AWARENESS REGARDING PERSONAL PROTECTIVE EQUIPMENT USE AMONG HEALTH CARE PROVIDERS IN VARIOUS TERTIARY HOSPITALS A CROSS PAKISTAN DURING COVID-19 PANDEMIC

Sanum Kashif, Erum Pervaiz, Faisal Azam, Tahira Waqar*, Ayesha Babar, Ambreen Gul****

Frontier Corps Hospital, Quetta/National University of Medical Sciences (NUMS) Pakistan, *Shifa College of Medicine, Islamabad Pakistan, **Al Razi Medical College, Peshawar Pakistan, ***HITEC Institute of Medical Sciences, Taxila/National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: To assess the awareness of personal protective equipment usage, among health care providers.
Study Design: Cross sectional survey.
Place and Duration of Study: Tertiary care hospitals across Pakistan, from 1st May 2020 to 25th May 2020 by convenient sampling method.
Methodology: A total of 74 responders from different health care setups completed a questionnaire-based survey on the knowledge and practice regarding personal protective equipment usage among healthcare providers. The questionnaire was designed by the help of central disease control (CDC) guidelines and its reliability and validity check by SPSS.
Convenient sampling was used for data collection and frequencies and percentages were used to present distribution of responses. WHO sample size calculator (2.2a for population proportions) was used for sample size calculation from previous study[23]. Data was tabulated in excel and SPSS 17 was used for Descriptive Statistics.
Results: The overall awareness among healthcare providers about personal protective equipment use in COVID-19 was not satisfactory with 40.5% reported correct answers. About 54 (75%) of responders had been in contact with confirmed or suspected COVID-19 patients. Regarding kind of personal protective equipment use, 41 (58.6%) knew the correct sequence of donning as per central disease control guidelines and only 21(30%) knew the correct sequence of doffing.
Conclusion: The current survey concluded that although majority of responders had fair knowledge regarding COVID-19, yet many knowledge gaps were there, regarding proper donning and doffing technique of personal protective equipment. Therefore continuous health education and training programs according to the recent guidelines by CDC and WHO, at all health care levels, regarding judicious use of personal protective equipment in COVID-19 is required.

Keywords: Awareness, COVID-19, Donning and doffing, Health care providers, personal protective equipment.

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INTRODUCTION

In the COVID-19 pandemic, front liners (healthcare providers) are at the highest risk and prone to get this infection. According to one of the study among Jordanian dentists, by wearing simple surgical mask, the risk of getting COVID-19 is 85%[1]. Initially this virus was termed as 2019-nCoV and then it was called as Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) by the International Committee on Taxonomy of Viruses[2,3].

Due to its rapid transmission, healthcare workers are among the highest risk of being infected. Apart from extended working hours, psychological and physical stress and fatigue, life threatening SARS-CoV-2 virus is an additional hazard for the whole healthcare system[4,5]. Due to pandemic, usage of PPE has been increased at all levels. For the health safety and continuous availability of PPE, efficient and effective use of PPE is the first and foremost thing. Wise use of PPE, decreases the viral transmission and definitely provide health safety[6,7]. The objective of the current study was to assess the awareness of personal

Correspondence: Dr Sanum Kashif, Assistant Professor of Anaesthesia, Frontier Corps Hospital Quetta Pakistan
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protective equipment's usage, related to COVID-19 disease and measures to control the rapid transmission of infection among healthcare providers. This was a questionnaire-based study, formulated from the United States CDC and WHO.

METHODOLOGY

This cross sectional study was conducted among tertiary care hospitals, across Pakistan (Balochistan: Frontier Corps Hospital, CMH Quetta, Civil Hospital, Bolan Medical College, CMH Zhob, CMH Sibi Punjab: Pak Emirates Military Hospital Rawalpindi, Ganga Ram Hospital Lahore, King Edward Medical University, SINDH: Aga Khan Hospital, Civil Hospital Indus Hospital, CMH Panoaqil, KPK: Khyber Teaching Hospital) in the form of questionnaire form and was sent to 85 persons, who included health care providers of all levels (paramedical staff, house officers, medical officer, residents, consultants and allied health care providers) but potential responders were 74. The period of the survey was 1st May 2020 to 25th May 2020.

