0.05.

### *Conclusion*

The health care professionals had not enough knowledge to practice their duty. So, the researchers recommended focusing on more training courses regarding the COVID19 virus and guidelines of infection control by the ministry of health/infection control department to develop their knowledge and practice.

**Keywords:** *Knowledge, attitude, practice, Nurses, physicians, COVID19 virus .*

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## INTRODUCTION

Coronavirus Disease 2019 (COVID-19), a deadly respiratory disease caused by SARS CoronaVirus-2 (SARS CoV-2), was declared a global pandemic on Mar 11, 2020, by World Health Organization (WHO). Around the world, more than 35 million cases and over a million deaths due to COVID-19 were reported. According to Oct 2,1, 2020, this pandemic disease is expected not to go away any sooner. Therefore, a continuous need for frontline healthcare workers (HCW) for the management of COVID-19 patients, making them the most vulnerable group to contract the disease. High transmission risk can be reduced by using Personal Protective Equipment (PPE) appropriately during close contact with COVID-19 patients.

According to the recommendation of the World Health Organization, regular hand hygiene, respiratory hygiene (covering mouth and nose while coughing or sneezing), keeping rooms well-ventilated, and physical and social distancing are vital points to preventing transmission of COVID-19 in the broader community during the onset of this pandemic disease <sup>(1)</sup>. Most patients have mild symptoms and do not require medical intervention. About twenty percent of COVID19 patients had serious clinical manifestations of the illness, such as dyspnea, sepsis, organ failure, and septic shock, which may be fatal in less than 5% of cases <sup>(2)</sup>. frontline COVID- 19 pandemic disease are the health care professionals not only exposed to infection with COVID-19 but also to long working hours, psychological distress, occupational stigma, fatigue, and physical violence <sup>(3)</sup>.

The overestimation by the absence of isolation facilities and overcrowding of contaminated environment is likely enhanced by inadequate information and awareness about guidelines of infection control programs in the practices among health care providers <sup>(4)</sup>. Healthcare workers (HCWs) form a significant risk group for infection <sup>(5)</sup>. In the early period of the COVID-19 pandemic, most cases were in health care workers <sup>(6)</sup>.

Hand hygiene, use of Personal Protective Equipment (PPE) which consists of (gloves, mask for respiratory protection, eye or face shield, and gown), safe practices in the handling of sharps, potentially contaminated materials, and handling of patient's belongings to prevent healthcare-associated Infections and coughing label/respiratory hygiene are the components of standard precaution measures and safety measures aimed at both professional and worker and patients

in health care settings <sup>(7)</sup>; within about 6 feet via respiratory secretions in coughs or sneezes or by touching virus-contaminated surfaces or objects, the SARS-COV-2 is transmitted from person to person by close contact, especially risky for old age. The pre-existence of chronic illnesses has been identified as a potential risk factor for severe disease and mortality <sup>(8)</sup>.

### **Importance of the study**

In the management of COVID 19, the healthcare workers are in front-liners because they play a vital role. They are the first point of contact with this pandemic disease, the htal patients. Hence, they are at high risk for COVID19. Standard practice and demonstrated competency in donning, doffing, and proper use of personal protective equipment are considered the best way for health care professionals to prevent this infection. So, inadequate knowledge and incorrect attitudes among health care professionals can directly influence practices and lead to delayed diagnosis, poor infection control practice, and the spread of disease <sup>(2)</sup>. Therefore, understanding health care workers, knowledge, attitudes, and possible perception of the risk of infection help to predict the outcomes of COVID-19 in the Kurdistan region, so the study aimed to assess the knowledge, attitude, and practices.

### **The objectives of the study**

#### **General objective**

To assess the knowledge and practices of health care providers in (Shahid Hemin and Shahid Aso hospital for coronavirus) regarding Covid19.

#### **Specific objectives**

- 1.To determine health care providers' attributes regarding age, sex, marital status, educational level, occupation, and residential area.
2. To find out health care providers' pattern of knowledge, attitude, and practice regarding the Covid19 outbreak.
3. To identify the association between some socio-demographic data and the level of the health professional regarding Covid19.

