

Student Corner

Awareness of Personal Protective Equipment Among Health Care Professionals

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Abstract

Objective: In accordance to the severity of the outcomes associated with this disease this study was aimed at mapping out the knowledge, attitude and practice of availability and use of PPE use among the health care workers and medical students.

Methods: A cross-sectional study design was implied, using non-probability convenience sampling. Data was collected through a self-administered online questionnaire filled out by the corresponding participants in direct contact with Covid-19 patients that included Doctors, Medical students, Nurses and Paramedic staff. The study was conducted in various medical college and hospitals across Karachi over a period of one week (26/05/2020 – 04/06/2020). SPSS Version 22 was used for data analysis. The findings were analysed alongside guidelines from the world Health Organization (WHO). This study was approved by the Ethics review committee, Aga Khan University Hospital, Karachi (Reference number: 2020-4838-10683)

Results: A total of 604 results were analysed. Mean age of participants was 31± 9.3 years and 323 (53.5%) were males. Most data was collected from doctors (68.4%). Only 244 (40.5%) of the participants reported a history of PPE exposure. Almost all of the participants were unaware of the WHO guidelines regarding the PPE and its conservation strategy in time of crisis. Inadequate knowledge coupled with less proficiency in practice proved to be a burden on the already scarce resources of PPE. WHO recommendations regarding the use of PPE during this Pandemic have evolved alongside emerging evidence. PPE has been extensively used and the resources depleting faster than it could be replenished. There are measures being taken on a global scale to overcome this by proposing strategies to conserve the existing PPE.

Conclusion: PPE being an integral part for the safety of HCWs needs to be used according to the appropriate guidelines. Our research highlights a lack of awareness of PPE that needs to be addressed.

Keywords: COVID19, PPE, Awareness

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Introduction

Coronavirus disease 2019 (COVID-19), caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), was first reported as unknown cases of severe pneumonia in the city of Wuhan, Hubei province, China. In March 2020, World Health Organization (WHO) declared it a global pandemic.¹ At the time of writing, this highly contagious disease has affected 13.2 million people, and killed 575,844, so far(2). In Pakistan, the first case of COVID-19 was recorded on 26th February 2020, and at the time of writing there are more than 250 thousand confirmed cases and

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more than 5,000 confirmed deaths.²

WHO-China Joint Mission COVID-19 reported that, 80% of confirmed COVID-19 cases had mild to moderate disease.³ However, this disease may cause severe respiratory illness in rest of the patients and is considered to be a global health concern. It causes a cytokine storm⁴, which may eventually lead to Acute Respiratory Distress Syndrome (ARDS), multi-organ failure, and ultimately death.(5) Studies comparing it with typical flu have revealed that COVID-19 has a mortality rate of about 2.92%, which is around 30 to 60 times more lethal than the former,⁵ Moreover, COVID-19 has a

lower mortality rate than diseases caused by other strains of corona virus (SARS and MERS), yet COVID-19 has killed more people than the former two combined. This is because COVID-19 is highly contagious and has affected a higher total number of people than to SARS and MERS combined.⁶

Non-pharmacological interventions (NPI's) are the main public health measures used to reduce viral transmission.⁷ These preventive measures like using a face-mask, frequent hand washing, and physical distancing are encouraged to reduce the risk of person to person transmission, especially to high-risk population such as elderly and immunocompromised, and to flatten the curve.⁵

Front line Healthcare Workers (HCWs) are at a higher risk of infection⁸, especially due to exponentially increasing patient load in already overburdened healthcare settings. Moreover these HCWs are more vulnerable due to exposure to higher viral load in COVID-19 special wards as compared to community settings⁹. This vulnerability especially increases while performing aerosolizing procedures on COVID-19 patients.¹⁰

Personal Protective Equipment (PPE), such as gloves, medical masks, respirators, goggles, face shields, gowns, and aprons, is an essential tool used by HCWs for infection control. A study conducted in the UK corroborated that risk of viral transmission and infection can be reduced by availability and appropriate usage of PPE.¹¹

