

Original Article

Assessment of Knowledge, Attitudes, and Practices towards COVID-19 among Hemodialysis Nurses during the COVID-19 Outbreak in Ma'an Governorate Hospitals- Jordan

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Abstract

The COVID-19 pandemic remains a worldwide challenge. Despite extreme study efforts globally, effective treatment and vaccine options have eluded the investigators. Therefore, this study aimed to investigate knowledge, attitudes, and practices (KAP) towards COVID-19 among hemodialysis nurses in Ma, Governorate hospitals- Jordan. An exploratory research design (cross-sectional study design) has been utilized to achieve the aim of the current study. The study was conducted in the dialysis unit at Ma' a governmental hospital- in Jordan. Data were collected by using a self-administered structured questionnaire. Nearly half (47.5%) of nurses were male, ranging from 30 to 40 years old. More than half of them (62.5%) were married and graduated from nursing college; their years of experience were more than 5 years. The vast majority of participants reported that they have adequate knowledge and good practice about how to deal with COVID-19. The majority of participants have a favorable attitude regarding COVID -19 outbreaks. A positive correlation was found between nurses' knowledge and attitudes toward COVID19 according to their years of experience. The study found that most nurses have good knowledge and practice levels and favorable attitudes toward COVID 19 infection. Educational programs about COVID 19 should be provided to nurses in different departments and units in the hospital.

Keywords: Virus Infection, Respiratory System, Renal Dysfunction

1. Introduction

Chronic Hemodialysis (HD) patients constitute a high-risk group for severe complications in case of presenting infections, by the status immunosuppression and coexistence of Comorbidities significant, in particular, cardiovascular pathology, diabetes mellitus, and others. Additionally, from the epidemiological point of view, they constitute a conglomerate closed since they go to treatment regularly (two to three times a week), so they spend three to four hours in the places (1).

According to Jordan's Ministry of Health (2) data, a total of 333855 cases were confirmed since the initial spark of the COVID-19 outbreak and 4369 deaths across the country as of Feb 7, 2021. However, the total numbers of patients treated and registered in the Jordan Renal Registry by the end of 2019 were (5.000) patients; Distributed over 1,300 patients in governmental hospitals, 1,600 patients in private hospitals, 1,200 patients in private hospitals rented by the Ministry of Health, 1,200 patients in medical

services hospitals, and 180 patients in university hospitals (3).

Only the experience of a Hemodialysis Unit (HDU) in Wuhan, China, where characteristics are reported relevant to the clinical presentation and diagnosis of infection. A total of 230 patients with chronic HD reported a SARS-CoV 2 infection rate of 16% (37/230), while the medical personnel in charge of the care of these patients was infected by 12% (4/33), which shows the high transmission rate in this context (4).

COVID-19 has high transmissibility, and the mechanism of the viral spread of COVID-19 still has some degree of uncertainty (5). However, human-to-human transmission occurs via respiratory droplets and aerosols resulting from infected persons and direct contact with contaminated objects (6). Nursing staff must take adequate precautions and recommendations and implement appropriate practices that substantially reduce the risk of workplace transmission of COVID-19 to patients and staff within the dialysis units (7).

Globally, healthcare workers are at the forefront in containing the COVID-19 outbreak, diagnosis, and management of infected patients. Unfortunately, healthcare workers were also the source and means of nosocomial and community transmission. The disease burden in both developed and developing countries worsened the response and management strategies due to inadequate provision of personal protection equipment for healthcare workers, environmental contamination, overcrowding, and inadequate provision of proper isolation facilities. Thus, mitigating the increasing number of COVID-19 cases requires the HCWs' adherence to the recommended measures to prevent transmission. These measures are affected mainly by the frontline workers' knowledge, attitudes, and practices (KAPs) (8).

Recommendations are needed for action during the COVID-19 pandemic for specific contexts of HD patients and to identify and treat early SARS- COVID-19 to contain the spread to other patients and health personnel. The present recommendations are based on

the Guidelines for managing UHD during the COVID-19 epidemic published by the Center for Disease Control and Prevention (9) and the ministry of Jordan health. Additionally, some recommendations are added and considered necessary by the group of experts.

Infection control measures are essential in preventing COVID-19 spread, such as appropriate hand hygiene, consistent use of aseptic technique, and implementing appropriate personal protective equipment (PPE) regarding contact and droplet precautions (10). Infection control and prevention from COVID-19 is the responsibility of nurses and is a crucial component of the patient safety program (11). Therefore, nurses in all departments must have professional and ethical responsibilities to ensure that their knowledge and skills related to infection control are up-to-date and that they practice safely and competently at all times (12).