## **PATIENTS AND METHODS**

### **Design of the study**

Quantitative design (Cross Sectional, Descriptive study). A sampling of the study: Non-probability (purposive) sample of all nurses (governmental, contract, voluntary employ and the physicians who work in (Shahid Hemin and Shahid Aso) hospitals for coronavirus disease patients by interview technique.

### **The Study Instrument**

For data collection, the study tool was based on an extensive review of related literature and studies to assess the knowledge, attitude, and practices of health professionals (nurses and physicians). The study tool comprises four parts distributed through the following: The first part deals with socio-demographic data (age, sex, and level of education). The second part is the knowledge of the participants regarding Covid19. The third part is the attitude of the participants regarding Covid19. The fourth part is about the practices of the participant regarding Covid19.

The setting of the study: The study was conducted at (Shahid Hemin and Shahid Aso) hospitals for coronavirus, a governmental hospital in Sulaimani City.

### **Criteria for including the study sample**

Both adult male and female nurses and physicians who worked in both (Shahid Hemin and Shahid Aso) hospitals for coronavirus that work with coronavirus cases.

### **Criteria for excluding the study sample**

-Those health care professionals who do not work with coronavirus patients.

-Workers who work in these hospitals

Data Collection: The data was collected using an adapted and constructed questionnaire interviewing the health professional (nurses and physicians).

### **Pilot Study**

A pilot study was conducted on (15) male and female health care professionals from the period of Jun 15 up to Jun 22, 2021.

### **Reliability of the questionnaire**

Reliability was conducted by applying internal consistency reliability (split half), conducted at (Shahid Hemin and Shahid Aso) hospitals by 15 health care professionals for such reliability estimation. The reliability of the current study was ( $r= 0.75$ ) for the knowledge and practical work of health care professionals. Cronbach Alpha Correlation Coefficient was computed to calculate the correlation coefficient.

### **Data analysis**

The data were organized and coded into computer files using the Statistical Package for Social Science (SPSS, version 25). Data analysis was employed by applying descriptive statistics (frequency, percentage, and mean), inferential statistics, mean scores, and Chi-square.

## **RESULTS**

Table (1) showed that more than half of the participants were married females between 20 and 30 years old (58.3%, 63.8%, 51%), respectively. Most of them were nurses and have lived in the urban area (96.1%, 97.6%), respectively. Most health care professionals had a barely sufficient economic state (85.8%). They graduated from the institute of nursing, the secondary school of nursing, and postgraduate (61.4%, 10.2%, 1.6%), respectively. One to five, and less than one year is the highest and lowest level of experience (46.5%, 2.4%) and, (39.4%,29.1%,) of them had less and more than 24 hours of duty per week respectively. More than half of the health care professionals were governmental employees, not trained regarding COVID19, and the source of their knowledge was from social media (59.1%, 52%, 55.9%), respectively.

Table 2 in the current study deals with the participants' knowledge of COVID 19, demonstrating that nearly all health care professionals answered that they have enough information regarding COVID 19 (99.2%). Nearly most of them correctly answered the signs and symptoms of COVID 19, which lead to pneumonia and respiratory failure, also regarding preventive measures against COVID 19 such as washing hands with soap and water, frequently avoiding touching eyes, nose, and mouth, putting face mask, covering mouth during coughing and sneezing, avoid staying for a long time in a crowded place, cleaning the surfaces by disinfectant frequently, keep at least one meter far from people, and avoid direct close contact with them respectively (95.3,98.4%, 96.9%,96.1%,99.2%,100%, 100%, 99.2 and 97.6). The majority responded that this virus is more dangerous for elderly patients and the

person with chronic diseases; COVID19 is transmitted by direct contact and droplet (83.5%, 87.4%, 82.7%, 89.8%) respectively. (70.9%, 70.1%) of them reposed that the main source of this disease was not plants and antibiotics are the drug choice in treating COVID 19 respectively. (63.8%, 61.4%) answered that the disease incubation period is between (2-14) days.

