



# The Open Nursing Journal

Content list available at: <https://opennursingjournal.com>



## RESEARCH ARTICLE

### Predictors of COVID-19 Prevention Practices among Abu Dhabi Healthcare Professionals

Salam Abufeddeh<sup>1</sup>, Ayman Hamdan-Mansour<sup>2</sup>, Ahmad Abu Raddaha<sup>3</sup>, Basema Nofal<sup>4</sup> and Muhammad Darawad<sup>5,\*</sup>

<sup>1</sup>Abu Dhabi Health Authority, Zayed Military Hospital, United Arab Emirates, Al-Khairj, Saudi Arabia

<sup>2</sup>Community Nursing, The University of Jordan, Amman, Jordan

<sup>3</sup>Department of Nursing, Prince Sattam Bin Abdulaziz University, Saudi Arabia

<sup>4</sup>School of Nursing, Applied Science Private University, Amman, Jordan

<sup>5</sup>Clinical Nursing Department, School of Nursing, The University of Jordan, Amman, Jordan

#### Abstract:

#### Background:

Healthcare professionals (HCPs) played an important role in preventing, controlling, and managing the COVID-19 pandemic because of their proximity to the outbreak. Protecting HCPs and their surroundings at home and at work is critical in pandemic planning and response. Abu Dhabi strongly responded to the COVID-19 pandemic by implementing stringent procedures in the management process, implementing high-quality measures, and adhering to strict protocols.

#### Purpose:

To explore the predictors of COVID-19 pandemic practices among HCPs.

#### Methods:

In a descriptive, cross-sectional research design, an online survey was used. The survey was sent out *via* email and social media platforms such as Facebook, Twitter, and WhatsApp. The target population included all HCPs at Abu Dhabi hospitals. In addition to the demographic data sheet, the level of knowledge, attitudes, and practices (KAP) toward the COVID-19 pandemic was assessed. The study questionnaire was completed by 290 participants.

#### Results:

Analysis revealed that HCPs had a high level of knowledge ( $M=13.9$ ,  $SD=1.76$ ), high level of attitudes ( $M=6.8$ ,  $SD=1.02$ ) and high level of practices ( $M= 5.7$ ,  $SD= 0.80$ ). Many significant differences in participants' practices were observed based on their demographics. Christians ( $t= 3.73$ ,  $B= .21$ ,  $p <.001$ ), official health organizations, news media, seminars and workshop ( $t= 4.61$ ,  $B= .26$ ,  $p <.001$ ) and being physicians ( $t= -2.64$ ,  $B= -.12$ ,  $p <.01$ ) were significant predictors of HCPs' COVID-19 pandemic prevention practices, accounting for 14% of the variance in participants' practices level ( $F(6, 283) = 7.94$ ,  $p <.001$ ).

#### Conclusion:

The majority of HCPs in Abu Dhabi showed a high level of awareness of the COVID-19 pandemic, as well as favorable attitudes and good infection control measures. To maintain high knowledge, attitudes, and behaviors of COVID-19, continuous training and evaluation program should be created.

**Keywords:** COVID-19, Healthcare professionals, Attitudes, Knowledge, Practices, Abu Dhabi.

#### Article History

Received: January 15, 2023

Revised: June 14, 2023

Accepted: June 21, 2023

## 1. INTRODUCTION

The COVID-19 pandemic began in Wuhan, China, in December 2019. It had devastating effects on people's social lives, school systems, physical and mental health, and the

economy on a global scale [1]. Due to COVID-19's global expansion, the World Health Organization first designated the outbreak a public health emergency of international concern on January 30, 2020, and then a pandemic on March 11, 2020 [2].

The COVID-19 virus is primarily transmitted through air droplets in contact with infected people or contaminated objects and surfaces [3]. Over 400 million people were infected, and 5.8 million died as a result of this global pandemic [4]. Over 850,000 people were infected, and over 2,100 died in the United Arab Emirates [5].

Due to the COVID-19 pandemic's massive number of casualties among both patients and healthcare professionals (HCPs), which resulted in an increased workload and a shortage of protective equipment, the healthcare sector globally was put under tremendous pressure [6]. Mutambudzi *et al.* [7] found that HCPs were seven times more likely than other workers to have severe COVID-19. Additionally, by May 2020, 1413 (0.5%) deaths and 153,000 (4% of HCPs) worldwide COVID-19 infections had been documented [8].

