Knowledge, Attitude, and Practices of Health Care Providers Regarding COVID-19 Infection in Tertiary Care Hospitals of Karachi, Pakistan

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Abstract. COVID-19 is an inciting panic that hits the world, its effects are most hard in Pakistan due to weak health infrastructure, putting the health care providers (HCPs) at high risk of exposure. Our study is a prospective cross-sectional study which analyzes the knowledge, attitude, and practice of the HCPs towards the disease. In our study, 395 health care workers were included, 52% of the HCPs were females, 64% were doctors. HCPs were found to have limited knowledge related to the transmission of disease but better knowledge regarding the protection against the disease 328[83%]. In our study 63% of HCPs had appropriate knowledge, 67% had a good practice and 52% had a positive attitude towards the disease, knowledge of the HCPs was significantly related to their good practice [p value <0.05]. This study found gaps in specific aspects of knowledge and practice that should be focused on in future awareness and educational campaigns.

Keywords: COVID-19, Health care provider, Pakistan, Knowledge, Attitude, Practice, Transmission, Protection

What is already known?

- Other studies conducted on this topic depict a higher percentage of knowledge and good practice of HCPs toward COVID-19.
- Studies conducted on the same subject showed mixed results of knowledge regarding the transmission and preventive measures against COVID-19.
- Studies conducted on this subject showed a higher proportion of positive attitudes of HCPs.

What this article adds?

- Our study focuses on the knowledge, attitude, and practices of the Health care providers, while most studies conducted in Pakistan and across the world cover this topic among the general population, so it adds a piece of valuable information on this subject.
- Our study investigates the deeper knowledge of health care workers regarding personal protective equipment and investigation criteria as compare to other studies conducted on this subject.
- Our study indicates the importance of strengthening of COVID-19 awareness program on the academic level and highlights the fact that HCPs need to be trained more regarding the transmission of the disease which is crucial in preventing the spread of disease. Data can be used by policy making institutes to design the educational program.

Introduction

According to the World Health Organization (WHO), viral diseases possess significant health issues in the modern era. In the last twenty years, many viral epidemics have been recorded such as the severe acute respiratory syndrome coronavirus (SARS-COV) in 2002 to 2003, and H1N1 influenza in 2009, the Middle East respiratory syndrome coronavirus (MERS-COV) in 2012, and most recently novel coronavirus named as COVID-19 has affected the world at its worst. Till February COVID 19 has affected 120million people across the world with 2.6 million death (University JH, 2020). According to John Hopkins Corona Virus Resource Centre case fatality in Pakistan is estimated to be 2.2 % (University JH, 2020). In Pakistan, total number of cases 665,000 with more than 14,000 deaths were notified until March. The highest number of cases of COVID-19 were from Punjab 217,694 followed by Sindh 265,158 (Poon et al., 2018). The multiplication rate of COVID-19 is significantly higher than SARS and MERS, which posed enormous challenges for containing the spread of COVID19 by concerning authorities (Chan et al., 2020).

Hospital-acquired transmission is another severe problem. Healthcare workers (HCWs) are the most vulnerable group likely to be infected due to the high risk of exposure (Lin et al., 2020; Minder & Peltier, 2020; Koh, 2020). In China 3387 Health care provider [HCPs] got infected out of which 22 (0.6%) died (Lin et al., 2020; Wang, Zhou, & Liu, 2020). Similarly, Italy (20%), Spain (14%), and France (over 50 deaths amongst HCWs) highlight high rates of HCW infection (Minder & Peltier, 2020; Pfau et al., 2004; Lancet, 2020). Also in Pakistan, until December 1 2020, more than 10,000 health care workers have been infected with COVID-19 with highest number reported from Khyber Pakhtunkhwa and deaths more than 100 (Harrison & Ouyang, 2013).

