AWARENESS AMONG HEALTH CARE PROFESSIONALS IN KUWAIT IN MANAGING CARDIAC ARREST AMONG COVID-19 PATIENTS: A QUESTIONNAIRE-BASED SURVEY

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Abstract

Background: Ensuring both staff and patients' safety is crucial during cardiac arrest management and this can be optimized through appropriately training Health Care Professionals (HCPs) on infection control measures as well as managing cardiac arrest in COVID-19 patients.

Objectives: To identify the knowledge base of HCPs in Kuwait regarding infection control practices and resuscitation of COVID-19 patients and to identify any association between provision of training to HCPs and the level of knowledge they acquire.

Methods: A questionnaire-based survey was taken by HCPs working in major hospitals in Kuwait during COVID-19 crises.

Results: A total of 461 HCPs voluntarily participated in the survey. Results showed that awareness of the appropriate steps in managing cardiac arrest for COVID-19 patients including donning and doffing PPE is higher in HCPs who received specific training on infection control practices and management of cardiac arrest for this group of patients compared to those who did not receive training. In addition, the survey demonstrated a higher level of staff comfort in dealing with cardiac arrest scenarios after receiving the training compared to those who did not receive it.

Conclusion: There is a strong need to implement urgent educational interventions and training sessions not only on infection control practices for COVID-19 but also on how to safely respond to an emergency life threatening situation for COVID-19 patients. Training through simulation sessions and emergency drills is a particularly useful tool to increase the level of staff comfort in dealing with these situations.

Keywords: Cardiac Arrest; COVID-19; Health Care Professionals; Infection Control Practice; Kuwait; Personal Protective Equipment.

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Introduction

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was first reported in Wuhan, China in December 2019 and in March 2020, the outbreak was declared a global pandemic. The rapid and extensive spread of the Corona Virus Disease 2019 (COVID-19) has become a major concern for the health-care professionals (HCPs). HCPs are at higher risk of being infected with the disease due to their exposure to higher viral loads[1]. It is also known that if the virus is aerosolized then it becomes more infectious to HCPs[2].

The COVID-19 patients can develop acute respiratory distress syndrome, myocardial injury, ventricular arrhythmias, multiorgan dysfunction, cytokine storm, and shock, thus increasing the risk of cardiac arrest[3]. Cardiac arrest is one of the most common emergency situations which HCPs are facing both inside and outside the hospital. Effective chest compressions and early defibrillation are major interventions that can improve the outcome. The World Health Organization (WHO) has categorized cardiopulmonary resuscitation (CPR) as an aerosol generating procedure (AGP) and continues to recommend droplet and contact precautions for HCPs caring for COVID-19 patients with additional airborne precautions during AGPs[4]. Resuscitation of COVID-19 patients are high-risk events for HCPs not only due to exposure with aerosolization that occurs with chest compressions and intubation but also as resuscitation requires numerous HCPs to work in close proximity to one another leading to nosocomial spread. Moreover, cardiac arrest is one of the most stressful events in which the immediate need of resuscitation may result in breach of infection control practices. The American heart association (AHA), in collaboration with other professional organizations, released interim guidance for life support for COVID-19. This guidance aims to protect rescuers delivering CPR, while at the same time providing timely, effective resuscitation to the patients. These guidelines include three main general principles for resuscitation of suspected or confirmed COVID19 patients which include reducing HCPs exposure to COVID19, prioritizing oxygenation and ventilation strategies that have a lower risk of generating aerosols and finally considering the appropriateness of starting and continuing resuscitation[5]. In addition, as CPR is considered an AGP, it is essential for medical personnel to have AGP Personal Protective Equipment (PPE) on before performing CPR[6].

It is important that resuscitators are aware of the fact that current resuscitation guidelines emphasize on HCPs safety, allowing them to don PPEs before starting the resuscitation[7]. The objective of this survey is to identify the knowledge base of HCPs in Kuwait regarding infection control practices as well as main factors involved during resuscitation of COVID-19 patients. In addition, the survey aims to identity any association between provision of training to HCPs and the level of knowledge they have.

Methods

A simple questionnaire-based survey was prepared using online google form. The survey link was shared through social networks (e.g. WhatsApp and Facebook groups). The target group was clinical health care professionals (Nurses, technicians, doctors) working in main territory care hospitals of Ministry of Health (MOH) in Kuwait, several of whom were frontline workers during the COVID-19 crises. The ethical committee approval was obtained through the MOH ethical committee and the survey was conducted over a period of one week (April 1st 2020 to April 7th 2020) in AlAdan Hospital, Kuwait. Statistical analysis was performed using SPSS version 23 (IBM Corp. Released 2015. IBM SPSS Statistics for Macintosh, Version 23.0. Armonk, NY: IBM Corp.). The answers to the questionnaire were summarized and compiled in tables. Comparisons were drawn between those who had training in specific infection control measures for COVID-19 patients and those that did not. Categorical data was compared using the chi-square test or the Fisher's exact test (when cell counts <5). The Spearman's Rho co-efficient test was used to assess the correlations between selected questions in the survey. A p-value of <0.05 was considered statistically significant.