Healthcare professionals are essential in preventing, managing, and containing the COVID-19 pandemic since they are on the front lines of this outbreak. Therefore, crucial components of any pandemic response and management are aiding, sustaining, and safeguarding HCPs and their surroundings at work and home. This necessitates the availability of adequate protective personal equipment as well as HCPs with current knowledge, optimistic attitudes, and appropriate practices about all elements of the pandemic.

According to the literature, a variety of characteristics, including socio-demographics, work experience, profession, and level of education, have been associated with COVID-19 preventative strategies [9 - 11]. Additionally, it was determined that knowledge and attitudes levels were associated with COVID-19 prevention activities [12]. Furthermore, researchers in China [13] and Nigeria [14] found that having strong knowledge and a positive attitude toward COVID-19 among HCPs is a significant predictor of effective prevention practices during the COVID-19 pandemic.

One of the emerging Gulf countries is the United Arab Emirates (UAE), which consists of seven emirates (Abu Dhabi, Dubai, Sharjah, Ajman, Fujairah, Ras al-Khaimah, and Umm al Quwain). Abu Dhabi, the largest emirate, has 2.7 million people, or 28% of the UAE's total population. According to the Deep Knowledge Group, Abu Dhabi was the safest city in the world during the COVID-19 pandemic in the second quarter of 2021. This was based on 114 parameters that covered important aspects of the COVID-19 response. The ranking was based on five major categories: government efficiency, economic resilience, quarantine system efficiency, healthcare management, and vaccination rates [15]. In addition, the UAE has spearheaded research studies and fostered scientific discoveries, and worked with other nations to create a vaccine [5].

Exploring the factors that influence how HCPs practice in relation to the COVID-19 pandemic can undoubtedly assist decision-making authorities in establishing policies and guidelines that maintain the highest level possible of HCP

knowledge, attitudes, and practices in relation to the COVID-19 pandemic by either enhancing and maintaining positive impacts or preventing and minimizing negative impacts. There were no studies found on the predictors of COVID-19 prevention practices among Abu Dhabi HCPs. To achieve the study aims, the researchers are expected to answer the following questions:

1. What is the level of practice of HCPs in relation to COVID-19?
2. Are there statistically significant differences in HCPs' practices regarding COVID-19 based on their demographics?
3. What are the predictors of HCPs' practice level during the COVID-19 pandemic?

## 2. METHODS

### 2.1. Design

A descriptive cross-sectional design was used, with an online survey distributed *via* E-mail and social media.

### 2.2. Setting and Sample

In UAE, the Ministry of Health and Prevention is in charge of the healthcare system. However, each emirate has its own health authority. The Department of Health (DOH) is the regulatory body for healthcare services in Abu Dhabi. In addition, there are three types of hospitals in Abu Dhabi: public, private, and military. Data were collected from various hospitals that represent various healthcare settings. According to the Abu Dhabi Social Statistic Center (SCAD) [16], the total number of hospitals in Abu Dhabi is 65, with 42 of these hospitals being private, with approximately 6000-bed capacity. Nurses make up the largest proportion of healthcare providers in Abu Dhabi, accounting for approximately 27650 of the total. Hospitals were chosen at random from a list of hospitals representing each healthcare sector in each emirate, and a convenient sample was drawn from all healthcare workers at the chosen hospitals.

The target population included all HCPs at Abu Dhabi hospitals. The accessible sample included all HCPs working at the participating hospitals at the time of data collection. Participants were conveniently recruited. To be included, participants had to be Physicians, nurses, or paramedics at the participating hospitals. On the other hand, administrative HCPs who do not provide direct patient care were excluded.

Cohen's table was used to calculate the sample size [17]. Using multiple regression, a sample size of 107 participants is predicted, with a moderate effect size of 0.15, power of 0.80, and level of significance of 0.05. In order to have more reliable data for the outcome's generalizability, a larger sample was used, taking into account the possibility of incomplete questionnaires.

### 2.3. Instruments

The study measures included a demographics data questionnaire and knowledge, practices, and attitudes toward COVID-19 which was developed by Albahri *et al.* [18]. After reviewing the literature, the researchers developed a

\* Address correspondence to this author at the Clinical Nursing Department, School of Nursing, The University of Jordan, Amman, Jordan;  
E-mail: m.darawad@ju.edu.jo

demographic data sheet that included: gender, age, marital status, type of facility (hospital or healthcare facility), years of experience, education level, religion, and COVID-19 infection or exposure status (not exposed to a confirmed case, past exposure and quarantine, currently ill with the virus, and past illness with the virus), the primary source of information (Official health organizations, social media, news media, scientific journals, work colleagues, internet, seminars and workshop and the duty shift (day, night or rotating).