Moreover, the vaccine against influenza is not protected against COVID 19 respectively. Table (3) deals with the participant's attitudes; (78%, 72.4%) of them believed that COVID 19 is a severe, dangerous disease but can treat at home, respectively. (93.7%, 96.9%, and 96.1%) of them agreed that health care professionals must acknowledge themselves toward COVID 19 disease; health education plays an important role in this pandemic disease prevalence of this disease is reduced when face masks are used properly, and health care workers implemented infection control program respectively. (88.2%, 61.4%) of the contributors believed that standard precautions could protect the health care workers from this serious disease, and vaccination against COVID 19 is essential for the medical staff. (18.1%, 44.1%) of them believed that the coronavirus will be increase day by day , but they are confident that the Kurdistan Region would overcome it, respectively.

Table (4) deals with practical issues of the participants

during their duty in the hospital (20.5%) answered that they educate the patients regarding COVID 19 disease. Less than half (40.2%) responded that they always wore a mask in crowded areas and controlled touching eyes, nose, and mouth, or coughed on their elbow if they had no tissue ( 47.2%, 44.9%), respectively. However, more than half of them washed their hands with alcohol or soap and water after coughing and sneezing on their hands. Regarding maintaining a healthy lifestyle, only (31.5) of them always focused on this period of the COVID 19 outbreak. (18.1%, 13.4%) of the participants have always washed their hands before and after finishing their duty at the hospital, respectively. Only (47.2%) of them were always avoiding touching their eyes, nose, and mouth.. Figure (1) showed that (24% and 76%) of the health care professional had a high and medium level of knowledge, respectively, and they had a low, medium, and high level of practice during their duty (20%, 67%) and 13%) respectively.

Table (5) deals with the association between the same socio-demographic data and the level of knowledge and practice of health care professionals regarding the COVID19 pandemic disease, which detected that only knowledge is significant with the level of education, position, and source of information toward coronavirus at p-value less than (0.05).

**Table 1. Socio-demographic characteristics of the study sample.**

<b>Variables</b>	<b>Class</b>	<b>Frequency</b>	<b>(%)</b>
<b>Age( Year)</b>	20-30	65	51
	31-40	33	26
	41-50	24	19
	51-60	5	04
	Total	127	100.0
<b>Gender</b>	Male	46	36.2
	Female	81	63.8
	Total	127	100.0
<b>Marital status</b>	Married	74	58.3
	Single	53	41.7
	Total	127	100.0
<b>Residential area</b>	Urban	124	97.6
	Rural	3	2.4
	Total	127	100.0
<b>Economic state</b>	Sufficient	13	10.2
	Barely sufficient	109	85.8
	Insufficient	5	3.9
	Total	127	100.0

**Table 1. Continued.**

<b>Level of education</b>	Secondary School of Nursing	13	10.2
	Institute of Nursing	78	61.4
	University of Nursing	34	26.8
	Postgraduate	2	1.6
	Total	127	100.0
<b>Position</b>	Nurse	122	96.1
	Physician	5	3.9
	Total	127	100.0
<b>Work experience (by year)</b>	Less than one year	3	2.4
	1-5 years	59	46.5
	5-10 years	21	16.5
	More than ten years	44	34.6
	Total	127	100.0
<b>Duty per week (hours)</b>	Less than 24 hrs.	50	39.4
	24 hours	40	31.5
	More than 24 hrs.	37	29.1
	Total	127	100.0
<b>Number of training courses regarding COVID 19</b>	No training course	66	52
	1-5 training courses	59	46.5
	More than five training courses	2	1.6
	Total	127	100
<b>Type of job</b>	Governmental employ	75	59.1
	Contract employ	17	13.4
	Voluntary employ	35	27.6
	Total	127	100.0
<b>Source of knowledge toward COVID 19</b>	WHO& CDC	17	13.4
	Training course	18	14.2
	Social media	71	55.9
	TV& Radio	21	16.5
	Total	127	100

Table 2. knowledge of health care workers regarding COVID19.