This research aimed to investigate knowledge, attitudes, and practices (KAP) toward COVID-19 among hemodialysis nurses in Ma'an, a Governorate hospital- in Jordan.

2. Materials and Methods

2.1. Research Design

Exploratory research design (cross-sectional study design) has been used to achieve the aim of the study. The study period was from January to February 2021.

2.2. Setting

The study was conducted in the dialysis unit at Ma' a governmental hospital- in Jordan (Ma'an governmental hospital and Ministry Queen Rania Al Abdullah Hospital).

2.3. Participants

The sample in this study was composed of all available nurses (40 nurses) who were providing direct care to patients in hemodialysis units at previously mentioned hospitals.

2.4. Tool of Data Collection

2.4.1. A Self-Administered Structured Questionnaire

The questionnaire collected the knowledge, attitude, and practice toward the COVID-19 outbreak. The questionnaire was adopted from other published articles

(13-19), and further modification was done to fit the local context and research objective. It includes the following parts:

Part 1. Personal and demographic data of the nurses as age, gender, level of education, and years of experience.

Part 2. Nurses' Knowledge about COVID-19: Nurses' Knowledge of the COVID-19 was measured using eighteen questions questionnaires and by proving numerical value for each question (1=Yes (correct), 0=No (incorrect answer). The total knowledge score for the nurses varied between 0 (with no correct answer) and 18 (for all correct answers), and a cut-off level of ≤ 9 was evaluated as poor knowledge, and >9 indicated good knowledge.

Part 3. Nurses' Attitude towards COVID-19: The question regarding attitude was eleven (with a minimum score of 11 and a maximum score of 55). The attitude score was based on 5 points Likert Scale, in which a score of 1 to 5 was given from strongly disagree to agree strongly. A mean score >33 (answering for strongly agree or agree) was carried out as a favorable attitude, and a score of 11 to 33 indicated an unfavorable attitude (answering strongly disagree or disagree or neutral).

Part 4. Nurses' Practice to prevent COVID-19: The question regarding the practice was fourteen (with a minimum score of 14 and a maximum score of 70). The practice score was based on 5 points, in which the score of 1 to 5 was given from never to always. A mean score >42 (answering for always or most of the time or sometimes) was carried out as having a good practice, and a score of ≤ 42 indicated poor practice (answering never or occasionally).

2.4.2. Tool Reliability

All scales represented acceptable Cronbach's Alpha which illustrates valid and reliable scales. It showed that the Cronbach's Alpha for infection prevention practice of hemodialysis nurses toward the COVID-19 was 933, Knowledge about COVID-19 questionnaire 873, and nurses' attitudes towards the COVID-19 922.

2.5. Study Procedure

Based on recent and scientific research, data was collected to design the research tool to assess hemodialysis nurses' knowledge, practice, and attitude regarding COVID-19 diseases by using a self-administered questionnaire.

A pilot study of 10 % of the study sample ensures the questionnaire's applicability.

The researcher obtained permission from the dean of the faculty and the dialysis unit at Ma'an, a governmental hospital- in Jordan (Ma'an governmental hospital and Ministry Queen Rania Al Abdullah Hospital), to explain the purpose of the study, as well as asked the participant about the possibility to join the study.

The researcher distributed the self-administered questionnaire to each subject in the study and asked them to fill the questionnaire completely and honestly. After that, the researcher collected the questionnaire from the nurses.

2.6. Data Processing and Analysis

The collected data was checked for its completeness manually and then entered into EPI-data manager version 4.2.1 and analyzed using SPSS version 23 statistical software package. Descriptive statistics, including proportion, Percentage, ratios, frequency distribution, the mean, and standard deviation, were used to describe the normally distributed data, whereas, for the skewed data, the median and interquartile range was used.

3. Results

Table 1 shows that nearly half (47.5%) of nurses were male, and half (50%) ages ranged from 30 to 40 years old. More than half of them (62.5%) were married and graduated from nursing college; their years of experience were more than 5 years.

Table 2 demonstrates that the vast majority of participants reported having adequate knowledge about dealing with COVID-19. For instance, 30 participants (75%) agree that COVID-19 is a viral infection.

Similarly, 30 participants (75%) agree that healthcare workers are at a higher risk of infection. Also, 33 (82.5) participants wash their hands with soap and water, and using face masks can help prevent disease transmission. Moreover, 32 (80%) of them reported that the main clinical symptoms of COVID-19 are fever, cough, sore throats and shortness of breath, and myalgia/ fatigue. Of some participants, 16 (40%) reported that children and young adults do not need to take measures to prevent infection by the COVID-19 virus. Also, 17 (42%) persons with COVID-2019 could not infect with the virus when there was no fever.

