



Safety and Awareness of Healthcare Workers During the COVID-19 Outbreak; A Cross-Sectional Study

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Authors' contributions

This work was carried out in collaboration among all authors. Author SM presented study design and concept. Authors RT and MSK did the literature search. Authors YQ and GK did the drafting. Authors AA did data analysis. Authors NK and JJ designed the questionnaire. Author JA did the data collection. Author RS did the data interpretation. All authors read and approved the final manuscript.

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ABSTRACT

Objective: COVID-19 has affected millions of people throughout the world and due to the high rate of its spread, it is very vital to protect the people who are at the frontlines of COVID-19 positive cases. In this study, we have analyzed the level of awareness among the Healthcare Workers (HCWs) and level of preparedness by the Healthcare Authorities (HCA) for the safety of HCWs.

Study Design: Cross-sectional prospective study.

Subjects and Methods: Study was conducted online, for 3 months, from July to September 2020, at various Health Care Facilities (HCF) of Sindh, Pakistan. The survey instrument was circulated among the HCWs and a total of 419 filled forms were received and analyzed using SPSS 24.

Results: Out of 419 participants, 54.4% were male and 45.6% female. Half of the respondents were doctors (50.1%) with majority having 1-5 years (61.6%) of experience. It was found that the major sources of information of HCWs about COVID-19 was social media (80.4%) and only 18.6% of HCWs had trainings to deal with pandemics. HCA couldn't manage to maintain adequate supply of personal protective equipment (PPE) as goggle/eye shields were available only to 20.5% HCWs, shoe covers to 24.3%, N95 masks to 28.5%.

Conclusion: We identified serious concern in the source of information but despite that the knowledge and awareness level was quite acceptable among our study respondents. However, greater efforts to be taken for training campaigns for HCWs as well as supply of PPE.

Keywords: COVID-19; pandemic; awareness; safety; healthcare workers.

1. INTRODUCTION

The novel Coronavirus Disease 2019 (COVID-19) may be new to many people but it has its footprints since 2002. The first of similar type of virus known as the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) emerged in 2002 in Guangdong province of southern China. The cases then appeared in Hong Kong after the travel of a physician who incubated the SARS-CoV in laboratory [1]. The SARS-CoV then spread to about 26 countries of the world and affected about 8,000 people and was contained [2]. Second similar type of outbreak named as Middle East Respiratory Syndrome Coronavirus (MERS-CoV) emerged in 2012 in Saudi Arabia. It was given this name because of the region in which it primarily appeared [3]. It affected 1,368 people in 26 countries but was contained as well [4].

The current pneumonia due to novel coronavirus is known as Severe Acute Respiratory Syndrome Coronavirus 2019 (SARS-COV-2) and its spread started from the Wuhan city of Hubei province of China in November or December 2019 [5]. Till January 2020 its spread increased to many countries and World Health Organization (WHO) on January 30, 2020 officially announced the outbreak a Public Health Emergency of International Concern (PHEIC) [6] while on

February 12, 2020 WHO named the disease caused by the novel coronavirus as Coronavirus Disease 2019 (COVID-19) [7]. Currently, COVID-19 has become a pandemic and has infected more than two million people and killed more than hundreds of thousands and this number is still increasing. However, started from China most of the confirmed cases and deaths have been reported from United States of America and the number is still rising [8].

The Healthcare Workers (HCWs) play a pivoting role in the containing epidemics, but sometimes the safety of HCWs is compromised. The safety of HCWs is very important as they are in direct contact with patients and WHO recommends the use of surgical masks, gowns, gloves, and for eye protection, goggles or face shields. WHO has recommended the N95 masks for the HCWs, who are involved in the aerosol generating procedures on the COVID-19 patients [9].

During the current coronavirus outbreak hundreds of deaths of HCWs have been reported throughout the world [10]. Dr. Marcello Natali (Regional Head of General Practitioners) who died of COVID-19 had frequently warned of unavailability of medical supplies for fighting COVID-19. Dr. Natali said that, in health care facilities (HCF) of Italy, the mask which should be used for half a day, lasted for a week. Fifty

HCWs were reported to be dead due to COVID-19 in Italy till March 2020 [11].