No	Items	Yes		No		I don't know	
		F	%	F	%	F	%
1	Do you have enough information regarding COVID 19?	126	99.2	1	0.8	0	0
2	The main source of the disease is Plants	18	14.2	90	70.9	19	15
3	COVID-19 is transmitted by direct contact with infected persons	105	82.7	17	13.4	5	3.9
4	COVID-19 is transmitted by dealing with domestic animals	46	36.2	52	40.9	29	22.8
5	The incubation period of the disease is from 2 to 14 days	81	63.8	25	19.7	21	16.5
6	Antibiotics are the drug of choice in treating COVID 19	89	70.1	31	24.4	7	5.5
7	The influenza vaccine also gives protection from COVID 19	31	24.4	78	61.4	18	14.2
8	The virus may be more dangerous in patients with chronic diseases	111	87.4	9	7.9	6	4.7
9	The virus may be more dangerous for the elderly patient	106	83.5	11	8.7	10	7.9
10	Health care workers are much more prone to COVID 19	119	93.7	6	4.7	2	1.6
11	COVID 19 is transmitting from humans to animals	13	10.2	64	50.4	50	39.4
12	COVID 19 is transmitting from animals to humans	66	52	31	24.4	30	23.6
13	COVID 19 is transmitted by animal products (e.g., milk, meat)	41	32.3	54	42.5	32	25.2
14	COVID 19 is not transmitted in well-cooked product	74	58.4	33	26	20	15.7
15	COVID 19 always causes death	36	28.3	86	67.7	5	3.9
16	COVID 19 is transmitted by droplets	114	89.8	9	7.1	4	3.1
17	Headache, fever, and dry cough are common symptoms of COVID 19	121	95.3	5	3.9	1	0.8
18	COVID-19 leads to pneumonia and respiratory failure.	121	95.3	1	0.8	5	3.9
	<b>Preventive measures against COVID-19</b>						
19. a	Wash hands with soap and water or alcohol frequently	125	98.4	2	1.6	0	0
19. b	Avoid touching eyes, nose, and mouth	123	96.9	4	3.1	0	0
19 .c	Putting on facemask properly in a crowded area.	122	96.1	4	3.1	1	0.8
19.d	Covering the nose and mouth while coughing & sneezing.	126	99.2	1	0.8	0	0

Table 2. Continued.

19. e	Avoiding crowdedness and closed areas in public places	127	100	0	0	0	0
19. f	Frequently cleaning and disinfecting surfaces.	127	100	0	0	0	0
19. g	Keep at least one-meter distance between people	126	99.2	0	0	1	0.8
19h	Avoid direct contact with colleagues (close friends)	124	97.6	1	0.8	2	1.6

Table 3. Attitude of health care workers toward COVID19.

No.	Variables	Class	F	(%)
1.	COVID 19 is a severe and dangerous disease	Agree	99	78
		Disagree	17	13.3
		Undecided	11	8.7
		Total	127	100
2.	COVID 19 can be treated at home.	Agree	92	72.4
		Disagree	24	18.9
		Undecided	11	8.7
		Total	127	100
3.	Healthcare workers must be knowledgeable themselves about all the information about COVID 19 virus	Agree	119	93.7
		Disagree	5	3.9
		Undecided	3	2.4
		Total	127	100
4.	Health education can play an important role in COVID 19 prevention.	Agree	123	96.8
		Disagree	1	0.8
		Undecided	3	2.4
		Total	127	100
5. a	The prevalence of COVID-19 can be reduced by: Using PPE properly when dealing with patients.	Agree	123	96.9
		Disagree	3	2.3
		Undecided	1	0.8
		Total	127	100
5. b	Implementing infection control programs by healthcare workers in the hospitals	Agree	122	96
		Disagree	3	2.4
		Undecided	2	1.6
		Total	127	100
6.	Performing standard precautions properly can protect the health care providers from COVID 19	Agree	112	88.2
		Disagree	5	3.9
		Undecided	10	7.9
		Total	127	100
7.	COVID 19 cases will be increased day by day	Agree	23	18.1
		Disagree	68	53.5
		Undecided	36	28.4
		Total	127	100
8.	Vaccination against Covid19 is very important for healthcare workers	Agree	78	61.4
		Disagree	14	11
		Undecided	35	27.6
		Total	127	100
9.	I am confident that the Kurdistan region can overcome COVID 19	Agree	56	44.1
		Disagree	16	12.6
		Undecided	55	43.3
		Total	127	100

Table 4. Practice of health care workers during COVID-19 outbreak.