The questionnaire comprised of socio-demographic questions, and 14 questions based on knowledge and practice regarding PPE use in the pandemic of COVID-19, in tertiary care hospitals, were taken from the current interim guidance and information for healthcare providers, published by the CDC, updated on March 7, 2020.

Consent was obtained by all responders in the survey. The Institutional Review Board (IRB) reviewed the study (CMH-QTA-IRB/035) and approved. For data collection, convenient sampling was used and frequency and percentages were used to present distribution of references. Sample size was calculated by WHO sample size calculator (2.2a for population proportions) from previous study[23]. Health care providers who had been involved in the care of suspected or confirmed COVID-19 patients were included in the study. Data was tabulated in excel and SPSS 17 was used for descriptive statistics.

RESULTS

The overall awareness among healthcare providers about PPE use in COVID-19 was not satisfactory with 40.5% reported correct answers. Among responders, 43 (58.1%) were post graduates and 22 (29.7%) were graduates, 1 (1.3%) undergraduates, 1 (1.3%) intermediate, 2 (2.7%) were matric and 5 (6.8%) from others (ward boys, sanitary workers). Female responders were 48 (64.9%) and male responders were 26 (35.1%). Responders were from all age groups (36.2 ± 6.07), mainly 39-40 years of age (18.9%). Almost all tertiary care hospitals of Pakistan were covered in this survey. About 54 (75%) of responders had been in contact with confirmed or suspected COVID-19 patients. Regarding kind of PPE use in confirmed cases, 54.1% had given correct answer and in suspected cases 35.7% had given correct answer. According to the survey, 45.1% had got some kind of training before PPE use and 54.9%

Table-I: Variables with frequency and percentage.

Variables	n (%)
Sex	
Male	26 (35.1)
Female	48 (64.9)
Age in Years	
15-24	9.1
25-34	28.3
35-44	50.8
Above 45	11.8
Education Level	
Matriculation	2 (2.7)
Intermediate	1 (1.3)
Undergraduate	1 (1.3)
Graduate	22 (29.7)
Post graduate	43 (58.1)
Others (ward boys, sanitary workers)	5 (6.8)
Level of Health Care Provider	
Allied health care provider	4 (5.8)
Paramedical staff & Nurses	11 (15.3)
House officer	1 (1.2)
Medical officer	14 (19.4)
Resident	10 (13.9)
Consultant	32 (44.4)
Contact with COVID-19 Patients (Confirmed/ Suspected)	
Yes	54 (75)
No	20 (25)
Training of Personal Protective Equipment Use	
Yes	32 (45.1)
No	42 (54.9)

had got no training before its use (table-I). According to responders, 78.9% knew the correct way of donning, among which 41 (58.6%) knew the correct sequence of donning as per CDC guidelines and 63.4% followed checklist every time. Likewise about doffing, according to 70.4 responders, they understand the doffing technique and 55.7% follow the doffing check list every time, among which only 21 (30%) knew the correct sequence of doffing. Spotter is essential during both donning and doffing, as per CDC guidelines but according to our survey spotter was present only in 18.6% of cases at the time of donning and 14.5% of cases at the time of doffing. Only 14 (20.3%) of responders knew the proper technique of wearing N95 mask. 34 (49.3%) of responders knew the type of PPE required for droplet and contact precautions, 38 (55.1%) responded correctly about PPE for airborne, droplet and contact precaution and 58.8% gave right answer for PPE use for airborne, droplet, contact and aerosol generating procedures (table-II).

Table-II: Questions with the frequency & percentage of correct responses n(%).