As Pakistan is among one of the most affected country with COVID-19, only appropriate knowledge, positive attitude towards the disease and good practice could help the health care workers to combat the danger. Hussain et al. (2021) showed good scores for knowledge, attitude and practice of COVID-19 among primary health care provider in Peshawar, Pakistan. Misinformation and myths about the origin, cure, and prevention of COVID-19 complicate health care workers' [HCWs] efforts to control the outbreak. In Pakistan and third world countries medical infrastructures are weak so COVID 19 spread would be difficult to control. So, awareness of health care provider's doctors and other medical staff regarding the disease, its origin, cure, and prevention could play a significant role in confronting the situation.

This study was conducted to assess the knowledge of disease; attitude of heath care workers towards the disease; and most importantly this study would highlight the real practice in terms of counseling, management, and prevention of disease by the health care provider. If HCWs' knowledge, attitude, and practice towards the virus can be determined promptly in this era of the pandemic, then this information will be helpful for training and policy-making authorities to overcome the situation and it will also guide HCW in prioritizing protection and avoiding occupational exposure.

Methodology

This was cross-sectional study was conducted with a total of 395 consecutive Health care workers from the duration between April 2020 to September 2020, during a period of 6 months. Prospective data was collected through electronic proforma filled using Google forms and manually after taking informed consent. Proformas were distributed after taking Ethical consent from the Institute ethical committee, ERC NO.81. Addressographs were removed to conceal the identity of the patients. All the health care workers who understood filling out the electronic web form and filling the Performa manually and are still working in the health care industry were included in the study. The questionnaire analyzed the knowledge, attitude, and practice of the health care worker regarding COVID 19. The study questionnaire contained the

consent form which stated the objective of the study, voluntary participation, and declaration of confidentiality. To analyze the knowledge of participants, a total of 21 questions were asked, few questions were multiple-choice questions with more than 1 correct answer, 50% of the correct options selected by the participants were considered as the eligible correct answer for that question. The knowledge part of the questionnaire comprises of questions related to COVID 19 origin, name, sign and symptoms, transmission, and protective measures along with investigation criteria of COVID 19. 4 questions analyzed the attitude of participants, positive and negative attitude were documented. Similarly, 4 questions analyzed the practice of the patient. Overall knowledge, attitude, and practice were recorded.

Statistical Analysis

Descriptive and inferential statistics were applied using SPSS Version 21 (IBM Corp.). Mean±SD or Median [IQR] was reported. Whereas frequency and percentage were generated for all categorical data. To see the association and mean differences in knowledge, attitude, and practices of HCW and compared with clinical, demographics characteristics, Chi-squared test, independent sample *t*-test, and one-way analysis of variance were used. Pearson's rank correlation test was used to identify any correlation between knowledge, attitude, and practice. 95% CI. $P<0.05$ was considered to indicate significance in all tests.

Results

Demographic Characteristics

In our study, 395 health care workers were included, knowledge attitude and practice of health care workers providing direct care to COVID patients or who are posted in other departments of the hospital were assessed. Majority of participants 248[62%] of the participants were less than 30 years, 229[52%] of the health care workers were females, 142[35.9%] were certified nurse, 253[64%] were doctors. Most of the respondents 153[38.7%] were from the medicine department, 19% of the respondents were from the critical care department involving in direct care of COVID 19 patients. Table 1 depicts the demographic data of the participants.

Table 1. Demographic characteristics of health care providers

Demographic characteristics of health care workers	
Age Groups	
<= 30 Years	62.8% (248)
31-45 Years	35.2% (139)
46-60 Years	2% (8)
Gender	
Male	42% (166)
Female	58% (229)
Designation	
Intern	7.1% (28)
MO	4.1% (16)
PGY1	8.1% (32)
PGY2	3.3% (13)
PGY4	0.3% (1)
SR	9.4% (37)
Consultant	10.1% (40)
Nursing student	2.5% (10)

Certified nurse	33.4% (132)
PG3	0.5% (2)
Medical Office	14.9% (59)
PGY4	2% (8)
PGY3	2.5% (10)
PGY5	1.8% (7)
Department	
Medicine	38.7% (153)
Surgery	8.6% (34)
Gyne/obs	2.5% (10)
HDU/ICU	19.5% (77)
Others	30.6% (121)