The KAP survey has three different dimensions. The first dimension uses 15 questions to evaluate respondents' knowledge of COVID-19, with the possibilities for each question being true, false, or I don't know. Only the correct answer was given a score of 1; all other answers scored 0. So, this section's final score could be anything from 0 and 15. There are seven items in the second domain, which examines attitudes regarding COVID-19. There are three possible responses: agree, disagree, or unsure. Only the response "agree" that demonstrated a positive attitude received a score of 1; all other responses received a score of 0; the section's overall score ranged from 0 to 7. The practice section, the final domain, was evaluated using six questions. Measures that were consistently used received a score of 1; otherwise, they received a score of 0. The maximum score for this section was, therefore 6. Bloom's cutoff criterion of 80% was chosen in order to have a sufficient score in each part (Albahri *et al.*, 2021). As a result, a score of 12 or higher was deemed sufficient knowledge, a score of 5.6 or higher indicated a positive attitude and a score of 4.8 or higher indicated appropriate infection control practices. Cronbach's alpha was used to measure the reliability of the KAP survey. Results showed that the practice scale (0.73), attitude scale (0.80), and knowledge scale (0.70).

#### 2.4. Data Collection Procedure

After receiving ethics approval, the researchers approached the managers of the units and hospitals, gained access to the sample, screened HCPs to identify eligible staff, to whom they explained the nature and goals of the study. Those who accepted invitation to participate in this study were given the survey, which was a web-based survey using Google Forms, by email, WhatsApp, or Instagram. The cover letter included the purpose, risks, and benefits, as well as the rights of the participants. After submitting the responses, all information was treated with confidentiality.

#### 2.5. Ethical Considerations

The Scientific Research Committee at Zayed Military Hospital gave ethical permission to conduct this study. All ethical principles were taken into account, including protecting participants' privacy and confidentiality, outlining the aim and scope of the study, obtaining participants' informed consent when they agreed to participate voluntarily and without coercion, and exposing them to no harm or damage. The willingness of the participants to complete and submit the

questionnaires and protect them from harm or risk ensured their agreement.

#### 2.6. Data Analysis Plan

The IBM statistical package for social science software (IBM SPSS), version 28, was used for data analysis. To answer the first questions, descriptive statistics were used (means, standard deviations and frequencies). The second question was answered using a one-way analysis of variance (ANOVA), t-test, and Pearson correlation test to determine any differences or relationships between COVID-19 practices based on participant demographics. Finally, hierarchical regression was used to investigate the predictors of HCPs' COVID-19 pandemic practices.

### 3. RESULTS

#### 3.1. Participants Characteristics

Table 1 shows that 290 HCPs agreed to participate and completed the questionnaire. Among them, 237 were male (81.7%), 197 were married or lived with a partner (67.9%), 204 were Muslims (70.3%), and 229 had a bachelor's degree (79.0%). Half of the participants ( $n=145$ ) worked in governmental facilities. Nurses made up the majority ( $n=188$ , 64.8%), 219 of the participants (75.5%) worked in hospitals, and 166 (57.2%) did rotating shifts.

The participants' average age was 36.4 years ( $SD=5.0$ ), their average period of experience was 12.9 years ( $SD=4.2$ ), and their average income was 19883 UAE Dirham ( $SD=10193.8$ ). The majority of participants ( $n=266$ , 91.7%) had both prior exposure to COVID-19 and quarantine as well as prior illness with the virus. A total of 98 participants ( $n=98$ ) reported that the primary source of COVID-19 information was through accessing official health organizations, news media, seminars, and workshops.

#### 3.2. Level of Knowledge, Attitudes, and Practices toward COVID-19

A high level of knowledge of the COVID-19 pandemic was demonstrated by the participants' 99.3% accuracy rate in responding to the questionnaire questions (mean score:  $M=13.9$  [out of 15],  $SD=0.93$ ). The participants had positive attitudes toward the COVID-19 epidemic, as demonstrated by their score of 97.9%, with a mean of ( $M=6.8$  [out of 7],  $SD=0.97$ ). The participants had effective infection control practices, as evidenced by their COVID-19 score of 98.3% ( $M=5.7$  [out of 6],  $SD=0.95$ ). Table 2 shows that the two questions "During the epidemic, did you use sodium hypochlorite or 70% alcohol as a surface disinfectant?" and "Did you participate in training programs to improve/refresh your practice on infection control and COVID-19 during the outbreak?" received the highest scores of ( $n=286$ , 98.6%) and ( $n=285$ , 98.3%), respectively. In the same vein, the question "Did you maintain social distance at work during the outbreak?" earned the lowest score ( $n=266$ ; 87.9%).