WHO deems that this pandemic has introduced a global imbalance in the demand and supply of PPE, leaving HCWs dangerously ill-equipped to care for COVID-19 patients.¹² China is the major producer and supplier of PPE globally and as the infection domestically, its exports have come to a halt.¹² There is a lack of availability of PPE, and appropriate knowledge about its usage, among frontline HCWs because of disruption to worldwide supply chains, international travel restrictions, combined with exceptionally high levels of demand, slow release of pandemic stocks as well as confusing and ever-changing PPE guidelines.¹³ HCWs should not only use PPE as effectively as possible to minimize the spread of infection, but also to avoid any misuse which may further exacerbate shortage.¹³ WHO has put forward several guidelines to guide about conservation of PPE in order to optimize its availability with minimal disruption to the global supply chain.¹⁴

In this trying time, it is imperative to evaluate the HCWs in resource-limited developing countries, like Pakistan, and gauge the need to apprise them about correct usage protocols of PPE, the type of PPE required in different clinical settings, and the most appropriate

method of donning and doffing PPE required to optimally minimize the risk of transmission of COVID-19 using the limited supply that is available.

The aim of the study was to evaluate knowledge, attitudes, and practices about availability and use of PPE among healthcare workers (HCWs) and medical students in Pakistan.

Methods

This cross-sectional study was conducted in May-June 2020, using non-probability convenience sampling. The study was approved by the Institutional Review Board at Aga Khan University, Karachi. No personal identifiers were collected.

A self-administered online questionnaire was distributed among all the HCWs including the on-call physicians (emergency physicians, internist, hospitalist, infectious disease specialist, surgeons, etc.), nurses, patient care/nursing attendants and lab technicians, who are in direct contact with COVID-19 patients, and medical students.

Data was analyzed on SPSS Version 22. Demographic data was presented as simple descriptive statistics giving mean and standard deviation. Qualitative variables were presented as frequency and percentages. Chi square test was applied to determine associations taking p-value of < 0.05 as statistically significant.

Some of the operational definitions are given as follows,

COVID-19: Corona virus disease 2019, an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (15).

Probable cases: A person who tests positive to a validated specific SARS-CoV-2 nucleic acid test or has the virus identified by electron microscopy.¹⁶

Suspected cases: A person presenting with a history of high fever (>38°C), cough, or breathing difficulty, exposure with a confirmed/suspected case on one or more occasions and/or with a history of travel to an area of COVID-19 pandemic.¹⁶

Personal Protective Equipment (PPE): Special coverings designed to protect health care personal from exposure to or contact with infectious agents. These include gloves, face mask, protective eye wear, face shield, N95 and protective clothing (for example, reusable or disposable gown).

Health Care Workers (HCWs): Health care workers are defined as employees of a health care facility or emergency medical system that will interact closely with a patient. These were divided into three main categories: doctors (Post graduate house officers, trainees, residents and consultants), nurses, technicians and ancillary staff.

Results

A total of 604 responses were received, all of which were included in our final analysis. Mean age of our participants was 31 ± 9.3 years and 323(53.5%) were males. Most respondents were doctors 413 (68.4%), followed by students, 141(23.3%), and nurses & paramedics, 50 (8.3%). 372 (61.6%) of the participants were from private hospitals and medical colleges, while 232 (38.4%) were from public hospitals and medical colleges. (Table 1)

Only 244 (40.5%) participants reported that they have used PPE before this pandemic. Both the sectors showed a lack of practice with as low as only 197 (53.1%) and 47(20.3%) respondents had used the PPE before, from the private and public hospitals respectively. 363(60.1%) participants were not new to the PPE since they had heard of it before this COVID-19 pandemic. With respect to organization private hospitals had 247(66.4%) respondents while public hospitals had 116(50.0%) respondents with prior exposure respectively. (Table 2)