Knowledge, Attitude, and Practice of Participants

21 Questions regarding the knowledge showed that responses of the participants were a mix, professional colleagues were found to be the main source of knowledge of the majority of HCP i.e., 195[49.4%] followed by newspaper and social media [43% each]. 368[93%] of the participants had knowledge regarding the origin of disease. In general, HCPs were found to have limited knowledge related to the transmission of disease 208[52%] perceived that COVID-19 is an airborne infection rather than the droplet, 191[48.4%] knew accurately that disease cannot be contracted from animals. Surprisingly only 114[31.1%] of HCPs had knowledge that COVID-19 cannot be spread by taking food. 142[35.9%] and 149[40.7%] knew the inability of ultraviolet lamp and disinfectant spray to protect against the disease. It was observed that HCPs had better knowledge regarding the protection against the disease, 328[83%] HCPs had acceptable knowledge of the means of protection against the disease. The majority 282 [71%] knew the correct use of personal protective equipment. 318[80.5%] of HCPs correctly knew the gown use. 287 [72%] of HCPs knew the correct use of face mask. 281[71%] had correct knowledge regarding the high-risk group of patients while 313[79.2%] of HCPs had correct knowledge regarding testing criteria to diagnose the disease.

Majority of participant i.e56.8% thinks that going to hospital can cause infection,43.7% thinks that virus was created in lab while 206 participants i.e. 56% disagrees with this myth. 64% of the participant prioritizes the patients with respiratory symptoms. Only 202 [55%] of the HCPs have an adequate supply of personal protective equipment. 308 [84.2%] of health care workers perform hand hygiene before attending to every patient.

Table 2. Knowledge of participants regarding general information, transmission, testing, and protective measure towards COVID 19

What do you think is this covid 19	**f(%)**	**Who do you think should wear the mask?**	**f(%)**
Bacteria	32.9% (130)	Everyone should wear it	64.6% (255)
Virus	67.1%(265)	All healthcare personnel should wear the mask	64.6% (255)
From where coronavirus got its name		The person who has fever and cough should wear the mask	30.9% (122)
due to their crown-like projections	43.8% (173)	Health care personnel taking care of suspected or diagnosed corona patients	28.9% (114)
due to their leaf-like projections	23.3% (92)	Housekeeping of the hospital should wear the mask	20.5% (81)
due to the surface structure of bricks	23.8% (94)	**Do you know when PPE (personnel protective equipment) is necessary?**	
None	9.1% (36)	need only for people who are triaging patient with respiratory symptoms	54.2% (214)

The first case of novel coronavirus was identified in		Need for every Health care worker	52.9% (209)
Beijing	3.5% (14)	Need for Health care worker doing aerosols generating procedure (intubation/bronchoscopy)	72.4% (286)
Shanghai	2.5% (10)	HCW who are attending patient with respiratory symptoms in ward and ICU	57.7% (228)
Wuhan	93.2% (368)	**How to protect yourself from Covid 19**	
Can ultraviolet disinfection lamp kill the virus late?		wash hands for 20 sec	65.5% (256)
Yes	28.9% (114)	wear a mask all the time	57.8% (226)
No	35.9% (142)	avoid close contact with people who have fever and cough	58.1% (227)
Don't know	35.2% (139)	social distancing	54.7% (214)
Do you think covid is more contagious than SARS?		**Who do you think is at greater risk?**	
Yes	48.6% (192)	kids less than 5 years	53.4% (211)
No	27.8% (110)	adults/elderly	58.5% (231)
don't know	23.5% (93)	patients with diabetics, lung disease, and heart disease	64.6% (255)
Do you think covid 19 is airborne?		**Who do you think should be tested?**	
Yes	52.7% (208)	any person with flu-like symptoms	61.9% (223)
No	28.4% (112)	a person with flu fever cough	68.6% (247)
don't know	19% (75)	no symptoms but positive travel history	61.9% (223)
Do you think you can catch it through pets?		no symptoms but positive contact history	54.7% (197)
Yes	44.8% (177)	**Can someone who has been quarantined for Covid 19 spread the illness?**	
No	48.4% (191)	Yes	149 [40.7%]
don't know	6.8% (27)	No	132 [36.1%]
What is the incubation period of the disease?		Don't know	85 [23.2%]
10 days	18.5% (73)	**Do you think warm weather can kill the virus**	
7 days	18.5% (73)	Yes	123 [33.6%]
14 days	49.6% (196)	No	137 [37.4%]
20 days	13.4% (53)	Maybe	106 [29%]
Can virus be spread through frozen food/ refrigerated food?			
Yes	33.2% (131)	**What do you understand by word quarantine?**	161 [44%]
No	36.5% (144)	The person whom you suspect to have symptoms in the future should be in isolation for 14 days	114 [31.1%]
Maybe	30.4% (120)	Everyone who has flu should be in isolation for 14 days	91 [24.9%]
Do you think antibiotics help in treating the disease?		**Do you think disinfectant sprays and wipes would help prevent the spread of the Corona Virus**	
Yes		Yes	207 [56.6%]
No		No	149 [40.7%]
Maybe		Don't know	10 [2.7%]
Do you think is there a vaccine or drug that can treat covid19?			
Yes	24.3% (96)		
No	53.9% (213)		
Maybe	21.8% (86)		