**Table 1. Demographic profile of the participants (N=290).**

Variable	Mean (SD)	Range	n (%)
Age	36.4 (5.0)	28- 57	-
Income monthly (UAE Dirham) *	19883.1 (10193.8)	8000- 55000	-
Period of experience (years)	12.9 (4.2)	5- 28	-
<b>Gender</b>	-	-	237 (81.7)
Male			53 (18.3)
Female			
<b>Marital status</b>	-	-	197 (67.9)
Married/Living with partner.			87 (30.)
Single			6 (2.1)
Divorced			
<b>Religion</b>	-	-	204 (70.3)
Muslim			86 (29.7)
Christian			
<b>Education level</b>	-	-	229 (79.0)
Bachelor's degree			61 (21.0)
Master's degree or higher.			
<b>Type of facility</b>	-	-	219 (75.5)
Hospital			71 (24.5)
Primary health care center			
<b>Type of profession</b>	-	-	188 (64.8)
Nursing			32 (11.0)
Paramedic			69 (23.8)
Physician			
<b>Type of hospital/healthcare center</b>	-	-	145 (50.0)
Governmental			89 (30.7)
Private			56 (19.3)
Military			
<b>Duty shift</b>	-	-	117 (40.3)
Day			7 (2.4)
Night			166 (57.2)
Rotating			
<b>Sars-CoV-2 exposure or infection status</b>	-	-	15 (5.2)
Past illness with the virus.			6 (2.1)
Not exposed to confirmed infected cases, and past illness with the virus			266 (91.7)
Past exposure, quarantine, and past illness with the virus			3 (1.0)
Past exposed, quarantine, and currently ill with the virus.			
<b>Primary source of information</b>	-	-	95 (32.8)
Social media, News media, Seminar and workshop			98 (33.8)
Official health organizations, News media, Seminar and workshop			97 (33.4)
Official health organizations, News media, Scientific journal, internet			

Note: \* 1 UAE Dirham = 0.27 US Dollar

**Table 2. Description of the individual Items of the practice regarding COVID-19.**

Item	Frequency of correct answer (n)
1. During the outbreak, did you participate in training programs to increase/ refresh your practice on infection control and COVID-19?	285 (98.3)
2. During the outbreak, did you use sodium hypochlorite or 70% alcohol as surface disinfectant?	286 (98.6)
3. During the outbreak, did you wash your hands before and after contact with your patients?	281 (96.9)
4. During the outbreak, did you maintain social distance at work place?	266 (87.9)
5. During the outbreak, did you follow the steps in doffing your PPE as per protocol?	280 (96.6)
6. During the outbreak, did you wear surgical mask for routine patient contact?	270 (93.1)

### 3.3. Comparison of Practices based on Participants' Demographics

According to the findings of the independent-samples t-test, there was a statistically significant difference in practices based on the religion of the participants ( $t = -3.7$ ,  $df = 287$ ,  $p <$

0.05). In terms of practices, Christian volunteers significantly outperformed Muslims ( $M = 5.98$ ,  $SD = 0.22$ ). There was a significant difference in practices based on educational level ( $t = -2.07$ ,  $df = 288$ ,  $p < 0.05$ ). Furthermore, participants with Master's degrees or higher demonstrated significantly higher

levels of practice than their contemporaries ( $M = 14.25, SD = 1.11$  vs.  $M = 5.90, SD = 0.35$ ).

To compare the means of the study variables, the one-way ANOVA test was used. The cause for the difference in the means of these variables was investigated using Bonferroni post-hoc analysis. The study's findings revealed statistically significant differences in practices ( $F = 4.33, df = 3, p < 0.05$ ) depending on the type of profession. In terms of mean scores, physicians outperformed nurses and paramedics. There was a statistically significant difference in practices regarding COVID-19 infection status ( $F = 4.52, df = 3, p < 0.05$ ). Participants who had previously been ill with the virus had the highest mean scores in practice. Furthermore, the main source of COVID-19 information revealed a statistically significant difference in practices ( $F = 21.47, df = 2, p < 0.05$ ). The post-hoc analysis revealed that the participants with the highest mean score levels used official health organizations, news media, seminars, and workshops.

Pearson test was used to examine the correlation between COVID-19 practices and the continuous variables of the participants. Practices had a positive and significant correlation with attitudes toward COVID-19 ( $r = .153, p < 0.01$ ). Table 3 shows that there no significant correlations were found between COVID-19 practices and age, income, years of experience, and knowledge of COVID-19.