Table 3 reported that more than one-third of participants (n=15, 37.5%) reported that they sometimes went to crowded places. However, little of them reported never or occasionally, most of the time or always. One-quarter of participants (n=11, 27.5%), (n=10, 20%) reported that sometimes or always they have worn a mask when leaving home. However, few of them reported most of the time, never, or occasionally. Nearly similar numbers of participants

remove protective equipment carefully. A quarter of participants (n=12, 30%) always covered their mouths when coughing and sneezing in the past 14 days. Similarly, a quarter of them sometimes (n=0, 25%) do so. Also, a quarter of participants reported that most of the time (n=14, 35%) or always (n=10, 25%) wash hands immediately after coughing, rubbing the nose, or sneezing in the past 14 days. The vast majority of participants (n=13, 32.5%) reported they always wear masks regardless of the presence or absence of symptoms in the past 14 days. Likewise, a quarter of participants (n=14, 35%) reported they washed hands after touching contaminated objects in the past 14 days. Those who were sometimes or most of the time doing so were (n=10, 25%) and (n=9, 22.5%) consequently. According to other practices, a large number of participants reported they sometimes avoided using the elevator, sitting in one row while having a meal, avoided meeting with more than 10 people, felt that too much worry or anxiety had been made about COVID-19, and stay at home to avoid COVID-19.

Table 1. Distribution of demographic characteristics of the studied sample during the COVID-19 outbreaks (n=40)

Variable name		Frequency	Percent %
Sex	Male	19	47.5
	Female	21	45.5
Age	20 ≤30 years old	16	40
	30 ≥ 40years old	20	50
	40 years and above	4	10
Marital status	Single	14	35.0
	Married	25	62.5
	Divorced	1	2.5
level of education	School of Nursing	9	22.5
	Nursing Institute	4	10.0
	Nursing College	27	67.5
Years of experience	Less than 5 years	16	40
	More than 5 years	24	60

Table 2. Distribution of study sample regarding knowledge of hemodialysis nurses toward the COVID-19 during the COVID-19 outbreaks (n=40)

Variable name	Frequency	Percent%
Have you received specialized training in infection control?	Yes 27	67.5
	No 13	32.5
COVID-19 is a virus infection	Yes 30	75.0
	No 10	25.0
COVID-19 vaccine is available in markets	Yes 18	45.0
	No 22	55.0
Antibiotics are the first-line treatment	Yes 23	57.5
	No 17	42.5
Washing hands with soap and water and using face masks can help prevent disease transmission	Yes 33	82.5
	No 7	17.5
Healthcare workers are at a higher risk of infection	Yes 30	75.0
	No 10	25.0
COVID-19 could be fatal	Yes 25	62.5
	No 15	37.5
The main clinical symptoms of COVID-19 are fever, cough, sore throats and shortness of breath, and myalgia/ fatigue	Yes 32	80.0
	No 8	20.0
Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with the COVID-19 virus	Yes 26	65.0
	No 14	35.0
There currently are 2 effective cures for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection	Yes 31	77.5
	No 9	22.5
Elderly patients and Patients with underlying chronic diseases are at a higher risk of severe infection and death	Yes 29	72.5
	No 11	27.5
Eating or contacting wild animals would result in infection by the COVID 19 virus	Yes 21	52.5
	No 19	47.5
Persons with COVID-2019 cannot infect others when a fever is not present	Yes 17	42.5
	No 23	57.5
COVID-19 is transmitted by close contact and via respiratory droplets with the infected person	Yes 33	82.5
	No 7	17.5
Ordinary residents can wear general medical masks to prevent infection by the COVID-19 virus	Yes 28	70.0
	No 12	30.0
Children and young adults do not need to take measures to prevent infection by the COVID-19 virus	Yes 16	40.0
	No 24	60.0
To prevent the infection by COVID-19, individuals should avoid going to crowded places such as train stations and taking public transportations	Yes 31	77.5
	No 9	22.5
Isolation and treatment of people infected with the COVID-19 virus are effective ways to reduce the spread of the virus	Yes 34	85.0
	No 6	15.0
People who have contact with someone infected with the COVID-19 virus should be immediately isolated in a proper place. In general, the observation period is 14 days	Yes 32	80.0
	No 8	20.0

Table 3. Distribution of study sample regarding the practice of hemodialysis nurses toward the COVID-19 during the COVID-19 outbreaks (n=40)

Variable name	Frequency	Percent %
Have you gone to any crowded place?	never	8 20.0
	occasionally	8 20.0
	sometimes	15 37.5
	most of the time	4 10.0
	always	5 12.5
Have you worn a mask when leaving home?	never	4 10.0
	occasionally	7 17.5
	sometimes	11 27.5
	most of the time	8 20.0
	always	10 25.0

