

# Novel COVID-19 Pandemic: A Cross-Sectional Survey among Global Health Care Providers

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Received: November 2020; Accepted: December 2020; Published: January 1, 2021.

Citation: Nazish Jaffar et al. Novel COVID-19 Pandemic: A Cross-Sectional Survey among Global Health Care Providers. World Family Medicine. 2021; 19(1): 110-118 DOI: 10.5742/MEWFM.2021.93956

## Abstract

**Background:** Covid-19, a highly infectious disease was first reported in Wuhan, China on 31 December, 2019. It was declared a pandemic by World Health Organization on 11 March, 2020 when 118,326 cases were reported globally.

The present study was designed to determine the knowledge, practices, availability of personal protective equipment to health care providers and hindrance to delivering health care facilities during the COVID-19 pandemic.

**Methods:** A descriptive cross sectional study was conducted with 217 health care workers serving in different hospitals/departments across the globe. Sample size was calculated by using Open EPI software and data was analysed by using SPSS version 22.0.

**Results:** Knowledge of many 152(73.4%) participants regarding guidelines for isolation of suspected cases and recommendations for wearing a mask in a community setting was not satisfactory. About 51(24.63%) did not receive any

personal protective equipment. Inadequate provision of personal protective equipment was reported by 78(37.7%) participants as the most common factor that might impede their willingness to work during the COVID-19 pandemic. About half, 98(47.3%) of the participants admitted that they are not well prepared/trained in handling COVID-19 cases. PCR was correctly reported as diagnostic test for SARS CoV-2 by 136(65.7%) respondents.

**Conclusions:** Our study recorded lack of knowledge about newly emerged COVID-19 pandemic among health care workers. Shortage of ventilators, testing kits and personal protective equipment was noted in many hospitals and departments. Lack of personal protective equipment and insufficient training in infection control management may act as barriers in delivering health care during COVID-19.

**Key words:** COVID-19, Healthcare personnel, practice, knowledge, barriers, pandemic, global.

## Introduction

Corona virus infectious disease is caused by severe acute respiratory syndrome corona virus type-2 (SARS CoV-2), which belongs to the family coronaviridae [1-3]. The disease was first reported in Wuhan, Hubei province of China in December 2019 which then spread rapidly throughout the country in merely 30 days [4, 5].

It is a highly infectious disease with an incubation period ranging from 2-14 days [6]. It is estimated that the number of individuals infected with the virus doubles every 6-7 days [7].

It is suspected that bats serve as the main animal reservoir of SARS CoV-2 [8]. Old age, male gender, and underlying co-morbidities such as hypertension, diabetes mellitus, chronic obstructive pulmonary diseases, liver diseases and renal diseases serve as important risk factors [3].

Patients infected with SARS CoV-2 commonly present with fever, cough, myalgia, fatigue and shortness of breath. Anorexia, sore throat, sputum production, headache, diarrhoea and haemoptysis are reported as less commonly occurring symptoms [9]. Frequent hand washing with soap and water, use of alcohol based sanitizers, avoiding public gatherings and maintaining good respiratory hygiene are some important preventive measures. People with respiratory symptoms (coughing sneezing shortness of breath) and travel history should wear a mask also [10-11].

Adequate supply of ventilators and testing kits is required for the diagnosis and treatment of the patients. However, hospitals around the world are already reporting shortage of personal protective equipment and ventilators [12]. Lack of provision of protective gear will cause deteriorating effects on our health care providers who are playing an important role in prevention and management of COVID-19 pandemic. Up to date knowledge regarding the disease, adequate provision of personal protective equipment and sufficient training in infection control management thus serve as an important factor in identifying the cases and treating them. Hence, the present study was aimed to determine the knowledge and practices of health care workers, availability of personal protective equipment and hindrance to delivering health care during the COVID-19 pandemic.

## Materials and Methods

A descriptive cross sectional study was conducted during March, 2020 with a total of 217 health care workers working across the globe. Ethical approval was obtained from the institutional review board of Jinnah Sindh Medical University (JSMU/IRB/2020/-359) and informed consent was acquired before data collection. All the consenting doctors, house officers, residents, physicians, surgeons, paramedics, nurses, medical students, pathologists, virologists, and laboratory technicians practicing across the globe were included in our study.