No.	Variables	Class	F	(%)
1.	<b>Do you educate your patient about COVID-19?</b>	Always	26	20.4
		Some time	82	64.6
		Never	19	15
		Total	127	100
2.	<b>Do you use a face mask in a crowded area?</b>	Always	51	40.2
		Some time	64	50.4
		Never	12	9.4
		Total	127	100
3.	<b>Did you control touching your eyes, nose, or mouth as far as you can?</b>	Always	60	47.2
		Some time	51	40.2
		Never	16	12.6
		Total	127	100
4.	<b>Do you throw the used tissue in the trash?</b>	Always	104	81.9
		Some time	19	15
		Never	4	3.1
		Total	127	100
5.	<b>Do you cover your nose and mouth with a tissue during sneezing or coughing?</b>	Always	95	74.8
		Some time	28	22
		Never	4	3.2
		Total	127	100
6.	<b>If you do not have a tissue, do you cough and sneeze on your elbow?</b>	Always	57	44.9
		Some time	54	42.5
		Never	16	12.6
		Total	127	100
7.	<b>Do you wash your hands with soap &amp; water or alcohol after coughing and sneezing on your hands?</b>	Always	67	52.8
		Some time	54	42.5
		Never	6	4.7
		Total	127	100
8.	<b>Do you maintain a healthy lifestyle focusing on outbreaks?</b>	Always	40	31.5
		Some time	76	59.8
		Never	11	8.7
		Total	127	100
9.	<b>Do you wash your hands for one minute before starting your duty at the hospital?</b>	Always	23	18.1
		Some time	26	20.5
		Never	78	61.4
		Total	127	100
10.	<b>Do you wash your hand for one minute after finishing your duty at the hospital?</b>	Always	17	13.4
		Some time	86	67.7
		Never	24	18.9
		Total	27	100

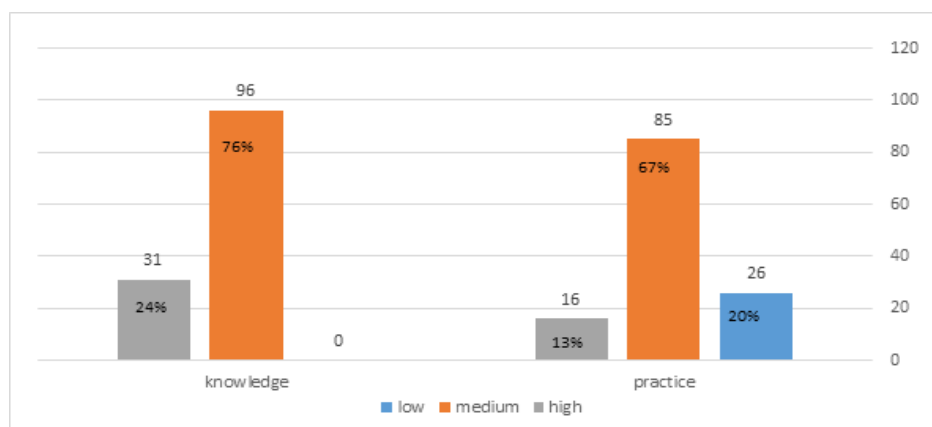


Figure 1. level of knowledge and practice of health care professionals regarding COVID 19 disease.

Table 5. Association between some socio-demographic data and level of knowledge and practice.

Variables	Classes	Level of knowledge (F& %)			P-value for knowledge	Level of practice (F& %)		
		Low (0-25) %	Medium (26-45) %	High (46 and more) %		Low (0-10) %	Medium (11-15) %	High (16 and more) %
<b>Age</b>	20-30	0	49	16	0.321	19	37	9
		0	0.39	0.13		0.15	0.29	0.07
	31-40	0	25	8		4	23	6
		0	0.2	0.06		0.03	0.18	0.05
41-50	0	17	7	2	21	1		
	0	0.13	0.06	0.02	0.17	0.00		
51 & More	0	5	0	1	4	0		
	0	0.04	0	0.00	0.03	0		
<b>Gender</b>	Male	0	32	14	0.234	10	30	6
		0	0.25	0.11		0.08	0.24	0.05
Female	0	64	17	16	55	10		
	0	0.5	0.14	0.12	0.43	0.08		
<b>Level of Education</b>	Secondary school on Nursing	0	9	4	0.004	2	11	0
		0	0.07	0.03		0.02	0.09	0
	Institute of Nursing	0	66	12		16	52	10
		0	0.52	0.1		0.13	0.41	0.08
University of Nursing	0	21	13	8	21	5		
	0	0.17	0.1	0.06	0.17	0.04		
Master & PhD	0	0	2	0	1	1		
	0	0	0.02	0	0.00	0.00		

Table 3. Continued.