Table 3. Distribution of study sample regarding the practice of hemodialysis nurses toward the COVID-19 during the COVID-19 outbreaks (n=40)

Variable name		Frequency	Percent %
Remove protective equipment carefully.	never	4	10.0
	occasionally	9	22.5
	sometimes	11	27.5
	most of the time	8	20.0
	always	8	20.0
Do you cover your mouth when coughing and sneezing in the past 14 days?	never	5	12.5
	occasionally	6	15.0
	sometimes	10	25.0
	most of the time	7	17.5
	always	12	30.0
Do you wash your hands immediately after coughing, rubbing the 2se, or sneezing in the past 14 days?	never	5	12.5
	occasionally	3	7.5
	sometimes	8	20.0
	most of the time	14	35.0
	always	10	25.0
Do you wear a mask regardless of the presence or absence of symptoms in the past 14 days?	never	6	15.0
	occasionally	5	12.5
	sometimes	7	17.5
	most of the time	9	22.5
	always	13	32.5
Do you wash hands after touching contaminated objects in the past 14 days?	never	6	15.0
	occasionally	1	2.5
	sometimes	10	25.0
	most of the time	9	22.5
	always	14	35.0
Do you avoid using the elevator in the past 14 days?	never	7	17.5
	occasionally	1	2.5
	sometimes	17	42.5
	most of the time	9	22.5
	always	6	15.0
Do you sit in one row while having a meal in the past 14 days?	never	5	12.5
	occasionally	4	10.0
	sometimes	17	42.5
	most of the time	9	22.5
	always	5	12.5
Have you avoided meeting more than 10 people in the past 14 days?	never	4	10.0
	occasionally	6	15.0
	sometimes	12	30.0
	most of the time	8	20.0
	always	10	25.0
Do you feel that too much worry or anxiety has been made about COVID-19?	never	3	7.5
	occasionally	5	12.5
	sometimes	19	47.5
	most of the time	8	20.0
	always	5	12.5
Do you stay home to avoid COVID-19 than a 2rmal situation (Family Quarantine)?	never	3	7.5
	occasionally	3	7.5
	sometimes	19	47.5
	most of the time	12	30.0
	always	3	7.5

Table 4 reported that approximately one-third of participants (n=13, 32.5%) agree that COVID-19 will finally be successfully controlled. Similarly, (n=12, 30%) have confidence that Jordan can win the battle against the COVID-19 virus. More than one-third of participants (n=17, 42.5%) have the attitude that they will get the illness. Also, one-third of participants (n=15, 37.5%) were worried that one of their family members may get the infection. About half of the participants (n=19, 47.5%) agree that they will accept isolation in health facilities if they are affected by COVID-19. Around half of the participants (n=17, 42.5%) have the attitude that transmission of COVID-19 can be prevented by washing hands with soap frequently. One-third of participants (n=14, 35%) reported that the prevalence of COVID-19 can be reduced by active participation in control programs such as hospital infection control programs. Only a few participants (n=12, 30%) agree to take the COVID-19

vaccine whenever available. One-third of participants (n=17, 42.5%) agree that patients should disclose their exposure. Similar number (n=17, 42.5%) agree to participate in anti-epidemic in the community.

Table 5 reported that the mean score for all variables was measured, and the result showed that the highest mean score was for nurses' practice, followed by their attitudes and eventually their Knowledge about COVID-19 outbreaks.

Table 6 demonstrated that the Kruskal-Wallis test was conducted to examine the differences in some dependent variables, such as Knowledge about COVID-19, attitudes toward COVID-19, and nurses' practices toward COVID-19 during the outbreaks of the disease. The result showed no significant differences among the subgroups of these variables. However, the only significant difference was found in Knowledge about COVID-19 (df=1, $P=0.020$) and attitudes toward COVID-19 (df=1, $P=0.024$) according to their years of experience.

Table 4. Distribution of study sample regarding the attitude of hemodialysis nurses toward COVID-19 during the COVID-19 outbreaks (n=40)

Variable name		Frequency	Percent %
Do you agree that COVID-19 will finally be successfully controlled?	Strong disagree	3	7.5
	Disagree	6	15.0
	Neutral	13	32.5
	Agree	13	32.5
	Strong agree	5	12.5
Do you have confidence that Jordan can win the battle against the COVID-19 virus?	Strong disagree	2	5.0
	Disagree	8	20.0
	Neutral	16	40.0
	Agree	12	30.0
	Strong agree	2	5.0
You think you will probably get the illness	Strong disagree	3	7.5
	Disagree	7	17.5
	Neutral	11	27.5
	Agree	17	42.5
	Strong agree	2	5.0
You are worried that one of your family members may get an infection	Strong disagree	3	7.5
	Disagree	6	15.0
	Neutral	10	25.0
	Agree	15	37.5
	Strong agree	6	15.0
If getting COVID-19, you will accept isolation in health facilities	Strong disagree	3	7.5
	Disagree	6	15.0
	Neutral	9	22.5
	Agree	19	47.5
	Strong agree	3	7.5