Results

Four hundred and sixty-one HCPs responded to

this questionnaire over the survey period of one week. The demographic characteristic of the participants is shown in Table 1.

Table 1

Baseline characteristics

Variable	n (%)
Age Group	
<30 years	90 (19.5%)
30 – 50 years	318 (69%)
>50 years	53 (11.5%)
Gender	
Male	252 (54.7%)
Female	209 (45.3%)
Year of Experience	
<5 years	85 (18.4%)
5-10 years	115 (24.9%)
10-20 years	181 (39.3%)
>20 years	80 (17.4%)
Role	
Specialist and above	88 (19.1%)
Senior Registrar	44 (9.5%)
Registrar	116 (25.2%)
Post Graduate Trainee or Assistant Registrar	57 (12.4%)
Nurse	60 (13%)
Technician	73 (15.8%)
Others	23 (5%)

The regular hand hygiene and PPE training is reported in 84.4% of cases. COVID-19 specific training was available only to 60.1% of the survey population and 58.8% participants were involved in managing COVID-19 cases. Most of the HCPs (74.6%) have access to local (MOH and departmental) guidelines in different aspects of COVID-19 management and almost half of the respondents keep themselves updated regarding the COVID-19 situation from the local guidelines. Publications (15.2%) and social media (13.7%) were the other most popular source of information (Table 2).

The survey results show statistically significant differences when comparing the responses between COVID-19 specific infection control trained versus untrained HCPs in different aspects of COVID-19 specific infection control measures and cardiac arrest management (Table 3).

89.2% of participants who responded that they received COVID-19 specific PPE training where aware about donning and doffing compared to 65.2% of those who did not receive training and this result was statistically significant ($p<0.001$). Overall, 67.7% of the respondents knew that CPR is an AGPs, with no difference between trained and untrained HCPs

Table 2

Responses regarding infection control training and source of Knowledge for COVID-19 management.

Questions	Yes	No	Don't know	Not Applicable
Do you have access to regular training at your healthcare setting focused on hand hygiene and PPE?	389 (84.4%)	72 (15.6%)	0	0
Have you been involved in the management of suspected or confirmed COVID-19 patients?	271 (58.8%)	190 (41.2%)	0	0
Do you have special training regarding infection control measures in COVID-19 patients?	277 (60.1%)	184 (39.9%)	0	0
Do you have any Ministry of Health or Departmental guidelines available to you for managing different aspects of COVID-19?	344 (74.6%)	47 (10.2%)	70 (15.2%)	0
How you are keeping yourself updated regarding COVID-19?				
Receiving continuous updates from MOH or Department you are working	230 (49.9%)	0	0	0
Lectures or webinars	31 (6.7%)	0	0	0
Publications from international societies	70 (15.2%)	0	0	0
PubMed	8 (1.7%)	0	0	0
Google	29 (6.3%)	0	0	0
Social Media (Facebook, Twitter, Instagram)	63 (13.7%)	0	0	0
WhatsApp	30 (6.5%)	0	0	0

PPE: Personal Protective Equipment. **COVID-19:** Corona Virus Disease 2019. **MOH:** Ministry of Health.

Table 3

Comparison between participants trained in COVID-19 infection control measures vs un-trained HCPs and their response to COVID-19 related infection control and cardiac arrest resuscitation measures.