Pakistan being the neighbor of first COVID-19 hit country- the China, has been expecting a huge outbreak. In the initial days the pandemic was only restricted in the major cities, but the cases have spread to rural areas as well. Till the 13th of November 2020, 352,296 cases have been confirmed. The healthcare services are not well developed in Pakistan, which is facing tough financial crisis since long. It will be quite a challenging task for Pakistan to equip HCWs and HCF and to contain the pandemic [8,12].

The awareness regarding epidemics and pandemics are as important as the safety of HCWs. It is thought that the knowledge regarding outbreaks is very less among the HCWs and government have made very few arrangements for the safety of health care workers. In many news reports the HCWs have refused to handle COVID-19 patients due to unavailability of safety gadgets. Here we will identify the level of knowledge and awareness regarding COVID-19 and grey areas in the safety of HCWs.

2. SUBJECTS AND METHODS

A cross-sectional prospective study was conducted among the HCWs (doctors, nurses, pharmacists, physiotherapists, paramedical staff, non-medical professionals) working in different HCF of Sindh Pakistan. Managerial staff was excluded from study. The survey was conducted online, for a period of 3 months, from July to September 2020. The survey questionnaire was adapted from the research study conducted by Akshaya Srikanth Bhagavathula and associates in 2020 [13].

The questionnaire was in English language and contained 17 close-ended questions and took about 10 minutes to complete. The questionnaire was divided into three parts, including participants personal information (seven questions), awareness regarding COVID-19 (five questions) and safety of HCWs against COVID-19 (five questions).

The survey questionnaire was initially distributed to twenty HCWs randomly to check the reliability, clarity, readability, relevance and acceptability. Based on suggestions from initial respondents'

minor changes were made to facilitate better comprehension and understanding. The survey questionnaire was finally distributed to study population.

A total of 449 HCWs responded during the study period, of them only 419 had completely filled the form and only those were taken for final analysis. Throughout the survey, confidentiality of the participants was assured, and the participants were asked to give honest replies. The participation in the study was on volunteer basis and no compensation was paid.

The data obtained was coded and analyzed on SPSS (version. 24, SPSS Inc. Chicago). Descriptive statistics was applied to calculate the frequencies and proportions. Chi-square test was used to determine the relationship between different variables.

3. RESULTS

3.1 Sociodemographic Characteristics

The sociodemographic characteristics of 419 of HCWs are mentioned in Table 1. Participants who attempted all the questions of the form, of them 228 (54.4%) were male and 191 (45.6%) females. Furthermore, most of the participants had bachelors degree (n=220, 52.5%) and were doctors by profession (n=210, 50.1%). From total respondents, 208 (49.6%) were working in government tertiary care hospitals and most of them were from Shaheed Benazirabad 146 (34.8%). More than half of the respondent stated that they had worked 1-5 years (n=258, 61.6%). Furthermore, 42 (10%) of HCWs were working in COVID-19 isolation wards on regular basis and 48 (11.5%) were sometimes working in isolation wards.

3.2 Knowledge about COVID-19

When HCWs were asked about their sources of information about COVID-19, 80.4% (n=337) responded social media and 53.7% (n=225) news channels as main sources of getting important information. Around 35.3% (n=148) participants had discussed with their friends and colleagues whereas only a few had acquired information through research articles (n=11, 2.6%), WHO website (n=2, 0.5%) or official meetings (n=2, 0.5%) as mentioned in Table 2.

Table 1. Sociodemographic characteristics of HCWs during outbreak of COVID-19

Characteristics		No. (and %)
Sex	Male	228 (54.4)
	Female	191 (45.6)
Education	Bachelors	220 (52.5)
	Masters/ Specialization	159 (37.9)
	Intermediate	17 (4.1)
	Diploma	13 (3.1)
	Ph.D.	10 (2.4)
Profession	Doctor	210 (50.1)
	Pharmacist	124 (29.6)
	Nurse	35 (8.4)
	Paramedical staff	24 (5.7)
	Non-medical professional	15 (3.6)
	Physiotherapist	11 (2.6)
Type of HCF	Tertiary Care Hospital (Government)	208 (49.6)
	Tertiary Care Hospital (Private)	137 (32.7)
	District Head Quarter Hospital	33 (7.9)
	Taluka Hospital	41 (9.8)
Division of Working	Banbhore	17 (4.0)
	Hyderabad	73 (17.5)
	Karachi	133 (31.8)
	Larkana	21 (5.0)
	Mirpurkhas	12 (2.9)
	Sukkur	17 (4.0)
	Shaheed Benazirabad	146 (34.8)
Professional Experience (Years)	1-5	258 (61.6)
	6-10	64 (15.3)
	>20	44 (10.5)
	11-15	37 (8.8)
	16-20	16 (3.8)
Working in COVID-19 isolation ward	No	329 (78.5)
	Sometimes	48 (11.5)
	Yes	42 (10.0)