Variable name		Frequency	Percent %
Transmission of COVID-19 can be prevented by washing hands with soap frequently	Strong disagree	2	5.0
	Disagree	4	10.0
	Neutral	8	20.0
	Agree	17	42.5
	Strong agree	9	22.5
Prevalence of COVID-19 can be reduced by the active participant (hospital infection control programs)	Strong disagree	2	5.0
	Disagree	5	12.5
	Neutral	13	32.5
	Agree	14	35.0
	Strong agree	6	15.0
If a COVID-19 vaccine were available, I would have it	Strong disagree	6	15.0
	Disagree	7	17.5
	Neutral	9	22.5
	Agree	12	30.0
	Strong agree	6	15.0
Covid-19 patients should be kept in isolation	Strong disagree	2	5.0
	Disagree	4	10.0
	Neutral	6	15.0
	Agree	15	37.5
	Strong agree	13	32.5
Patients should disclose their exposure	Strong disagree	4	10.0
	Disagree	4	10.0
	Neutral	9	22.5
	Agree	17	42.5
	Strong agree	6	15.0
Medical staffs are ready to participate in anti-epidemic in the community	Strong disagree	3	7.5
	Disagree	3	7.5
	Neutral	10	25.0
	Agree	17	42.5
	Strong agree	7	17.5

Table 5. Distribution of study sample regarding mean score of knowledge, practice, and attitude of hemodialysis nurses toward the COVID-19 during the COVID-19 outbreaks (n=40)

Variable name	Total number	Minimum	Maximum	Mean	Std. Deviation
Total Knowledge	40	18.00	36.00	23.8	4.4
Total practice	40	16.00	68.00	45.9	13.2
Total attitudes	40	14.00	55.00	37.3	9.2

Table 6. Relationship between knowledge, practice, attitudes, and demographic variables {year of experience, level of education} of hemodialysis nurses toward the COVID-19 during the COVID-19 outbreaks (n=40)

Variables' names	df	Asymp. Sig
level of education and Knowledge about COVID-19	2	0.426
level of education and attitudes toward COVID-19	2	0.203
level of education and Infection prevention toward the COVID-19 during the COVID-19	2	0.707
Years of experience and Knowledge about COVID-19	1	0.020
Years of experience and attitudes toward COVID-19	1	0.024
Years of experience and Infection prevention toward COVID-19 during the COVID-19	1	0.287

4. Discussion

The coronavirus disease 2019 (COVID-19) has rapidly spread worldwide, posing a danger to human health (20). This pandemic is traumatic for healthcare workers (HCWs) in general and nurses in particular because they are at the frontline of the worldwide battle against COVID-19. Nurses in healthcare settings are the most vulnerable because they have frequent and extended interaction with people diagnosed with COVID-19 or who are symptomatic or particularly susceptible to infection. Furthermore, they are in charge of their treatment and care (21).

As a result, nurses should have current and reliable Knowledge of COVID-19 to know how to obtain, diagnose, and offer quality treatment and education to patients with a suspected or verified case of COVID-19; they should also know how to protect their health and safety to prevent obtaining the infection (22).

The current study shows that nearly half of nurses are male, and half of them their age ranges from thirty to forty years old. More than half of them were married and graduated from nursing college, and their years of experience were more than five years (16). They disagreed regarding gender but agreed with the current study regarding marital status and age as they reported that "More than half of the participants were female. The participants had a median age of 30 years. Regarding the marital status, the majority of the participants were married."

The present study reported that most participants reported adequate knowledge about how to deal with COVID-19. From the researchers' point of view, these results are acceptable as most nurses have sufficient Knowledge of COVID-19, mainly from reliable sources such as the WHO and the MOPH; thus, most participants relied on credible resources to obtain information on COVID-19. However, many still relied on television, social media, and even family and friends to get information.

Asaad, El-Sokkary (13), Khan, Khan (18), and Bhagavathula, Aldhalei (17) agreed with the current

study findings as they reported that "the majority of the participants had good knowledge regarding the COVID-19 outbreaks. This is higher than with the study conducted in Iran and Saudi Arabia". Also, Huynh (19) was in line with a recent study conducted in a hospital in China among HCWs, reporting that most of them had good Knowledge about COVID-19.