<b>Position</b>	Nurse	0 0	95 0.75	27 0.21		26 0.21	82 0.65	14 0.11
	Physician	0 0	1 0.00	4 0.03	0.003	0 0	3 0.02	2 0.02
<b>Work Experience (by year)</b>	>1	0 0	3 0.02	0 0		0 0	3 0.02	0 0
	1-5 years	0 0	44 0.35	15 0.12		18 0.14	33 0.26	8 0.06
	5 - 10 years	0 0	15 0.12	6 0.05	0.737	2 0.02	15 0.12	4 0.03
	More than ten years	0 0	34 0.27	10 0.08		6 0.05	34 0.26	4 0.03
<b>Duty per week (hours)</b>	Less than 24 hours	0 0	39 0.31	11 0.09		7 0.06	37 0.29	6 0.05
	24 hours	0 0	28 0.22	12 0.1	0.609	8 0.06	24 0.19	8 0.06
	More than 24 hours	0 0	29 0.23	8 0.06		11 0.09	24 0.19	2 0.02
<b>Number of training courses regarding COVID-19</b>	No training	0 0	52 0.41	14 0.11		12 0.1	46 0.36	8 0.06
	1-5	0 0	43 0.34	16 0.13	0.519	13 0.1	38 0.3	8 0.06
	5 >	0 0	1 0.00	1 0.00		1 0.00	1 0.00	0 0
<b>Type of Job</b>	Voluntary	0 0	29 0.23	6 0.05		11 0.09	20 0.16	4 0.03
	Contract	0 0	12 0.1	5 0.04	0.487	6 0.05	10 0.08	1 0.00
	Government	0 0	55 (0.43)	20 0.16		9 0.07	55 0.43	11 0.09
<b>The most source of information regarding coronavirus</b>	Social Media	0 0	61 0.48	10 0.08	0.001	18 0.14	46 0.36	7 0.06
	TV & Radio	0 0	17 (0.13)	4 0.03		3 0.02	15 0.12	3 0.02
	Training Course	0 0	10 (0.08)	8 0.06		3 0.02	12 0.1	3 0.02
	WHO & CDC	0 0	8 (0.06)	9 0.07		2 0.02	12 0.1	3 0.02

## **DISCUSSION**

The results of the current study in Table (1) showed that more than half of the participants were married females under 40 years. Most of them were nurses, and others were physicians. Nearly half had the highest experience level (1-5) years. More than half of them were not trained regarding COVID19 virus, and obtained knowledge regarding COVID 19 from social media. This result disagrees with a study done in Egypt which showed that the female participants were (49.4%), only (35.6%) of them had the highest age between (20-29) years, and most participants in their sample were physicians. Finally, the main source of their knowledge was the WHO website<sup>(2)</sup>. Also, the present study disagrees with the study done in Bangladesh, which mentioned that most of their participants were unmarried (80.8%), and more than half of their participants graduated from a university<sup>(9)</sup>.

Table(2) demonstrated that most healthcare professionals answered that they have enough information regarding COVID 19. Nearly three-quarters of them reposed that the main source of this disease was not the plants. Most responded that COVID19 is transmitted by direct contact and droplet. More than half of them answered that the disease incubation period is between (2-14) days. This result contradicts the answers of the study's participants, as the majority correctly answered 2-14 days. Nearly three-quarters responded that antibiotics are the drug choice in treating COVID 19<sup>(9)</sup>.

More than half of the participants in the current study answered that the vaccine against influenza is not given protection against COVID 19. Most participants knew that this virus is more dangerous for elderly patients and persons with chronic diseases. This result is similar to the study in Bangladesh in which most participants answered the same<sup>(9)</sup>. Most of them correctly answered about signs and symptoms of COVID 19, which lead to pneumonia and respiratory failure, also regarding preventive measures against COVID 19 such as washing hands with soap and water frequently, avoiding touching the eyes, nose, and mouth, putting face mask, covering mouth during coughing and sneezing, avoid staying for a long time in a crowded place, cleaning the surfaces by disinfectant frequently, keep at least one meter far from people, and avoid direct close contact with them respectively.