When questioned about the components of PPE, only

Table 1: Basic Demographics of Sample (n = 604)

Characteristic	N (%) or Mean $\pm$ SD
Age	31 $\pm$ 9.3
Gender	
Male	323 (53.5%)
Female	275 (45.5%)
Prefer not to say	6 (1.0%)
Profession	
Doctors	413 (68.4%)
Students	141 (23.3%)
Nurses & Paramedics	50 (8.3%)
Department	
Medicine & allied	252 (42.5%)
Medical College	141 (23.8%)
Surgery & allied	103 (17.4%)
Emergency Medicine	28 (4.7%)
Other	69 (11.7%)
Hospital	
Private	372 (61.6%)
Public	232 (38.4%)

Table 2: Response to the Online Questionnaire

No.	Question	Total (N = 604)	Profession			Hospital Setting	
			Doctor n = 413 (68.4%)	Nurses & Paramedics n = 50 (8.3%)	Medical Students n = 141 (23.3%)	Private n = 372 (61.6%)	Public n = 232 (38.4%)
1	Have you ever used PPE before this Covid-19 pandemic? [people who said yes are reported]	244 (40.5%)	175 (42.5%)	37 (74.0%)	32 (22.7%)	197 (53.1%)	47 (20.3%)
2	Have you ever heard of PPE before this Covid-19 pandemic? [people who said yes are reported]	363 (60.1%)	255 (61.7%)	43 (86.0%)	65 (46.1%)	247 (66.4%)	116 (50.0%)
3	Does your institute/hospital have an awareness and training session on PPE?	384 (63.6%)	282 (68.3%)	39 (78.0%)	63 (44.7%)	277 (74.5%)	107 (46.1%)
4	Where did you get the information on PPE use?						
	a. Internet	300 (49.7%)	175 (42.4%)	17 (34.0%)	108 (76.6%)	148 (39.8%)	152 (65.5%)
	b. Respected Institute	287 (47.5%)	225 (54.5%)	33 (66.0%)	29 (20.6%)	215 (57.8%)	72 (31.0%)
	c. Other	17 (2.8%)	13 (3.1%)	0 (0.0%)	4 (2.8%)	9(2.4%)	8 (3.4%)
5	Would you like to have a formal teaching session on PPE?	470 (77.9%)	311 (75.5%)	39 (78.0%)	120 (85.1%)	280 (75.5%)	190 (81.9%)
6	Do you think that you can still get infected with COVID-19 despite wearing PPE?	475 (78.6%)	331 (80.1%)	34 (68.0%)	110 (78.0%)	296 (79.6%)	179 (77.2%)
7	Is your hospital adequately supplying the health care workers with PPE?	398 (65.9%)	281 (68.0%)	42 (84.0%)	75 (53.2%)	279 (75.0%)	119 (51.3%)
8	Are you satisfied with the supply of PPE at your hospital?	346 (57.3%)	244 (59.1%)	40 (80.0%)	62 (44.0%)	251 (67.5%)	95 (40.9%)
9	Do you think your colleagues are adhering to the PPE protocols?	392 (64.9%)	246 (59.6%)	40 (80.0%)	106 (75.2%)	255 (68.5%)	137 (59.1%)
10	Are you aware of the PPE conservation strategy by the CDC?	275 (45.4%)	193 (46.7%)	37 (74.0%)	45 (31.9%)	196 (52.7%)	79 (34.1%)