Question	Un Trained (n = 184)	Trained (n = 277)	p-value	Spearman Rho*	p-value
Do you know what is donning and doffing?					
Yes	120 (65.2%)	247 (89.2%)	<0.001	0.291	<0.001
No	64 (34.8%)	30 (10.8%)			
Is CPR a high-risk aerosol generating procedure?					
Yes	123 (66.8%)	189 (68.2%)	0.756	0.014	0.756
No	61 (33.2%)	88 (31.8%)			
Do you think the Sequence of Cardiac Arrest Algorithm is same in COVID 19 patients?					
Yes	41 (22.3%)	80 (28.9%)	<0.001	-0.016	0.776
No	65 (35.3%)	136 (49.1%)			
Don't know	78 (42.4%)	61 (22%)			
Do you feel comfortable in managing cardiac arrest in COVID-19 patients?					
Yes	20 (10.9%)	61 (22%)	0.007	0.172	0.002
No	113 (61.4%)	142 (51.3%)			
Don't know	51 (27.7%)	74 (26.7%)			
What do you think is the critical initial step in the management of cardiac arrest in COVID-19?					
Gearing up with PPEs	113 (61.4%)	236 (85.2%)	<0.001	-	-
Early compression	19 (10.3%)	15 (5.4%)			
Early bag mask ventilation	7 (3.8%)	7 (2.5%)			
Don't know	45 (24.5%)	19 (6.9%)			
How do you initially manage breathing and airway issues during cardiac arrests in COVID-19 patients?					
Apply oxygen therapy via face mask until airway skilled personnel arrive	44 (23.9%)	126 (45.5%)	<0.001	-	-
Bag mask ventilation until airway skilled personnel arrive	75 (40.8%)	111 (40.1%)			
Don't know	65 (35.2%)	40 (14.4%)			
Who do you think should perform intubation for the COVID-19 patient during CPR?					
An experienced anesthetist or intensivist	129 (70.1%)	207 (74.7%)	0.162	-	-
Any physician who has done his rotation in Anesthesia/ ICU	27 (14.7%)	44 (15.9%)			
Any healthcare professional who has basic airway training	28 (15.2%)	26 (9.4%)			

PPE: Personal Protective Equipment. **COVID-19:** Corona Virus Disease 2019. **CPR:** Cardiopulmonary Rescusitation. **ICU:** Intensive Care Unit.

(p=0.756). In addition, 85.2% of trained HCPs were aware that gearing up with PPEs is the critical initial step in COVID-19 cardiac arrest resuscitation. Trained HCP were more likely to know that the sequence of cardiac arrest algorithm and the steps of managing breathing and airway issues in COVID-19 patients is different (p <0.001). However, there was no significance between trained and untrained HCPs in knowing who should perform intubation (p= 0.162). In addition, HCPs who did not receive training on COVID-19 specific infection control measures were less comfortable in managing cardiac arrest compared to those who were trained, and the difference was statistically significant (22% vs 10.9%, p=0.007). Just over half of the survey respondents (55.3%) feel uncomfortable in managing cardiac arrest in COVID-19 patients; however the majority who feels comfortable are the ones who were adequately trained in special infection control measures in COVID-19 as shown in Figure 1.

Figure 2 shows that the main concerns of HCPs when managing cardiac arrest in COVID-19 patients was fear of passing the disease to the family (63.1%) followed by lack of PPE training and not providing timely resuscitation to the patient due to donning of the PPE.

Figure 3 shows that HCPs who indicated that lack of PPE is a concern in managing cardiac arrest in COVID-19 patients were more likely to have no PPE available or PPE partially available than those who had PPE available at their working area (45.8%, 63.1% vs 29.3%, p<0.001).

Discussion

The COVID-19 outbreak is an unprecedented global health challenge and HCPs are at constant risk of contracting the disease that results in severe illness and death. Nosocomial amplification is a common cause of spread among HCPs[8]. HCPs who perform AGPs are at high risk of exposure to the virus and might be associated with increased severity of illness[2,9]. As of July 21st, 2020, more than sixty thousand confirmed cases are reported in Kuwait[10]. During the current pandemic, we must maintain the safety and well-being of HCPs as well as patients. HCPs should receive

Fig. 1

Comparison between participants who special training regarding infection control measures in COVID-19 and them feeling comfortable or not in managing COVID-19 patients

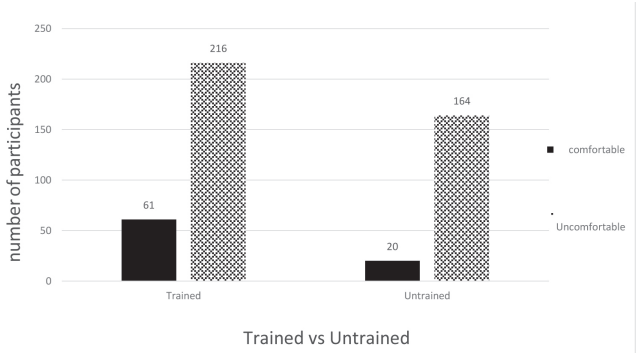


Fig. 2

Main concerns in managing cardiac arrest in COVID-19 patients.