Dentists, physiotherapists, psychologists and those who were not practicing medicine were excluded. Data was collected through a self-administered online questionnaire designed by using software online google forms [13] as it was difficult to approach all health care providers physically due to lockdown. Participants were selected by using non-probability convenient sampling technique. The questionnaire was prepared after extensive literature review from Google Scholar and consisted of three parts. The first section included socio-demographic data, location and workplace information. The second segment enquired about the knowledge and practices of the participants regarding coronavirus infection and the third section investigated the experience of health care workers related to patient exposure and protective equipment. Doctors, nurses, paramedics, laboratory personnel, general physicians, surgeons, consultants and technicians were invited to participate in a survey via posting an online questionnaire on different social media platforms including Facebook, email and Whatsapp. Sample size was obtained by using Open EPI software ([www.openepi.com/Menu/OE\\_Menu.htm](http://www.openepi.com/Menu/OE_Menu.htm)). Keeping confidence interval of 95% (Z score=1.96) 83% [14] as prevalence from previous study and 5% allowable error of known prevalence, sample size obtained was n=217

Data was analysed by using SPSS version 22.0. Descriptive statistics were used to determine mean and standard deviation for numerical variables. Categorical variables were expressed in frequency and percentages.

## Results

A total of 217 health care workers working across the globe were included in the current study. More than one-half of the participants were females. The age range was 20-30 years. Mean age with standard deviation was 2.48±0.78. More than half of the participants belonged to different provinces of Pakistan. About 137 (63.1%) participants were Doctors, house officers and residents practicing in government hospitals 155 (71.4%) for 1-5 years. (Table 1)

Only 74 (34.1%) correctly identified the name of virus causing COVID-19 whereas bat was reported as animal reservoir of the SARS CoV-2 by most 167 (76.9%) of the respondents. Fever, cough, dyspnoea and myalgia were reported as the most common symptoms by 108 (49.7%) participants. Knowledge of most 162(74.6%) of the respondents regarding patient isolation and recommendations for wearing surgical mask was not satisfactory according to WHO guidelines (Table 2).

Gloves and surgical masks were reported as the most common protective equipment supplied to health care providers (Figure 1). Visitors' restriction in hospitals was the most common infection control measure taken in 46(22.2%) hospitals. More than half 131(60.3%) of the participants reported that their hospital/department is not well prepared for the COVID-19 pandemic and inadequate provision of personal protective equipment might impede their willingness to serve during the pandemic (Table 3).

**Table 1: Distribution of socio-demographic data and workplace information:**

Variables:		N (%):	Mean ± STD deviation:
City/country/state/country:	National:	Pakistan:	29(14)
	Provincial:	Sindh:	53(25.6)
		Punjab:	95(43.7)
		Khyber Pakhtunkhwa:	18(8.7)
		Baluchistan:	3(1.4)
		Azad Jammu and Kashmir:	3(1.4)
	Global::	United states of America	2(0.9)
		United Kingdom	3(1.44)
		Hong Kong:	1(0.48)
		Algeria:	1(0.48)
		Saudi Arabia:	3(1.44)
		India:	2(0.9)
		Malaysia:	1(0.48)
		Dubai	1(0.48)
Srilanka:		1(0.48)	
Bangladesh	1(0.48)		
Gender:	Male:	96(46.4)	
	Female:	121(58.4)	
Age in Years:	<20	2(1.0)	(2.48±0.78)
	20-30	144(66.3)	
	31-40	44(21.3)	
	41-50	23(11.1)	
	>50	4(1.9)	
Profession/ Health care work category:	Doctor/house officer/resident:	137(63.1)	
	General physician/surgeon/consultant:	33(15.9)	
	Pathologist/virologist/laboratory director/:	5(2.4)	
	Nurse:	12(5.8)	
	Paramedic:	11(5.3)	
	Laboratory personnel/technologist:	6(2.9)	
	Medical student:	5(2.4)	
	Other:	8(3.9)	
Workplace:	Government hospital/public sector hospital:	155(71.4)	
	Private hospital/tertiary care unit:	30(14.5)	
	University hospital/laboratory:	10(4.8)	
	Private hospital (small scale)	7(3.4)	
	Temporary build isolation centre/field hospital:	4(1.9)	
	Private clinic:	7(3.4)	
	Paediatric unit:	3(1.4)	
	Diagnostic lab:	1(0.5)	
Professional experience in years:	<1	47(22.7)	
	1-5	100(46.0)	
	>5	70(33.8)	

**Table 1: Distribution of socio-demographic data and workplace information: (continued)**

Approximate number of suspected coronavirus infected cases brought to your setup on daily basis:	>100	6(2.9)
	76-100	3(1.4)
	51-75	5(2.4)
	26-50	17(8.2)
	1-25	186(85.7)
Facility of ventilator at hospital:		142(65.4)
Number of patients currently on a ventilator due to coronavirus infection at your workplace?	>10	10(4.8)
	6-10	7(3.4)
	1-5	24(11.6)
	None	126(58.0)
	Not applicable	50(24.2)