11	Do you think N95 respirators are compulsory to wear while providing direct care to all COVID-19 patients? [No]	81 (13.4%)	61 (14.8%)	6 (12.0%)	14 (9.9%)	46 (12.4%)	35 (15.1%)
12	Is N95 respirator necessary while performing aerosol-generating procedures on COVID19 patients? [Yes]	596 (98.7%)	408 (98.8%)	50 (100.0%)	138 (97.9%)	368 (98.9%)	228 (98.3%)
13	Do you think it is necessary to change PPE while visiting COVID 19 diagnosed patients when visibly contaminated? [Yes]	540 (89.4%)	372 (90.1%)	49 (98.0%)	119 (84.4%)	338 (90.0%)	202 (87.1%)
14	Do you think cloth face covering can be used as an alternative to face masks as a part of PPE? [No]	503 (83.3%)	364 (88.1%)	35 (70.0%)	104 (73.8%)	311 (83.6%)	192 (82.8%)
15	Which type of gown do you think should be preferred during this pandemic? [Reusable]	120 (19.9%)	72 (17.4%)	6 (12.0%)	42 (29.8%)	70 (18.8%)	50 (21.6%)
16	Do you think it is compulsory to wear PPE in the following cases?						
a.	Covid-19 [Yes]	597 (98.8%)	410 (99.3%)	49 (98.0%)	138 (97.9%)	366 (98.4%)	231 (99.6%)
b.	Tuberculosis [Yes]	421 (69.7%)	281 (68.0%)	35 (70.0%)	105 (74.5%)	284 (76.3%)	137 (59.1%)
c.	AIDS [No]	427 (70.7%)	301 (72.9%)	28 (56.0%)	98 (69.5%)	262 (70.4%)	165 (71.1%)
d.	H1N1 Pneumonia [Yes]	457 (75.7%)	320 (77.5%)	38 (76.0%)	99 (70.2%)	289 (77.7%)	168 (72.4%)
17	Do you think health care practitioner should wear PPE for the following?						
a.	Suspected COVID-19 Cases [No]	18 (3.0%)	9 (2.2%)	3 (6.0%)	6 (4.3%)	5 (1.3%)	13 (5.6%)
b.	Confirmed COVID 19 cases [Yes]	602 (99.7%)	413 (100.0%)	49 (98.0%)	140 (99.3%)	371 (99.7%)	231 (99.6%)
c.	Emergency triage area [No]	53 (8.8%)	21 (5.1%)	5 (10.0%)	27 (19.1%)	21 (5.6%)	32 (13.8%)
18	Which components of PPE can be reused in multiple confirmed cases of COVID 19						
a.	N95 Respirator [Yes]	483 (80.0%)	342 (82.8%)	41 (82.0%)	100 (70.9%)	309 (83.1%)	174 (75.0%)
b.	Surgical mask [Yes]	136 (22.5%)	95 (23.0%)	12 (24.0%)	29 (20.6%)	92 (24.7%)	44 (19.0%)
c.	Gloves [No]	530 (87.7%)	376 (91.0%)	36 (72.0%)	118 (83.7%)	327 (87.9%)	203 (87.5%)
d.	Goggles [Yes]	485 (80.3%)	340 (82.3%)	38 (76.0%)	107 (75.9%)	307 (82.5%)	178 (76.7%)
e.	Gown [Yes]	217 (35.9%)	125 (30.3%)	20 (40.0%)	72 (51.1%)	132 (35.5%)	85 (36.6%)

40(6.6%) respondents correctly identified gloves, gown, surgical mask, N95 respirator and face shield to be the only components of PPE as per the CDC guidelines.

Similarly, when the respondents were asked to choose the correct sequence of donning and doffing of PPE, only 250(41.4%) participants accurately identified the sequence of donning. Furthermore 357(59.1%) participants managed to identify the correct doffing sequence (Figure 1), as per the CDC guidelines. As per our data equal percentage of participants that is, 96(41.4%) from public and 154(41.4%) from private

hospitals knew the standard procedure of donning. However the percentage of responses for the standard procedure of doffing varied between both the hospitals, with private hospital leading with 234(62.9%) correct responses and public hospital managing 123(53.0%)

Around all participants 597(98.8%) agreed that PPE was compulsory to wear while they were in contact with COVID-19 patients.