Also, a study by Kassie (23) shows that most health care providers have good Knowledge of COVID-19 infection. This finding is lower than the study conducted in China by Huynh (19). The disparity may be attributed to the research setting; our study involved participants from all community clinics and hospitals, while the prior study only included hospital participants. Furthermore, health care professionals working in hospitals may have the highest qualified workforce compared to health centers, where diploma holders are mainly staff, and providers in China, where the first COVID-19 epidemic occurred, may have greater access to information and be more vulnerable to cases than in the current study. Furthermore, hospitals are well-equipped with robust infrastructures, such as the internet and others, to help healthcare professionals gain awareness of COVID-19.

The current study results clarify that most participants have a good practice level. From the researchers' point of view, these results were very accepted as more than half of nurses graduated from the faculty of nursing and have more than five years of experience in addition to their good level of knowledge, all reflecting on nurses' level of practice.

The present study reported that "more than one-third of participants (n=15, 37.5%) reported that they have sometimes gone to any crowded place. However, little of them reported never or occasionally, most of the time or always. One-quarter of participants (n=11, 27.5%), (n=10, 20%) reported that sometimes or always they have worn a mask when leaving home. However, few of them reported most of the time, never or occasionally. Nearly similar numbers of participants remove protective equipment carefully. A quarter of

participants (n=12, 30%) always cover their mouths when coughing and sneezing in the past 14 days. Similarly, a quarter of them was sometimes (n=10, 25%) do so. Also, a quarter of participants reported that they were most of the time (n=14, 35%) or always (n=10, 25%) wash hands immediately after coughing, rubbing the nose, or sneezing in the past 14 days. The vast majority of participants (n=13, 32.5%) reported they always wear masks regardless of the presence or absence of symptoms in the past 14 days. Likewise, a quarter of participants (n=14, 35%) reported they washed hands after touching contaminated objects in the past 14 days. Those who were sometimes or most of the time doing so were (n=10, 25%) and (n=9, 22.5%) consequently. According to other practices, a large number of participants reported they sometimes avoided using the elevator, sit in one row while having a meal, avoid meeting with more than 10 people, feel that too much worry or anxiety has been made about COVID-19, and stay at home to avoid COVID-19".

Unfortunately, Adhena and Hidru (24) disagreed with the current study results as they reported that "COVID-19 avoidance and regulation is practiced ineffectively by more than half of the respondents. The majority of the respondents, 401 (95.7%), had washed their hands with soap and water. Two hundred and ninety-nine percent (71.4%) of the respondents had visited the crowded city. Nearly half of the participants, 198 (47.3%), did not maintain physical space at all times, and more than one-third, 153 (36.5 percent), did not cover their mouth and nose with a towel or other substance when sneezing and coughing. More than half of the subjects, 237 (56.6%), touched their eyes and noses before regularly washing their hands with water, soap, or sanitizer. In general, 372 (88.8%) participants said they wore no mask in crowded places or while moving.

Also, some other researchers disagreed with the study results as they reported poor practice for their nurses (25-29). The explanation for the disparity could be attributable to disparities in research participants' social status, heterogeneity in data collection duration length,

sample size, target groups, study participants, and study location, or it could be due to differences in the method used to measure awareness, attitude, and experience. In these studies done in China, Uganda, and Iran, the data were collected during the main phase of the outbreak when most of their populations were exposed to a lot of information about COVID-19.

Regarding nurses' attitude toward COVID-19 during the COVID-19 outbreak, the current study demonstrated that most participants have a favorable attitude regarding COVID-19 outbreaks. From the researchers' point of view, these results are expected as nurses have a good knowledge and practice level that reflects positively on their attitude and a favorable attitude.

Studies were done to assess attitudes towards COVID-19 in different countries worldwide. In Egypt, a study by Abdelhafiz (8) showed that most of them had a positive attitude towards different items of the inquired preventive measures. A study conducted by Afzal, and Khan (30) in Pakistan, showed that nurses have a positive attitude about the need for gloves and hand sanitizers, as well as recovery centers and vaccine programs.

In Saudi Arabia, research done by Alahdal (31) showed that most participants presented with a high attitude. The vast majority of them are Staying at home helps to limit the spread of the virus, isolating sick individuals helps to limit the spread of the virus, closing schools and colleges helps to limit the spread of the virus, and closing malls helps to limit the spread of the virus, and avoiding travel between cities helps to monitor the spread of the virus.

Another study in Saudi Arabia by Al-Hanawi (32) showed an optimistic attitude towards COVID-19. According to the study by Huynh (19): healthcare workers in Vietnam, most had a positive attitude toward COVID-19. According to a study by Hussain (33), most primary healthcare providers in Pakistan had a positive attitude towards COVID-19 infection.

In Jordan, research conducted among a group of Khader, Al Nsour (34) dentists showed that more than

half of them reported a positive attitude about COVID-19 infection.