**Figure 1: Basic personal protective equipment supplied to the participants by department or hospital N (%)**

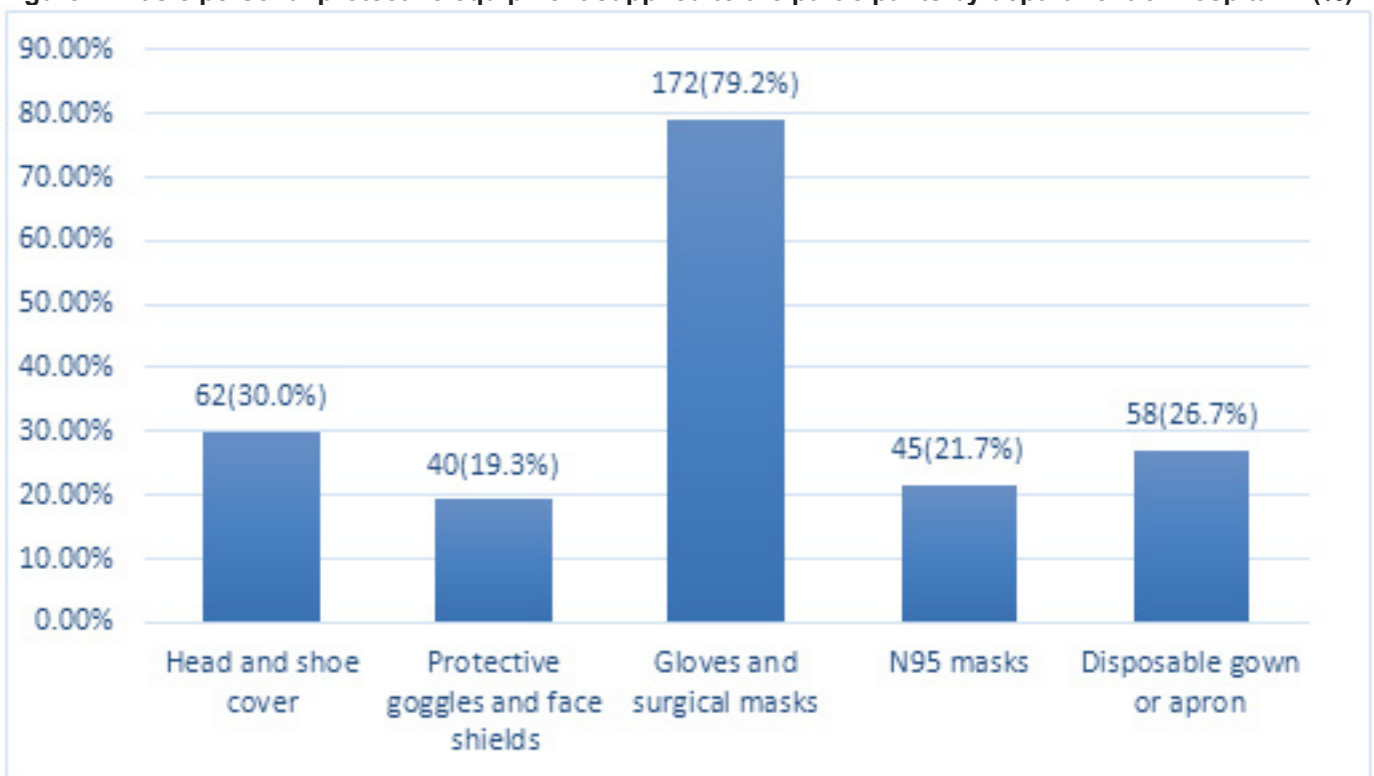


Table 2 Knowledge of participants related to COVID-19:

Variables:		N (%)
All suspected cases can be placed together in the same ward when single well-ventilated rooms are not available	Strongly agree	4(1.9)
	Agree	51(24.6)
	Disagree	162(74.6)
Wearing a surgical mask is not mandatory in community settings if one does not have respiratory symptoms	Strongly agree	13(6.3)
	Agree	51(24.6)
	Disagree	153(70.5)
Screening of airline passengers on exit from an affected area and upon arrival can miss 50% cases of COVID-19	Strongly agree	68(32.9)
	Agree	128(58.9)
	Disagree	20(9.7)
Main reservoir of COVID-19 causing virus	Camels	7(3.4)
	Bats	167(76.9)
	Sheep	2(1.0)
	All of them	25(12.1)
	None of them	16(7.7)
Incubation period of SARS CoV-2	1-5 days	6(2.9)
	1-14 days	130(59.9)
	2-21 days	79(38.2)
Mode of transmission of SARS CoV-2	Aerosol droplets	16(7.7)
	Person to person contact	9(4.3)
	Air borne transmission	8(3.9)
	Both aerosol and person to person transmission	83(38.2)
	All of them	101(48.79)
Infection by coronavirus provide lifelong immunity	Yes	39(18.8)
	No	65(31.4)
	Don't know	113(52.0)
Source of knowledge about novel COVID-19	Internet, colleagues, social media	13(6.3)
	Internet websites	49(23.7)
	Colleagues/co-workers	6(2.9)
	Medical journal	27(13.0)
	Textbooks	1(0.5)
	News media	7(3.4)
	Social media	17(8.2)
	Laboratory literature	2(1.0)
All of them	95(43.7)	
Common symptoms of COVID-19	Fever, cough, dyspnoea, myalgia	108(49.7)
	Fever, cough, dyspnoea, sore throat	95(45.9)
	Fever, cough, dyspnoea, sputum production	14(6.8)

The history of contact received from confirmed COVID-19 patients by our respondents showed traveling history in 128 (58.9%), followed by gatherings, handshake and close person to person contact. PCR was reported as the most common test used for diagnosis of COVID-19 by 146 (67.2%) participants whereas about one quarter 53(25.6%) of the respondents reported referring patients to other hospitals due to unavailability of testing kits (Table 3).



Table 3: Experience of health care providers related to patient exposure and protective equipment

Variables:		n (%)
Factors that might impede willingness to work during COVID-19 pandemic	Prioritizing wellbeing of family members	35(16.9)
	Inadequate provision of personal protective equipment	88(40.5)
	Insufficient training in infection control management	12(5.8)
	Fear of contacting virus and infection	11(5.3)
	All of the above	61(29.5)
	None of them	10(4.8)
Department/hospital well prepared to diagnose/treat patients	Yes	69(33.3)
	No	131(60.3)
	Not applicable	17(8.2)
I understand the risk of pandemic novel COVID-19 for patients and healthcare workers.	Strongly agree	155(71.4)
	Agree	60(29.0)
	Disagree	2(1.0)
I know how to protect myself and my patients during a novel COVID-19 pandemic	Strongly agree	67(32.4)
	Agree	126(58.0)
	Disagree	24(11.6)
I am well prepared/trained in handling novel COVID-19 cases.	Strongly agree	22(10.6)
	Agree	87(42.0)
	Disagree	108(49.7)
Use soap and water for hand washing before/after patient/sample contact	Always	140(64.5)
	Sometimes	18(8.7)
	Very often	59(28.5)
Contact patients/samples without a surgical mask or N95 mask		78(35.9)
I contact patients without surgical/N95 mask due to unavailability of equipment		78(35.9)
Preventive precautions can be taken until the patient is asymptomatic	Standard precautions	73(35.3)
	Air borne precautions	8(3.9)
	Contact and droplet precautions	136(62.6)
Monitor body temperature daily		127(58.5)
Infection control measures are taken in different clinic/hospital/laboratory	Visitors restriction	46(22.2)
	Closure of OPDs	32(15.5)
	Instituted fever triage ward	9(4.3)
	Novel COVID-19 screening	15(7.2)
	All of them	99(45.6)
	None of them	16(7.7)
Number of confirmed Covid-19 cases reported in your hospital/department	1-10	88(40.5)
	11-20	15(7.2)
	21-30	10(4.8)
	31-40	2(1.0)
	41-50	5(2.4)
	50-100	2(0.9)
	>100	5(2.4)
	No idea	30(14.5)
	None	58(28.0)
	Not allowed to tell	1(0.5)
	Referring suspected cases to relevant centres	1(0.5)

**Table 3: Experience of health care providers related to patient exposure and protective equipment (continued):**

Test/samples used for detection of novel COVID-19	PCR	146(67.2)
	ELISA	7(3.4)
	CBC, blood culture	2(1.0)
	On the basis of history	7(3.4)
	Referring the patients because test kits are not available	53(25.6)
	Not applicable	2(1.0)
No of colleagues infected with coronavirus in the line of duty	1-5	36(17.4)
	6-10	6(2.9)
	>10	7(3.4)
	None	74(35.7)
	Not sure	89(41.0)
	Not applicable	5(2.4)
Most common contact history given by patients	Gathering, hand shake, person to person contact	39(18.8)
	Complain of fever and cough	20(9.7)
	Traveling	128(58.9)
	Not applicable	30(14.5)

## Discussion

Nearly every country across the globe has been reporting cases and deaths due to SARS CoV-2, [15] management of which has now become a great challenge for health care workers. In order to manage the COVID-19 pandemic effectively, health care workers should have adequate knowledge and relevant clinical skills along with adequate provision of personal protective equipment as they are at a higher risk of acquiring the infection.