As shown in Table 2, variable analysis revealed HCW's perceived information associated with awareness regarding COVID-19. We identified that 80.6% (n=363) of respondents think that the first animal source of COVID-19 were bats but 7.4% (n=31) and 4.3% (n=18) thinks that it was rodents and civet cats respectively. But when we analyzed professional breakdown regarding animal source, it was found out that 8.3% (n=2) paramedical staff thinks that it was rodents whereas 17.1% (n=6) nurses think that it was civet cats. We also observed that there is significant gap of information between physiotherapist and other

HCW ($p = 0.022$). Furthermore, majority of them think that hand hygiene (n= 359, 85.7%), face masking (n=317, 75.7%) and social distancing (n=403, 96.2%) are important measures to stop spread of infection. Almost all the HCWs think that two main symptoms of this infection are fever (n=392, 93.2%) and shortness of breath (n= 401, 95.7%) whereas majority also thinks that its sore throat (n= 349, 83.3%), as they had option of selecting multiply symptoms in online survey form. The other symptoms which HCWs selected are mentioned in Table 2 along with their percentages.

Table 2. Awareness regarding COVID-19 among HCW

Variables		No. (and %)
Source of information	Lectures	130 (31.0)
	Social media	337 (80.4)
	News channels	225 (53.7)
	Newspapers	106 (25.3)
	Friends/ colleagues	148 (35.3)
	Research articles	11 (2.6)
	WHO website	2 (0.5)
	Official meetings	2 (0.5)
Animal source of Coronavirus 2	Bats	363 (86.6)
	Rodents	31 (7.4)
	Civet cats	18 (4.3)
	Camels	7 (1.7)
Mode of transmission	Animal to Human	141 (33.7)
	Human to Human	406 (96.9)
	Nonliving objects to Human	159 (37.9)
Safety measures to stop spread	Hand hygiene	359 (85.7)
	Face masking	317 (75.7)
	Social distancing	403 (96.2)
Symptoms of COVID-19	Fever	392 (93.6)
	Sore throat	349 (83.3)
	Shortness of breath	401 (95.7)
	Myalgia	170 (40.6)
	Diarrhea	147 (35.1)
	Headache	231 (55.1)
	Malaise	111 (26.5)
	Shivering	115 (27.4)
	Acute Kidney Disease	1 (0.2)
	Encephalopathy	1 (0.2)
Multi-organ Damage	1 (0.2)	

Table 3. Precautionary measures regarding safety of HCW against COVID-19

Variables		No. (and %)
Training regarding epidemic/ pandemic	No	310 (74.0)
	Yes	78 (18.6)
	Maybe	31 (7.4)
Types of PPE Provided by HCA	Surgical masks	365 (87.1)
	N95 masks	121 (28.9)
	Gowns	158 (37.7)
	Goggles/Eye shields	86 (20.5)
	Gloves	294 (70.2)
	Shoe covers	102 (24.3)
Thermometer gun in HCF	No	215 (51.3)
	Yes	173 (41.3)
	Maybe	31 (7.4)
Hand Sanitizer in HCF	Yes	339 (80.9)
	No	69 (16.5)
	Maybe	11 (2.6)
Spray of disinfecting solution in HCF	No	197 (47.0)
	Yes	173 (41.3)
	Maybe	49 (11.7)

3.3 Safety of HCWs against COVID-19

This section demonstrates the safety measures taken by authorities for HCWs at this time of pandemic conditions and these variables are mentioned in Table 3 along with their frequency and percentage. The first query was regarding conduction of trainings of HCWs to deal with epidemics or pandemics and only 18.6% (n=78) replied 'yes'. Collected data also indicate that PPE available for the safety of HCW was not enough. Surgical mask was available with 87.1% (n=365) and 70.2% (n=294) had hand gloves. Approximately 28.9% (n=121) had N95 mask and gowns 37.7 (n=158) and almost all these PPE were provided by healthcare authorities (HCA). Only 41.3% (173) recognized that thermometer gun was provided in HCF while 80.9% (n=339) HCW endorsed that the hand sanitizers were available in their facility. Furthermore, only 41.3% (n=173) believed disinfection sprays were carried out in their HCF.