### 3.4. Predicting Participants' Level of Practice regarding the COVID-19 Pandemic

The results of the hierarchical regression analysis used to determine the factors that predicted participants' degree of COVID-19 practice are displayed in Table 4. The first model of the regression analysis included the six demographic variables (religion, educational level, dummy coded private

hospitals, dummy coded physicians, dummy coded past and current exposure to COVID-19 virus, and dummy coded for official health organization, news media seminar and workshop). The findings showed that (being a Christian, accessing official health organizations and news media, attending seminars and workshops to obtain information, and being a physician) were significant predictors that explained 14% of the variance in practices related to COVID-19 ( $F(6, 283) = 7.94, p < .001$ ). After controlling for the demographic variables, the second step of regression analysis indicated that the model examining the relationship between attitudes and practices was significant ( $F(7, 282) = 7.67, p < .001$ ). However, this step contributed 2% to the variation that was not already explained by the previous step.

## 4. DISCUSSION

This research was carried out in Abu Dhabi during the late stages of the COVID-19 epidemic. In order to manage and stop the further spread of COVID-19 among HCPs and the general public, it may be helpful to investigate the predictors of HCPs' level of COVID-19 practice. According to the study's findings, there was an adequate degree of knowledge, attitudes, and practices regarding the COVID-19 pandemic (93%, 97%, and 95%, respectively), which is consistent with the prior research evaluating HCPs' knowledge, attitudes, and practices on COVID-19 [18, 19]. This may suggest that having a sufficient knowledge level and a positive attitude is a prerequisite to building sufficient preventive practice regarding COVID-19 [10, 13, 20]. Also, the studies revealed that Christian participants practiced COVID-19 at a higher level than Muslims did. The findings are consistent with other studies carried out in Nigeria [10] and Ethiopia [20, 21]. The reason is unclear; however, it might be connected to the traditional and cultural practices of healthcare professionals.

**Table 3. Correlation of HCP's practices regarding COVID-19 based on continues demographic variables.**

Variable	Age	Income	Period of experience	Knowledge	Attitudes
Practice	0.05	0.11	0.08	.12	.15**

Note: \*\* Correlation is significant at the 0.01 level.

**Table 4. Hierarchical multiple regression of HCP's attitude as predictor of practice toward COVID-19 pandemic controlling for demographic variables.**

	B	SE b	B	P-value
<b>Step 1</b>				
(Constant)	4.98	.22		<.001
Religion	.37	.10	.21	<.001
Educational level	.14	.11	.07	.20
Type of facility	.05	.06	.05	.37
COVID-19 exposure	.08	.09	.04	.42
Source of information	.25	.06	.26	<.001
Department of work	-.12	.05	-.15	.009
<b>Step 2</b>				
(Constant)	4.41	.33		<.001
Religion	.35	.10	.20	<.001
Educational level	.14	.11	0.7	.21
Type of facility	.04	.06	.04	.45

(Table 6) contd.....

	<i>B</i>	<i>SE b</i>	<i>B</i>	<i>P-value</i>
COVID-19 exposure	-.02	.10	-.01	.82
Source of information	.26	.05	.26	<.001
Department of work	-.11	.05	-.13	.016
Attitude	.11	.05	.14	.022

The participants with Master's degrees or higher also scored higher on COVID-19 pandemic practice tests than participants with bachelor's degrees. This finding is consistent with previous research [22, 23], which discovered that education level is a strong predictor of the psychomotor domain in COVID-19. Therefore, it is assumed that having better access to information and having higher education may result in appropriate perception and comprehension of COVID-19 information and, as a result, better practice during COVID-19. This suggests that HCPs may be more motivated to understand and deliver the highest level of care if they have access to information and a higher educational level.

When compared to other professions, physicians were shown to have a better degree of practice during the COVID-19 pandemic. This finding is consistent with previous studies in Egypt [24] and Uganda [10]. The difference in COVID-19 practice scores could be attributed to lower physician-patient interaction rates compared with other HCPs. Subsequently, the physicians may have more time to study, practice and implement the infection control procedures for COVID-19.

In line with other studies in China [13] and India [25], the majority of our study participants reported that official health organizations, news outlets, seminars, and workshops were their primary sources of information regarding the epidemic. The HCPs probably looked for the most steadfast sources driven by the significant impact of COVID-19 on societies. The majority of participants (91.7%) had both prior COVID exposure and quarantine as well as prior viral infection. The number demonstrates workers in healthcare settings are more likely than other professions to contract the COVID-19 virus due to their close interaction with infected patients [7, 25, 26].