Q. No.	Questions	Correct Response	n (%)
1	What kind of Personal Protective Euipment you use in confirmed COVID-19 cases	All of the above	27 (54.1%)
2	What kind of Personal Protective Euipment you use in suspected COVID-19 cases	All of the above	21 (35.7%)
3	Did you understand the correct way of Donning	Yes	70 (78.9%)
		No	15 (17.6%)
4	Donning checklist according to Central Disease Control as per sequence		41 (58.6%)
5	Do you follow the check list of donning every time	Yes	45 (63.4%)
		No	40 (30.5%)
6	Do you understand the correct way of doffing	Yes	50 (58.8%)
		No	35 (24.7%)
7	Doffing checklist according to Central Disease Control as per sequence		21 (30%)
8	Do you follow the checklist of doffing every time	Yes	39 (55.7%)
		No	46 (36.4%)
9	Is spotter present at the time of donning	Yes	13 (18.6%)
		No	72 (32.9%)
10	Is spotter present at the time of doffing	Yes	10 (14.5%)
		No	75 (38.8%)
11	How you ensure adequate mask seal in N95		13 (20.3%)
12	Personal Protective Equipment for droplet and contact precaution		32 (49.3%)
13	Personal Protective Euipment for airborne, droplet and contact precaution		36 (55.1%)
14	Personal Protective Euipment for airborne, droplet, contact precaution and aerosol generating medical procedures (AGMP)		37 (58.8%)

DISCUSSION

Coronavirus disease 2019, is a highly infectious life-threatening disease, with case fatality ratio is about 1-2% globally and incidence of acute respiratory distress syndrome (ARDS) is 17-29% in hospitalized patients[8]. Despite of prompt response and active measures taken all over the world, COVID-19 put big economic burden globally. One of the main reasons of rapid transmission of infection and death in Italy, was because of inadequate supply and use to PPE[9,10].

This survey is unique of its kind because it gives the picture as a whole regarding level of knowledge as well as application of knowledge

for the rational use of PPE, among health care providers[11].

For the safety of health care providers and sufficient availability of PPE, awareness regarding requirement of PPE is important, along with the knowledge of correct sequence of PPE's donning and doffing, to minimize the wastage[12,13]. The CDC has provided infection prevention and control recommendations for patients with suspected or confirmed coronavirus disease 2019 (COVID-19) in Healthcare Settings for PPE[14,15].

Figure: Central disease control checklist for donning & doffing.

A study, regarding awareness of PPEs use conducted among healthcare workers in China. showed that most of the healthcare personnel were aware of COVID-19, especially doctors and nursing staff had comparatively better knowledge than other healthcare providers[16]. The results of a similar survey carried out in healthcare workers in the Kingdom of Saudi Arabia, suggested poor knowledge of infectious diseases (MERS-COV) among participants, and self-reported infection control practices were found to be sub-optimal and almost more than 80% were unaware of practical use of PPE[17,18]. According to the survey, conducted in South Korea, among health care providers, poor level of knowledge regarding modes of transmission of MERS coronavirus was found[19].

Airborne Infection Isolation Room (AIIR) should be used for patient isolation and aerosol generating procedures, because they are kept under negative pressure. Suspected or confirmed cases should not be placed in a room with exhaust, that recirculates air inside the hospital. High-efficiency particulate air (HEPA) filter should be used to filter air from such rooms. Less than half the responders in our survey were aware of this concept[20,21].

One of the study, conducted among health care providers of Hong Kong and Singapore, published in Annals of Internal Medicine, showed that during aerosol generating procedures, 85% of health care providers were exposed while wearing a surgical mask, and 15% exposed were wearing N95 masks[22]. The results of our survey showed that 58.8% of health care providers were aware of the PPE use in air borne, droplet, contact precaution and aerosol generating procedures.

In one of the survey, conducted among health care providers in Mumbai[23], the overall awareness, regarding PPE use in COVID-19

was found 71.2% (as per correct responses). The percentage of correct responses were highest of medical students and the lowest percentage was from non-clinical staff. Only 45.4% of the responders were aware of the correct sequence of donning and doffing. While our study results showed that 54.1% responders were aware of the kind of PPE use in confirmed COVID-19 cases. 58.6% and 30% of the responders were aware of the donning and doffing checklist respectively.

This study is uniqueof its kind as it assesses the awareness of PPE usage in COVID-19 pandemic, among healthcare providers of all levels. To prevent the transmission of infection, formulation and implementation of SOPs for the proper use of PPEs, among health care providers, is the first and foremost thing.

CONCLUSION

The current survey concluded that although majority of responders had fair knowledge regarding COVID-19, yet many knowledge gaps were there, regarding proper donning and doffing technique of PPE. Therefore continuous health education and training programs according to the recent guidelines by CDC and WHO, at all health care levels, regarding judicious use of PPE in COVID-19 is required.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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