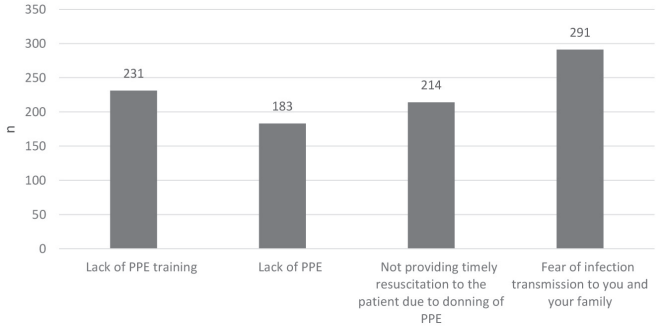
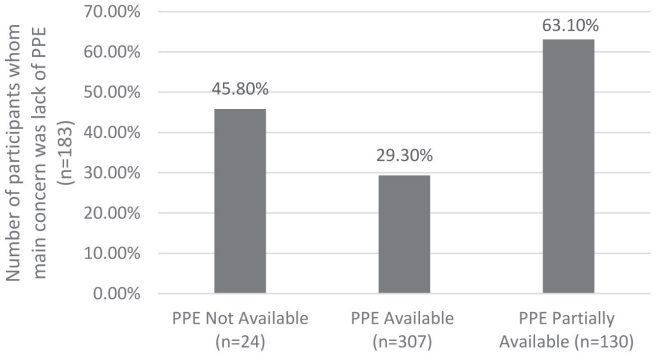


Fig. 3

Comparison between the availability of PPE in regards to participants whom main concern in managing cardiac arrest in COVID-19 patients is lack of PPE.



adequate administrative support not only by providing clinical guidelines and appropriate PPE gears but also by frequent training and simulation sessions to safely manage COVID emergencies like airway management and cardiac arrest resuscitation. The data suggested that the use of PPEs, infection control training and education were consistently associated with decreased risk of infection among HCPs[11].

Nowadays, with technology, many resources are reachable. However, it is important to direct our practice based on the best available evidence as well as clinical experience especially with a new disease like COVID-19. Therefore, having national/local guidelines available for most of the HCPs is important as guidelines improve the patients' outcomes and ensures quality and safety as well as maintaining consistency in clinical practices. Local guidelines (MOH, Kuwait) for management of COVID-19 patients have been available since March 2020 and are regularly updated. However the results of our survey show that one third of HCPs are not aware of the local guidelines which indicates that more efforts on training and education on local guidelines are warranted.

The results of this survey indicate that the majority of HCPs in Kuwait receive regular infection control and hand hygiene trainings. It is important to note that many of the HCPs did not receive COVID-19 specific infection control training, especially in regards of donning and doffing. Moreover, it reflected in the results of our survey that lack of adequate donning and doffing training makes them uncomfortable in managing COVID-19 resuscitation.

In the era of COVID-19, cardiac arrest resuscitation is among the most dangerous patient care scenarios and has the potential to expose the HCPs to this contagious virus. To ensure HCPs safety during this pandemic, AHA and several other professional organizations have released interim guidelines with necessary alterations to cardiac arrest management emphasizing on prioritizing PPE and airway management techniques that reduce aerosol generation[7]. The results of the survey showed that most of the respondents were not aware of COVID-19 related sequence alteration in cardiac arrest resuscitation. In addition, results of this survey clearly highlighted that adequate donning and doffing training of the HCPs makes them more comfortable and increases their knowledge in managing infection control aspects of COVID emergencies. Therefore, staff training and continuous refreshment of their knowledge regarding infection control practices and management of cardiac arrest in COVID-19 patients are of utmost importance.

HCPs main concerns in managing cardiac arrest in COVID-19 patients were clustered into 4 main concerns. The fear of disease transmission to the family was the main concern. The other significant concern of HCPs was delay in providing the timely resuscitation to the patient due to donning of the PPE. In our institution, we solved this issue by introducing the overall body suits, which is worn all the time during the shift and if an emergency situation arises, the HCPs will attend to the patient immediately and then doff of the overall after resolving the emergency situation and then don another overall body cover. Other concerns of HCPs involved lack of training and lack of PPE. All these concerns can be addressed through concentrating on regular training and staff education regarding infection control measures as well as ensuring adequate provision of PPE especially in critical areas where the risk of emergency situations like cardiac arrest is most likely to occur.

The main limitation of the study is the fact that the survey was conducted by sharing the link through social network, and this may have resulted in selection bias given that younger HCPs are more likely to use social media than older HCPs. However, participation from all occupational status of HCPs will give the broad idea of the general infection control practices, knowledge and need of training during this pandemic.

Conclusion

This survey shows that education and training of HCPs on infection control practices and resuscitation of covid-19 patients is useful in increasing the staff knowledge and hence comfort in managing these patients. There is a strong need to implement urgent educational interventions and training sessions not only on infection control practices for COVID-19 but also on how to safely respond to an emergency life threatening situation for COVID-19 patients. Health care workers should receive regular training on the

use of PPEs and additional education during surge events. Training through simulation sessions and emergency drills is a very useful tool to increase the level of staff comfort in dealing with these situations. Institutions should concentrate on resolving common staff concerns including adequate provision of PPE and regular training on nfection control measures in addition to management of emergency situation.

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