Being a physician, having a master's degree or higher, having experienced past and present COVID-19 virus exposure, and having access to official health organizations, news media, seminars, and workshop information are all significant predictors of HCPs' level of COVID-19 pandemic practices, according to the regression analysis results. This could be due to the nature of their role, which aids in providing high-quality education and training capabilities, allowing them to provide higher-quality services and more patient care [27]. Furthermore, El-Sokkary [28] reported that HCPs have higher attitudes and practices after being infected because they are worried about being infected again with the virus. It is worth noting that official health institutions and the news media played an important role in disseminating information and raising awareness about public health solutions such as mask use, keeping a safe distance between people, and hand washing [29].

The second stage of the regression analysis revealed that attitudes were a significant predictor of the level of practice. This finding is consistent with previous research, which found that a high level of attitude is associated with a high level of

practice [25, 26, 30]. There is evidence that having a positive attitude toward a disease serves as the foundation for taking disease prevention measures [11, 31]. Furthermore, Adeoye [14] reports that having a positive attitude toward COVID-19 is a significant predictor of good COVID-19 pandemic practice.

## 5. RESEARCH IMPLEMENTATIONS AND RECOMMENDATIONS

The current study findings showed that those who develop educational and training programs would work on keeping the contents of the training contents about COVID-19 up-to-date in order to break the infection transmission chains and decrease the likelihood of sick leaves and possible deaths among healthcare providers, who are in the frontline facing the epidemic. Healthcare facilities should continue their efforts to provide healthcare providers with online access to relevant information sources, such as official health organizations and research databases. Equipping HCPs with the necessary knowledge should begin at the school level so that they are prepared for such situations [32, 33]. Moreover, it is true that COVID-19 is vanishing, but what has been learned in this study could stand for future outbreaks, for which HCPs should be updated regarding the appropriate knowledge and best practices that would enable them to fight in the frontlines of any epidemic. Research-wise, both quantitative and qualitative studies are needed to focus on the responses of HCPs during the outbreak to learn from them the shortcomings to be prepared for the next outbreak. Also, studies are needed to link the HCPs' practices with patient outcomes. Finally, future studies are recommended to include larger samples from various countries with various healthcare systems to compare between them, aiming toward identifying the best responses for future outbreaks.

## 6. STRENGTHS AND LIMITATIONS

This study explored the predictors of HCPs' practices regarding COVID-19 in Abu Dhabi. Thus, it offers a foundational understanding of the COVID-19 epidemic's practices. One of the study's limitations was the use of a convenience sample, which would affect the generalizability of the results. Further, the veracity of self-reported data is dependent on the honesty of the study participants.

## CONCLUSION

This study looked into HCPs' practices regarding COVID-19 and compared them based on participants' demographics. We found that the majority of HCPs had a high level of knowledge, favorable attitudes, and good infection control measures. Furthermore, a number of parameters were discovered to significantly predict HCPs' practices regarding COVID-19; specifically, being Christians, official health organizations, news media, seminars and workshops and being physicians were significant predictors of COVID-19 pandemic

practices level. In order to increase and maintain the highest level of HCPs' practices regarding COVID-19 through seminars and workshop activities, healthcare administrators and policymakers should concentrate on these characteristics by implementing ongoing educational, training, and assessment programs. The authorities must also keep an eye on and offer guidance to the mainstream media.

#### ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The ethical approval was provided by the Institutional Review Board (IRB) at Zayed Military Hospital, UAE.

#### HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2013.

#### CONSENT FOR PUBLICATION

All the participants in this study signed written consent.

#### STANDARDS OF REPORTING

COREQ guidelines were followed.

#### AVAILABILITY OF DATA AND MATERIALS

The data presented in this study are available on request from the corresponding author [M.D]. The data are not publicly available due to privacy restrictions.

#### FUNDING

This study is supported *via* funding from Prince Sattam bin Abdulaziz University Project number (PSAU/2023/R/1444).

#### CONFLICT OF INTEREST

The ayman hamdan-Mansour is an Editorial Advisory Board member of the journal The Open Nursing Journal.

#### ACKNOWLEDGEMENTS

Declared none.