Almost all of our respondents were unaware of WHO guidelines on rational use of PPE which proclaims

HCWs to not wear PPE when in contact with suspected cases and while dealing with patients in emergency triage area. Only a negligible percent of our respondents, that is 18(3.0%) for suspected cases and 53(8.8%) for emergency triage area were able to respond correctly. When these results were broken down for each of the two variables, it was found that respondents working in public hospitals had a greater percentage of knowledge regarding the WHO guidelines, with 13(5.6%) for suspected cases and 32(13.8%) for emergency triage area, then the participants working in private hospitals with 5(1.3%) and 21(5.6%) respectively.

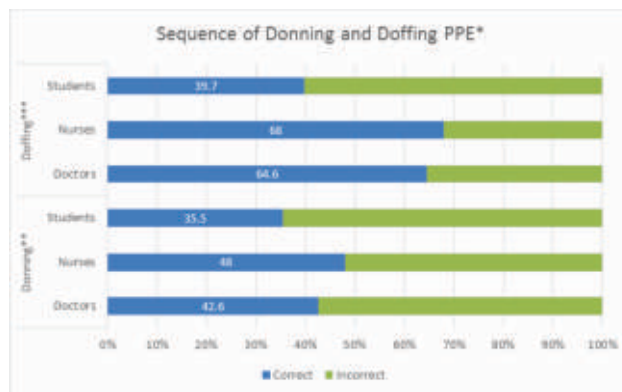


Figure 1: Sequence of Donning and Doffing PPE Among Different Professions

* Donning p -value = 0.202; Doffing p -value < 0.001

** Correct sequence: Gown > Mask/Respirator > Goggles > Gloves

*** Correct sequence: Gloves > Goggles > Gown > Mask/Respirator

When posed a query about the components of PPE that can be reused in multiple probable cases of COVID-19, most of the participants were aware that N-95 483(80.0%) and goggles 485(80.3%) can be reused, while majority were unaware that surgical mask 468(77.5%) and gowns 387(64.1%) can be reused.

Regarding their knowledge about N-95 respirators only 81(13.4%) respondents, 46(12.4%) from private hospitals and 35(15.1%) from public hospitals were able to correctly state that it was not compulsory to wear N-95 while providing direct care to COVID-19 patients.

A vast majority of 540(89.4%) participants knew that changing the PPE is necessary while visiting COVID-19 patients when it becomes visibly contaminated. Similarly, the idea, that cloth face covering can be used as an alternative to facemask as a part of PPE, was fairly rejected by 503(83.3%) respondents.

Information gathered on PPE use was almost equally divided among the internet 300(49.7%) and the respec-

ted institute 287(47.5). Surprisingly only 384(63.6%) of our sample reported having an awareness and training session on PPE at their institutes/hospitals. Private hospitals had 277(74.5%) respondents aware of their training sessions whereas only 107(46.1%) participants from the public hospitals were aware of the PPE training sessions being conducted. Positively, a great number of our respondents that is 470(77.9%) were interested in signing up for a formal training session on PPE with private 280(75.5%) and public 190(81.9%) institution.

Even during this global crises/pandemic where the healthcare facilities are facing a dearth of resources, 398(65.9%) of our respondents were in favor of the fact that their hospital was adequately supplying the health care workers with PPE. Consequently, only a mere percentage of 346(57.3%) participants were satisfied with the supply of PPE at their hospitals. A rather unprofessional trend was observed in terms of the HCWs adhering to the PPE protocols as only 392(64.9%) of respondents acknowledged that their colleagues were practicing the PPE protocol guidelines. A majority of the respondents 475(78.6%) lacked awareness that the chances of getting infected with COVID-19 were minimal once they were properly geared with the PPE.

Significant lack of knowledge was observed when asked about the type of gown that should be preferred during this pandemic. A total of only 120(19.9%) respondents were aware that a reusable gown should be preferred during this global shortage of supply. Public hospitals subjects had a slightly better percentage of correct responses that is 50(21.0%) when compared with only 70(18.8%) correct responses from private hospitals.