Finally, the present study revealed a positive correlation between nurses' knowledge and attitudes toward COVID-19 according to their years of experience. From the researchers' point of view, it was acceptable results as the years of work experience increased the nurses' knowledge about the diseases, reflecting positively on nurses' attitudes.

Nearly half of the nurses were male, and half of their ages ranged from thirty to forty. More than half of them were married and graduated from nursing college, and their years of experience were more than five years.

Most participants reported adequate knowledge and good practice in dealing with COVID-19.

The majority of participants have a favorable attitude regarding COVID-19 outbreaks.

That a positive correlation was found between nurses' knowledge and attitudes toward COVID-19 according to their years of experiences.

Based on the finding of this study, the following recommendations were made:

- Educational programs about COVID 19 should be provided to nurses in different departments and units in the hospital.
- Community prevention programs should be provided to overcome the disease in the kingdom.

Further research studies on larger populations for generalizing the study results.

Authors' Contribution

Study concept and design: H. A.

Acquisition of data: K. A. A.

Analysis and interpretation of data: K. A. A.

Drafting of the manuscript: H. A.

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Ethics

The ethical committee approved the research of the respective colleges. Any participant had the choice to quit the study at any point. The collected data's privacy, secrecy, anonymity, and protection were ensured. The end output was used for both publication and education.

Conflict of Interest

The authors declare that they have no conflict of interest.

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References

1. Vega-Vega O, Arvizu-Hernández M, Domínguez-Cherit JG, Sierra-Madero J, Correa-Rotter R. Prevención y control de la infección por coronavirus SARS-CoV-2 (Covid-19) en unidades de hemodiálisis. *Salud Publica Mex.* 2020;62(3):341-7.
2. Health JsMo. Jordan's Ministry of Health webpage for coronavirus 2021. Available from: <https://corona.moh.gov.jo/ar>.
3. (DOS) DoS. Annual Report, Jordan. 2019.
4. Ma Y, Diao B, Lv X, Zhu J, Liang W, Liu L, et al. 2019 novel coronavirus disease in hemodialysis (HD) patients: report from one HD center in Wuhan, China. *MedRxiv.* 2020;2(24):20027201.
5. Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *Int J Surg.* 2020;76:71-6.
6. Lai C-C, Shih T-P, Ko W-C, Tang H-J, Hsueh P-R. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. *Int J Antimicrob Agents.* 2020;55(3):105924.
7. Honein MA, Christie A, Rose DA, Brooks JT,