#### REFERENCES

- [1] Kılıç T, Bostan S, Erdem R, Öztürk YE, Yılmaz A. The effect of COVID-19 pandemic on the Turkish society. *Elect J Gen Med* 2020; 17(6): em237. [<http://dx.doi.org/10.29333/ejgm/7944>]
- [2] World Health Organization. Coronavirus Disease (COVID-19) Outbreak. 2020. Available From: <https://www.who.int/emergencies/diseases/novel-coronavirus-2020>
- [3] Bianco F, Incollingo P, Grossi U, Gallo G. Preventing transmission among operating room staff during COVID-19 pandemic: The role of the Aerosol Box and other personal protective equipment. *Updates Surg* 2020; 72(3): 907-10. [<http://dx.doi.org/10.1007/s13304-020-00818-2>] [PMID: 32449034]
- [4] World Health Organization. Coronavirus Disease (COVID-19) statistic. 2022. Available From: <https://www.who.int/emergencies/diseases/novel-coronavirus/stat-2022>
- [5] Ministry of Health and Prevention. 2020. *Ministry of Health*. Available From: <https://www.moh.gov.ae/en/home>.
- [6] Liao T, Meng D, Xiong L, *et al*. Long-Term Effects of COVID-19 on Health Care Workers 1-Year Post-Discharge in Wuhan. *Infect Dis Ther* 2022; 11(1): 145-63. [<http://dx.doi.org/10.1007/s40121-021-00553-0>] [PMID: 34687442]
- [7] Mutambudzi M, Niedzwiedz C, Macdonald EB, *et al*. Occupation and risk of severe COVID-19: Prospective cohort study of 120 075 UK Biobank participants. *Occup Environ Med* 2021; 78(5): 307-14. [<http://dx.doi.org/10.1136/oemed-2020-106731>] [PMID: 33298533]
- [8] Bandyopadhyay S, Baticulon RE, Kadhum M, *et al*. Infection and mortality of healthcare workers worldwide from COVID-19: A systematic review. *BMJ Glob Health* 2020; 5(12): e003097. [<http://dx.doi.org/10.1136/bmjgh-2020-003097>] [PMID: 33277297]
- [9] Alghfeli AK, Al Zarouni AAR, Alremeithi HM, *et al*. COVID 19 Knowledge, attitude, and practice of the healthcare providers in United Arab Emirates. *medRxiv* 2021.
- [10] 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. [<http://dx.doi.org/10.3389/fpubh.2020.00181>] [PMID: 32426320]
- [11] Papagiannis D, Malli F, Raptis DG, *et al*. Assessment of knowledge, attitudes, and practices towards new coronavirus (SARS-CoV-2) of health care professionals in Greece before the outbreak period. *Int J Environ Res Public Health* 2020; 17(14): 4925. [<http://dx.doi.org/10.3390/ijerph17144925>] [PMID: 32650614]
- [12] Cooper S, Wiyeh A, Schmidt BM. Cochrane corner: Factors that influence compliance by healthcare workers with infection prevention and control guidelines for COVID-19 and other respiratory infections. *Pan Afr Med J* 2020; 35(Suppl 2): 23. [<http://dx.doi.org/10.11604/pamj.supp.2020.35.2.23012>]
- [13] Zhang M, Zhou M, Tang F, *et al*. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. *J Hosp Infect* 2020; 105(2): 183-7. [<http://dx.doi.org/10.1016/j.jhin.2020.04.012>] [PMID: 32278701]
- [14] Adeoye P, Oke G, Fadele K, Awotunde TA. Knowledge, attitude, practice and predictors of preventive practices toward COVID-19 among healthcare workers in Ogbomosho, Nigeria: A cross-sectional study. *Niger J Med* 2021; 30(4): 452-7. [[http://dx.doi.org/10.4103/NJM.NJM\\_86\\_21](http://dx.doi.org/10.4103/NJM.NJM_86_21)]
- [15] Media office Abu Dhabi. Abu-Dhabi ranking. 2022. Available From: <https://www.mediaoffice.abudhabi/en/health/abu-dhabi-maintains-its-lead-global-ranking-for-pandemic-response>
- [16] Abu Dhabi Social Statistic Centre. Statistic Centre-Abu Dhabi. 2022. Available From: <https://www.scad.gov.ae/en/pages/AboutUs.aspx>
- [17] Cohen J. A power primer. *Psychol Bull* 1992; 112(1): 155-9. [<http://dx.doi.org/10.1037/0033-2909.112.1.155>] [PMID: 19565683]
- [18] Albahri AH, Alnaqbi SA, Alnaqbi SA, Alshaali AO, Shahdoor SM. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in primary healthcare centers in Dubai: A cross-sectional survey, 2020. *Front Public Health* 2021; 9: 617679. [<http://dx.doi.org/10.3389/fpubh.2021.617679>] [PMID: 34395350]
- [19] Rani M, Sharma I, Sharma S, Sharma L, Kumar S. Exploring the knowledge, attitude, and practice of health-care professionals on coronavirus (COVID-19) pandemic infection. *J Educ Health Promot* 2021; 10: 115. [PMID: 34084862]
- [20] Fatimah , Taiwo , Baba , *et al*. COVID 19: Evaluating the knowledge, attitude and preventive practices of healthcare workers in Northern Nigeria. *Int J MCH AIDS* 2021; 10(1): 88-97. [<http://dx.doi.org/10.21106/ijma.418>] [PMID: 33659097]
- [21] Defar A, Molla G, Abdella S, *et al*. Knowledge, practice and associated factors towards the prevention of COVID-19 among high-risk groups: A cross-sectional study in Addis Ababa, Ethiopia. *PLoS One* 2021; 16(3): e0248420. [<http://dx.doi.org/10.1371/journal.pone.0248420>] [PMID: 33705480]
- [22] Kasemy ZA, Bahbah WA, Zewain SK, *et al*. Knowledge, attitude and practice toward COVID-19 among Egyptians. *J Epidemiol Glob Health* 2020; 10(4): 378-85. [<http://dx.doi.org/10.2991/jegh.k.200909.001>] [PMID: 33009730]
- [23] Tomar S, Singh P, Suman S, *et al*. Indian community's knowledge, attitude & practice towards COVID-19. *MedRxiv* 2020. [<http://dx.doi.org/10.1101/2020.05.05.20092122>]
- [24] mohammed . Mohammed ASE knowledge, attitudes, and practices towards COVID-19 among health care workers in primary health care units Dar El Salam, Suhag, Egypt. *Sohag Medical Journal* 2021; 25(1): 50-8. [<http://dx.doi.org/10.21608/smj.2020.47286.1209>]