Some of these results agree with the result of a study<sup>(9)</sup>, such as most of their participants answered correctly

about transmission and signs and symptoms of the COVID 19 virus.

Table (3) deals with the participant's attitudes; (78%, 72.4%) of them believed that COVID 19 is a severe, dangerous disease but can treat at home, respectively. Most agreed that health care professionals must acknowledge themselves toward COVID 19 disease. Health education plays an essential role in this pandemic disease prevalence of this disease is reduced when face masks are used properly and healthcare workers implement infection control programs, respectively. (88.2%, 61.4%) of the contributors believed that standard precautions could protect the health care workers from this serious disease, and vaccination against COVID 19 is essential for the medical staff. (53.5%, 44.1%) of them believed that the coronavirus would increase daily, but they are confident that the Kurdistan Region would overcome it, respectively. This result is nearly similar to the study done by (Wahed et al., 2020), which showed that the majority believed that COVID19 is a severe disease and can be prevented. Therefore, standard precautions can protect us against COVID 19 pandemic disease. However, disagree with some other items, such as (65.4%,78.4%) they confident that their country can overcome the COVID-19 pandemic disease, and they believe that the cases of COVID 19 recovered from the disease respectively<sup>(9)</sup>.

In Table (4), the participants described their practical issues during their work; less than a quarter of them answered that they educated the patients regarding COVID 19 disease.

Less than half of them answered that they always wore masks in crowded areas, controlled touching their eyes, nose, and mouth, coughed on their elbow if they had no tissue, and always maintained a healthy lifestyle focusing on this period of the COVID 19 outbreak, washed their hands before starting and after finishing their duty at the hospital. However, more than half answered that they wash their hands with alcohol or soap and water after coughing and sneezing on their hands. This result disagrees with the study done in Brazil, which mentioned that most participants performed hand hygiene before and after exposure to body fluid or after the procedure<sup>(7)</sup>. It also disagrees with the study done in Northwest Ethiopia because nearly half of their participants have washed their hands before the procedure<sup>(10)</sup>. The result of the present study in figure (1) showed that less than a quarter of the participants had a high level of knowledge regarding COVID 19.

This result agrees with the study done by (Kabir et al., 2018) in (Dhaka city in Bangladesh) and revealed that the majority of their participants had a good level of knowledge about infection prevention and relatively had a minimal level of practice during their practical issues <sup>(11)</sup>. However, the result disagrees with the study done in 10 hospitals in (Henan, China) and showed that most nursing staff have excellent knowledge regarding COVID 19.

Most staff had good practices and a positive attitude toward COVID 19. So, the findings of the study suggest that nursing staff demonstrated excellent knowledge, good practices, and a positive attitude toward COVID 19 <sup>(12)</sup>. It also disagrees with the study in (Kenya) which revealed a high knowledge about the COVID 19 pandemic <sup>(13)</sup>. Table (5) in the current study showed the association between the level of knowledge and practice of the participants toward COVID19 pandemic disease with the same socio-demographic data; The results are only significant with knowledge and the level of education, a position which consists of (nurses and physicians), and source of information regarding COVID 19 (0.004, 0.003 and 0.001) respectively at p-value less than (0.05). These outcomes are nearly agreed with the study done in (Iraq) in 2021 which demonstrated that some socio-demographic characteristics such as level of education and employment were statistically related with a higher mean score of knowledge and practice towards this pandemic disease as  $P < 0.05$  <sup>(14)</sup>.

In conclusion, the finding of the current study demonstrated that less than a quarter of the participants had a high level of knowledge and practice toward the COVID 19 pandemic disease; even this low level of knowledge and practice about COVID 19 pandemic disease is insufficient; So; this outcome directly affects practices and lead to delayed diagnosis, deprived infection control practice, and spread of the disease because this study suggested focusing on more training courses regarding COVID19 and implementing the guidelines of infection control by the ministry of health/infection control department to develop the level of knowledge, practice, and attitude of health care professionals.

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