Alarming results were seen pertaining to the awareness of PPE conservation strategy by the CDC, only 275 (45.5%) of the respondents admitted to be aware of it, where not only the private hospitals but the public hospitals reported percentages as low as 196(52.7%) and 79(34.1%) respectively

Discussion

HCWs encounter risk on daily basis by treating or nursing patients with contagious diseases. PPE acts as a barrier in the form of garments that protect the health care workers and the patients they manage, from exposure to infectious pathogens.¹⁷ However in order to make the most out of its use during this pandemic, HCWs should be aware of the protocols of PPE and they should also be updated with all the recent guidelines concerning its use with respect to COVID-19. As stated in an article by Edward Livingston, that effective use of PPE is integral to impede dissemination of infection.¹⁸

In our study, we found out that healthcare professionals were treating an average of 5.9 to 6.9 probable

cases per day. Yet surprisingly majority of them 360 (59.5%) never had any exposure to PPE prior this global pandemic. With them getting their feet wet by PPE use under such circumstances could make the situation unfavorable for them. Similarly, devastating results were witnessed when the knowledge of medical professionals was assessed and the response of only 40(6.6%) was correct regarding the basic components of PPE as clearly mentioned in the CDC guidelines. These results were in accordance with the ones conducted on Chinese critical care clinicians during influenza pandemic.¹⁹

Moreover, donning and doffing of PPE itself requires an intimate knowledge of protocol that needs to be followed in order to maximize the effective potential of this gear, but the order of donning 354(58.6%) and doffing 247(40.9%), majority of them claimed to follow was inaccurate to a point where its effectivity would be reduced. Previously, Linh T. Phan reported inaccurate doffing practices in terms of its sequence and technique in majority of the HCWs.²⁰

During this pandemic when there is already scarcity of supplies, our results reflect that majority of HCWs are not aware of the situations, where PPE is not deemed compulsory. Contrary to majority of the responses which were in favor of PPE, 586(97.0%) for suspected cases and 551(91.2%) for emergency triage area, WHO recommends maintaining safe distance is sufficient to protect medical professionals from getting infected while dealing with suspected cases. These similar precautions are also applicable on medical professionals, working in the emergency triage area.

A very small minority of our respondents 81(13.4%) were aware that probable cases can be taken care of without applying a higher level PPE that is N-95, when a basic surgical mask can be an acceptable alternative. Also this would add up to wastage of available resources as a research mentioned that using a higher level PPE as to what is required contributes to misuse and may further exacerbate shortage of supplies.²¹

Moreover, when asked about the components that can be reused majority of HCWs had a misconception that gowns 387(64.1%) and surgical mask 468(77.5%) cannot be reused over multiple patients. Yet again during these critical times, it was disappointing to see that majority of our respondents 484(80.1%) preferred a disposable over a reusable gown. Reconsideration of this practice is necessary and strategies should be imposed that help in conservation rather than over exhaustion of supplies. Meanwhile we were extremely dissatisfied to realize that less than half of them 275 (45.5%) were acquainted with PPE conservation strategy by CDC.

We as medical professionals should realize that austere

practices are imperative during this pandemic. Question pertaining to the attitude of colleagues was inquired and by now it was not surprising looking at the results that only 392(64.9%) were affirmative about their coworkers adhering to the PPE protocols. In a study conducted on Pakistani HCWs, majority were found to have low compliance with respect to the use of PPE.²² If our fellow HCWs are not rigorous in adhering to these protocols and continue to exercise negligence we propound that medical professionals will face significant dreadful consequences such as risking their lives and become a source of infection to others.