- [25] Narayana G, Pradeepkumar B, Ramaiah JD, Jayasree T, Yadav DL, Kumar BK. Knowledge, perception, and practices towards COVID-19 pandemic among general public of India: A cross-sectional online survey. *Curr Med Res Prac* 2020; 10(4): 153-9. [PMID: 32839725]
- [26] Milani GP, Bianchetti MG, Togni G, Schoenenberger AW, Muggli F. SARS-CoV-2 Ig G among healthcare workers and the general population. *Pathogens* 2021; 10(4): 465. [http://dx.doi.org/10.3390/pathogens10040465] [PMID: 33921459]
- [27] Patikar G, Shupao J. Job satisfaction of nurses': A comparative study between private and government hospitals. *Int J Res Bus Stud* 2017; 2017
- [28] El-Sokkary RH, El-Kholy A, Mohy Eldin S, *et al.* Characteristics and predicting factors of Corona Virus Disease-2019 (COVID-19) among healthcare providers in a developing country. *PLoS One* 2021; 16(1): e0245672. [http://dx.doi.org/10.1371/journal.pone.0245672] [PMID: 33471839]
- [29] Bedford J, Enria D, Giesecke J, *et al.* Towards controlling of a pandemic. *Lancet* 2020; 395(10229): 1015-1018
- [30] Baig M, Jameel T, Alzahrani SH, *et al.* Predictors of misconceptions, knowledge, attitudes, and practices of COVID-19 pandemic among a sample of Saudi population. *PLoS One* 2020; 15(12): e0243526. [http://dx.doi.org/10.1371/journal.pone.0243526] [PMID: 33296420]
- [31] Kanligi DA, Boah M, Adokiya MN. Predictors of knowledge and adherence to COVID-19 safety protocols among nurses at health facilities in Tamale Metropolis of Northern Ghana. *PLoS One* 2022; 17(9): e0274049. [http://dx.doi.org/10.1371/journal.pone.0274049] [PMID: 36067188]
- [32] Darawad MW, Al-Hussami M. Jordanian nursing students' knowledge of, attitudes towards, and compliance with infection control precautions. *Nurse Educ Today* 2013; 33(6): 580-3. [http://dx.doi.org/10.1016/j.nedt.2012.06.009] [PMID: 22789874]
- [33] Al-Khawaldeh OA, Al-Hussami M, Darawad M. Knowledge and attitudes regarding pain management among Jordanian nursing students. *Nurse Educ Today* 2013; 33(4): 339-45. [http://dx.doi.org/10.1016/j.nedt.2013.01.006] [PMID: 23398912]