Table 3. The attitude and practice of HCPs

Attitude	f [%]
Yes	208 [56.8%]
No	147 [40.2%]
Don't know	11 [3%]
Do you think there is nothing we can do to contain the virus?	
Yes	176 [48.1%]
No	190 [51.9%]
Do you think whoever gets the disease will die?	
Yes	150 [41%]
No	216 [59%]
Do you think everybody should wear a surgical mask?	
Yes	198 [54.1%]
No	96 [26.2%]
Don't know	72 [19.7%]
Practices	
Do you prioritize the patient with respiratory symptoms?	
Yes	237 [64.8%]
No	128 [35%]
Do you have an adequate supply of facemask and other PPE?	
Yes	202 [55.2%]
No	164 [44.8%]
Do you perform hand hygiene on every patient visiting OPD/Wards and ER?	
Yes	308 [84.2%]
No	22 [6%]
Sometimes	36 [9.8%]
What would you like to suggest patient with COVID19 tested positive?	
Keep your self-isolation	66.6% (257)
Mouth and nose should be covered while coughing and sneezing	52.6% (203)
Avoid meeting people	54.7% (211)
Don’t share personal item like dishes/towels and bedding	48.2% (186)
Wear a face mask before you enter a shared space	46.9% (181)
Seek medical attention if your condition gets worsen	43% (166)

Overall, 63% of HCPs had appropriate knowledge, 67% had good practice and 52% had a positive attitude towards the disease. Knowledge was found to be better among the doctors versus nurses [65.3% vs. 61.3]. Doctors found to perform better practice than nurses [71.6% vs. 59.1%] while nurses were found to have a positive attitude than doctors [58.4% vs. 49%] It was found that knowledge of HCPs was not significantly related to their attitude. However, knowledge of the HCPs was significantly related to their good practice [p value <0.05].

Discussion

COVID-19 is a novel disease that imposes a greater health hazard. Knowledge of the health care provider is key to the prevention and spread of disease, also the positive attitude and good practice of health care providers towards the disease is the epitome on which our world could win the battle against the pandemic.

Awareness of health care workers would essentially make the basis of the community’s awareness regarding the disease. Our study highlights the importance of knowledge, attitude, and practice of health care workers in this part of the world, where the awareness of the

community regarding the disease is lacking. The survey found that the majority [49%] of HCPs source of knowledge was professional colleagues versus 31% of HCPs who used the academic session as a knowledge tool, against the result found in the study conducted in other setups of the same country where the majority had used social media as a source of knowledge (Saqlain et al., 2020; Huynh et al., 2020). It highlights the need of proper educational training programs for COVID-19 in this part of the world as social media and other sources are less reliable than general guidelines of the disease. According to our study, 63% of our health care worker are found to have good knowledge, comparable to the study conducted in Yemen that shows 69% of good knowledge among health care workers (Alrubaiee, Al-Qalah, & Al-Aawar, 2020). It is less in percentage compared to the study conducted in Peshawar, Pakistan that showed overall knowledge of 90.7% (Hussain et al., 2021) and another study showed overall knowledge of 93% in health care provider (Saqlain et al., 2020). Likely this difference is due to the fact that the questionnaire was filled during the beginning of pandemic and most of the participants were from departments other than that which directly involved in the care of the COVID-19 patient. Results showed that doctors were found to have greater knowledge than nurses i.e. 65% vs. 61% compared to the study which shows similar results, depicting the significance to train the nurses as they are the backbone of the patient care and poor awareness would result in failure of prevention and control of COVID-19 (Zhang et al., 2020).