Furthermore, a significant number of our respondents 475(78.6%) were unsure if they were completely protected in spite of wearing PPE. Researchers conducted in this regard corroborated that effective use of PPE could totally save HCWs from contracting any infection at all.²² Therefore uncertainties and misconceptions about contracting the virus need to be addressed and awareness sessions to enlighten medical professionals and make them assertive of the fact, that gearing up with PPE appropriately would reduce the chances of getting them infected to minimal.

Majority of the responses from both the organizations lay in a similar range, however few striking dissimilarities were observed between both organizations in terms of awareness, attitude and practice. With respect to PPE usage before this pandemic, public institutes were far behind with only 47(20.3%) compared to 197(53.1%) of private institute respondents having prior PPE exposure. Not even half of the participants from public hospitals 107(46.1%) were aware of any PPE training session being conducted at their institutes whereas majority from private hospitals 277(74.5%) were totally well informed of such sessions. Again, most of the participants from public institutes 79(34.1%) were not familiar with PPE conservation strategy by CDC, whereas a slight better response was recorded from private institutes 196(52.7%). Persistently, a very few number of respondents from public hospitals 95 (40.9%) were satisfied with PPE supply at their hospitals, as compared to private hospitals 251(67.5%).

These results critically highlight the fact that organizations especially public ones are in dire need of teaching and training sessions. If authorities will not divert their attention in cultivating healthcare professionals with required expertise to combat this pandemic, these workers won't be able to even save themselves, let alone their patients.

An alarmingly low percent of both the public and private organizations were informed of rational use of PPE in terms of suspected cases 21, 5(5.6%, 1.3%) and emergency triage area 32, 13(13.8%, 5.6%) respectively, as per CDC guidelines. In order to seek PPE

guidance, respondents from private hospitals 215 (57.8%) relied more on their institutes whereas those from public institutes 152(65.5%) made their way through internet.

Lack of awareness sessions more so in the public sector, is clearly evident. If their institutes would keep them updated with all the latest guidelines and information, they would not have to rely on other means which come their way to seek guidance.

Profession wise breakdown didn't yield remarkable results but some points are worthy of attention. In terms of donning and doffing of PPE, medical students 50, 56(35.5%, 39.75%) respectively, had the lowest percentage of correct answers. Upon asking if their institutes have any training or awareness session on PPE, only 63(44.7%) students acknowledged being aware of any such session. Furthermore, only 45(31.9%) students were aware of PPE conservation strategy by CDC. To top it all off only 65(46.1%) of medical students have heard of PPE and only 32(22.7%) have used it before this pandemic.

In this era of pandemic, where resources including medical staff are limited and students could be called any time to provide some support, our results indicate that students are nowhere ready to lend a hand anytime soon. Furthermore, a large number of medical students 108(76.6%) reported using internet as a medium to acquire knowledge regarding PPE which again highlights the fact that institutes have not done their part in educating their students.

Comparatively, HCWs were relatively more knowledgeable than medical students. Yet there is a great need to conduct sessions to address the misconceptions these workers have regarding PPE and its rational usage. Furthermore, the HCWs should be updated with all the recent guidelines regarding conservation of PPE and COVID-19.

Conclusion

In the wake of COVID-19, PPE is integral for the safety of HCWs. Despite of using PPE HCWs are still getting infected which points out to shortcomings that need to be addressed. Our research confirms that there is lack of intimate knowledge among healthcare professionals and medical students regarding PPE components, usage and its conservation strategies. Also there was a lack of compliance observed in terms of following PPE protocols. Furthermore, only a minority of them were cognizant of PPE sessions being held at their institute, which render the majority to opt for internet and other means, putting them at risk of incomplete and misleading knowledge. Most of the HCWs are not trained on the use of PPE in Pakistan,

we strongly urge organizations to have proper training sessions on PPE and to keep their HCWs and students updated with all the latest guidelines and strategies. Also austere strategies requiring changes in practices should be implicated. More research work is needed to further evaluate the knowledge, attitude and practices of HCWs with respect to PPE.

Conflict of interest

None

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None

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