The majority of the participants in our study reported 1-25 as the suspected number of cases brought to their setup on a daily basis however, confirmed COVID-19 cases reported by different hospital/departments was/were mostly 1-10. It indicates fear of acquiring infection among general public due to which people are visiting hospitals/laboratories unnecessarily to get themselves tested for COVID-19. Proper public service messages should be conveyed to masses regarding signs and symptoms of the disease and self-isolation in order to avoid unnecessary visits to the hospitals which may increase their chances of acquiring infection. Some 32(15.5%) health care units therefore, closed regular OPDs and many 46(22.2%) imposed visitor's restriction.

In the current study, we found that 36% hospitals/departments did not have facility of ventilators which is a worrisome situation as approximately 42% of the cases infected with SARS-CoV-2 develop acute respiratory distress syndrome [16] and according to World Health Organization, one in every six COVID-19 patients develop dyspnoea [17]. Ventilators help these patients to breathe and give more time to fight against virus. Unfortunately, prognosis is not good in such cases.

PCR was reported as the most common test used for detection of COVID-19 by the majority of the participants however CT chest has proved to be more sensitive [9]. Referring suspected cases to more advanced hospitals or centres because of unavailability of testing kits was noted in one quarter of 53(25.6%) the participants. It shows that there were still some hospitals/departments which were not well prepared for the diagnosis of disease. Furthermore, referring the suspected COVID cases may have been a cause of further spread of the disease because there must have been some among those referred individuals who might not go to that relevant centre and take necessary precautions till their condition starts deteriorating.

Our study showed that the majority of the health care workers were not well aware of the World Health Organization guidelines for isolation and wearing surgical masks. All suspected cases of COVID-19 can be placed in the same ward when a single well ventilated room is not available [18]. Moreover, wearing surgical mask is not mandatory in community settings if one does not have respiratory tract infection symptoms [19]. Approximately half of the participants agreed that they were not well prepared/trained in handling COVID-19 cases and insufficient training in infection control management might impede their willingness to serve during the COVID-19 pandemic. Earlier, the world has faced different pandemics including plague, influenza, Spanish flu, Asian flu, Ebola virus disease etc. which caused the death of many health care workers also, due to insufficient knowledge about proper use of personal protective equipment and other infection control strategies including environmental and administrative strategies [20]. We should learn from our past experiences and devise a proper system in which health care workers from different departments be given opportunity to perform in infection control management

programs which will not only enhance their clinical skills but will also boost their confidence to perform in case of any upcoming pandemics in future.

Many participants faced unavailability of personal protective equipment during duty hours. Since SARS CoV-2 spreads through close person to person contact [3] and aerosol droplets, [21] wearing mask is necessary for safety of health care workers as they are in close contact with infected patients but unfortunately N95 masks were available to only some 45(21.7%), whereas surgical masks and gloves were provided to most 172(79.2%) of the respondents. Health care workers during this pandemic are acting as frontline warriors and are trying to protect the entire world from this virus. Unavailability of personal protective equipment is increasing their risk of contracting the virus which will cause deteriorating effects not only to their health but also to their colleagues as well as to their patients which will ultimately make the situation more disastrous.

According to the World Health Organization, diagnosis of COVID-19 should be suspected in any individual presenting with fever, cough, dyspnoea, myalgia, either having history of travel or close contact with confirmed or suspected cases of COVID-19 in previous 14 days [22]. Participants in our study also reported traveling 128(58.9%) as most common history given by laboratory confirmed COVID-19 patients.

#### Limitations of study:

The limitation of this study was the small sample size and less number of responses from health care providers serving especially outside Pakistan. Moreover, we were not able to conduct face to face interview.

## Conclusion

Our study concluded lack of knowledge about newly emerged COVID-19 pandemic among health care workers. Shortage of ventilators testing kits and personal protective equipment was reported in many hospitals/ departments. Lack of personal protective equipment and insufficient training in infection control management may act as barriers in delivering health care facilities during COVID-19.

#### Acknowledgements:

We are thankful to Jinnah Sindh Medical University, Karachi for facilitating the research project.

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