- Meaney-Delman D, Cohn A, et al. Summary of guidance for public health strategies to address high levels of community transmission of SARS-CoV-2 and related deaths, December 2020. *Morb Mortal Wkly Rep.* 2020;69(49):1860.
8. Abdelhafiz AS, Mohammed Z, Ibrahim ME, Ziady HH, Alorabi M, Ayyad M, et al. knowledge, perceptions, and attitude of Egyptians towards the novel coronavirus disease (COVID-19). *J Community Health.* 2020;45(5):881-90.
 9. CDCP. Interim additional guidance for infection prevention and control recommendations for patients with suspected or confirmed COVID-19 in outpatient hemodialysis facilities. 2020.
 10. Ye L, Yang S, Liu C. Infection prevention and control in nursing severe coronavirus disease (COVID-19) patients during the pandemic. *BioMed Central*; 2020. p. 1-4.
 11. Sun N, Wei L, Shi S, Jiao D, Song R, Ma L, et al. A qualitative study on the psychological experience of caregivers of COVID-19 patients. *Am J Infect Control.* 2020;48(6):592-8.
 12. Gaikwad UN, Basak S, Kulkarni P, Sande S, Cahavan S, Mudey G, et al. Educational intervention to foster best infection control practices among nursing staff. *Int J Infect.* 2018;5(3):e81531.
 13. Asaad A, El-Sokkary R, Alzamanan M, El-Shafei M. Knowledge and attitudes towards Middle East respiratory syndrome-coronavirus (MERS-CoV) among health care workers in south-western Saudi Arabia. *East Mediterr Health J.* 2020;435-42.
 14. Nemati M, Ebrahimi B, Nemati F. Assessment of Iranian nurses' Knowledge and anxiety toward COVID-19 during the current outbreak in Iran. *Arch Clin Infect Dis.* 2020;1:102848.
 15. Patelarou AE, Konstantinidis T, Kartsoni E, Mechili EA, Galanis P, Zografakis-Sfakianakis M, et al. Development and Validation of a Questionnaire to Measure Knowledge of and Attitude toward COVID-19 among Nursing Students in Greece. *Nurs Rep.* 2020;10(2):82-94.
 16. Tadesse DB, Gebrewahd GT, Demoz GT. Knowledge, attitude, practice and psychological response toward COVID-19 among nurses during the COVID-19 outbreak in northern Ethiopia, 2020. *New Microbes New Infect.* 2020;38:100787.
 17. Bhagavathula AS, Aldhaleei WA, Rahmani J, Mahabadi MA, Bandari DK. Novel Coronavirus (COVID-19) knowledge and perceptions: a survey of healthcare workers. *MedRxiv.* 2020.
 18. Khan S, Khan M, Maqsood K, Hussain T, Zeeshan M. Is Pakistan prepared for the COVID-19 epidemic? A questionnaire-based survey. *J Med Virol.* 2020;92(7):824-32.
 19. Huynh G, Nguyen TNH, Vo KN, Pham LA. Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City. *Asian Pac J Trop Med.* 2020;13(6):260.
 20. Lake MA. What we know so far: COVID-19 current clinical knowledge and research. *Clin Med.* 2020;20(2):124.
 21. Finch J. Legal aspects of COVID-19 pandemic management for community nurses. *Br J Community Nurs.* 2020;25(4):196-9.
 22. COVID-19 resource center 2020. Available from: <https://www.nursingworld.org/practice-policy/work-environment/health-safety/disaster-preparedness/coronavirus/>.
 23. Kassie BA, Adane A, Tilahun YT, Kassahun EA, Ayele AS, Belew AK. Knowledge and attitude towards COVID-19 and associated factors among health care providers in Northwest Ethiopia. *PloS One.* 2020;15(8):e0238415.
 24. Adhena G, Hidru HD. Knowledge, attitude, and practice of high-risk age groups to Coronavirus Disease-19 prevention and control in Korem District, Tigray, Ethiopia: cross-sectional study. *Infect Drug Resist.* 2020;13:3801.
 25. Erfani A, Shahriarirad R, Ranjbar K, Mirahmadizadeh A, Moghadami M. Knowledge, attitude and practice toward the novel coronavirus (COVID-19) outbreak: a population-based survey in Iran. *Bull World Health Organ.* 2020;30(10.2471):10.2471.
 26. Kebede Y, Yitayih Y, Birhanu Z, Mekonen S, Ambelu A. Knowledge, perceptions and preventive practices towards COVID-19 early in the outbreak among Jimma university medical center visitors, Southwest Ethiopia. *PloS One.* 2020;15(5):0233744.
 27. Khasawneh AI, Humeidan AA, Alsulaiman JW, Bloukh S, Ramadan M, Al-Shatanawi TN, et al. Medical students and COVID-19: Knowledge, attitudes, and precautionary measures. A descriptive study from Jordan. *Front Public Health.* 2020;8:253.
 28. Olum R, Chekwech G, Wekha G, Nassozi DR, Bongomin F. Coronavirus disease-2019: Knowledge, attitude, and practices of health care workers at Makerere

- University Teaching Hospitals, Uganda. *Front Public Health*. 2020;8:181.
29. Shahbaznejad L, Navaeifar MR, Movahedi FS, Hosseinzadeh F, Fahimzad SA, Serati Shirazi Z, et al. Knowledge, attitude and practice of Sari Birth Cohort members during early weeks of COVID-19 outbreak in Iran. *BMC Public Health*. 2021;21(1):1-12.
30. Afzal MS, Khan A, Qureshi UUR, Saleem S, Saqib MAN, Shabbir RMK, et al. Community-based assessment of knowledge, attitude, practices and risk factors regarding COVID-19 among Pakistanis residents during a recent outbreak: a cross-sectional survey. *J Community Health*. 2021;46(3):476-86.
31. Alahdal H, Basingab F, Alotaibi R. An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia. *J Infect. Public Health*. 2020;13(10):1446-52.
32. Al-Hanawi M, Angawi K, Alshareef N, Qattan A, Helmy H, Abudawood Y, et al. Knowledge, attitude and practice toward COVID-19 among the public in the Kingdom of Saudi Arabia: A cross-sectional study. *Front Public Health*. 2020; 8: 217.
33. Hussain I, Majeed A, Imran I, Ullah M, Hashmi FK, Saeed H, et al. knowledge, attitude, and practices toward COVID-19 in primary healthcare providers: a cross-sectional study from three tertiary care hospitals of Peshawar, Pakistan. *J Community Health*. 2021;46(3):441-9.
34. Khader Y, Al Nsour M, Al-Batayneh OB, Saadeh R, Bashier H, Alfaqih M, et al. Dentists' awareness, perception, and attitude regarding COVID-19 and infection control: cross-sectional study among Jordanian dentists. *JMIR Public Health Surveillance*. 2020;6(2):18798.