79.2% of HCPs had the knowledge regarding the high-risk group of patients that is comparable to the study conducted in China (Huynh et al., 2020). 45% of our participants had the knowledge that antibiotics are not used for the treatment of disease comparable to results that showed 54% of the correct responses in a research conducted by Huynh et al. (2020) and to a lesser extent then the study conducted by Narayana et al. (2020). It was found that awareness regarding the protective measures against COVID 19 was adequate i.e. 83% comparable to the results obtained from the similar study conducted in China (Huynh et al., 2020) which showed 98.2% correct knowledge regarding the protective measures.

It was found that HCPs had limited knowledge regarding the transmission of disease, as mixed response, and ambiguity in the knowledge regarding counteracting COVID-19 by consumption of contaminated food is observed. Only 36% thinks that it cannot be transmitted through frozen food the result is comparable to the study conducted in Pakistan which showed 59% correct knowledge regarding this (Qasim et al., 2020). 48% had the knowledge that it cannot be transmitted through the pets far better than the study conducted in other setups which should that knowledge of the participants regarding the transmission between different species was only 23% (Qasim et al., 2020). Similarly, 40% of HCPs thinks that quarantined person can spread the illness this depicts the significance of educating the HCPs as being the frontline force they have high-risk of exposure.

Health care workers should have proper knowledge regarding the investigation criteria of the disease. This survey shows that our HCPs has adequate knowledge regarding testing criteria to diagnose COVID 19 i.e.,79.2% this highlights the significance of educating the health care workers at all levels and of every department, the lack of this basic knowledge also raised many questions regarding the credibility of infection control programs on national level. Myth regarding the warm weather can kill the virus was seen in the participants as the responses were ambiguous: 37% believed that warm weather cannot kill the virus but 33% believed in effectiveness of warm weather against virus, comparable to the study conducted in India which showed 57% correct response (Narayana et al., 2020). However multiple studies clear that warm weather is not shown to reduce the spread and multiplication of COVID-19 (Pan et al., 2021).

It was found that only 52% of our HCPs have a positive attitude, doctors, this is much less than the study conducted in Peshawar, Pakistan (Hussain et al., 2021), while nurses have shown a more positive attitude towards COVID 19. This finding of high proportion of negative

attitude towards COVID-19 must be addressed seriously by concerned authorities, recognizing the health care workers on national level, adding work incentives, provision of risk allowance are necessary tools to build confidence in our health care workers. In our study, knowledge scores were negatively correlated with the positive attitude against the results where a good knowledge of COVID-19 was associated with the positive attitude (Huynh et al., 2020).

Overall, 67% of HCPs found to have good practice, among which majority [84%] prioritize hand hygiene comparable to the results which showed 83% (Hussain et al., 2021). Doctors were found to have better practice than nurses [71% vs. 59%] comparable to the study by Zhang et al. (2020) and Nepal et al. (2020), and good knowledge was significantly related to good practice, comparable to the study conducted by Nepal et al. (2020) and Iranian population-based survey where good knowledge was associated with good practice (Erfani et al., 2020).

Conclusion

This study found gaps in specific aspects of knowledge and practice that should be focused on in future awareness and educational campaigns. The findings also demonstrated that HCWs were using less authentic sources for information; this should be addressed immediately as it ultimately affects knowledge and is reflected in attitude and practice. The study recommends that health ministries should provide comprehensive training programs, targeting all HCWs, to promote all precautionary and preventive measures of COVID-19, to achieve equilibrium in terms of clinical knowledge about COVID-19.

Conflict of Interest

Authors have no conflict of interest.

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