4. DISCUSSION

COVID-19 is current topic of discussion globally as people are getting affected by it on huge scale throughout the world. Due to high frequency of its transmission, it is very critical to protect the people who are at fore front to COVID-19 positive cases. At this time, when COVID-19 was declared a Public Health Emergency of International Concern, it is very crucial for HCA and health officials to manage evidence-based and accurate information for HCWs. So, it is very important to investigate about the perceptions of HCWs regarding safety and awareness during this public crisis condition. As HCW are at extremely high risk of exposure and getting infected [13].

While evaluating varied categories regarding awareness, knowledge and safety precautions, the major concern highlighted in our study was that the prime source of information was social media. As there is vast variety of information available including malicious and misinformation and majority of this information is not confirmed by official authorities. The Director General of WHO Tedros Adhanom stated at the Munich security conference on 15 February 2020 that "We're not just fighting an epidemic; we're fighting an infodemic". To control that WHO have assigned a communication team to be in touch with various social media platform like Twitter, Facebook, TikTok, Tencent, Pinterest and others so that they can present evidence-based answers to any spreading rumors or questions

[14]. There are positive implications even if small number of HCW follow official website as primary source of information and it is a key factor for transparent information about the emerging COVID-19 infection which is highly essential for HCWs' response and preparedness [13].

It was observed that, though the source of information was not right. The majority of HCWs had correct knowledge about animal source, transmission, symptoms of COVID-19. They also had good knowledge about safety precautions, ensuring better care to patients. However, it was found that the HCA failed to impart enough trainings and provide PPE to majority of HCWs. There was also decreased availability of thermometer guns, hand sanitizers and disinfecting sprays in HCF.

Our study also suggests that even though source of information was not authentic but positive impacts of knowledge and safety precautions were provided by HCWs to stop the transmission. The initial clinical data confirmed that 27 out of 41 COVID-19 positive patients had been to Wuhan seafood market, which was thought to be initial site of infection from animal source [15]. Similarly, an editorial article of International Journal of Infectious Diseases also confirms that outbreak had epidemiological link to Huanan Seafood Wholesale market, where there was also sale of live animals [16]. However, correspondence published online in Lancet stated that for transmission, exposure to an animal source is not required, indicating only human-to human transmission [17], which indicate that the initial transmission may be by animal source. These questions still needed to be proved and at present there is limited clinical information available and data is missing regarding animal source of virus and its transmission [16]. In our study 33.7% (n=141) HCWs also perceive that there is animal to human transmission and 96.9% (n=406) believe that there is human to human transmission, which is consistent with above mentioned studies.

Many studies highlighted the importance of training of staff to fight against any infectious outbreak. HCWs can protect themselves and provide better patient care with effective training as it may increase their knowledge and clinical skills applicable, which is extremely beneficial for handling major health care emergency [18,19]. But unfortunately, only 18.6% (n=78) participants of this study got training regarding pandemic

conditions, which is not consistent with the study done on MERS-CoV at three tertiary hospitals in Saudi Arabia from October-December, 2014 in which 78.8% HCWs were provided trainings to increase their knowledge and skills to make them feel prepared and maintain staff morale during an outbreak [20].

The clinical symptoms of COVID-19 are not specific. The patient may commonly have symptoms of fever, cough, fatigue, or myalgia. At the start of the infection patient may present with diarrhea and nausea few days before fever. While in some cases headache and hemoptysis may also be present, however some patients may be asymptomatic [21]. It has been observed that older patients with comorbidities have more respiratory failure and progression to rapid organ dysfunction (shock, acute cardiac injury, acute respiratory distress syndrome (ARDS), acute kidney injury) [22]. This is consistent with the responses of participants of our study, indicating different symptoms for COVID-19.

WHO had clearly mentioned in their interim guidance for rational use of PPE on 27th February 2020 that the most effective preventive and protective measures include frequent hand hygiene, avoiding touching face, practicing respiratory hygiene by coughing or sneezing into a bent elbow or tissue, wearing a medical mask if you have respiratory symptoms and maintaining social distance (a minimum of 1 m) [9] but it was observed in our study that some HCWs didn't know about hand hygiene (n=60, 14.3%), face masking (n= 102, 24.3%) and social distancing (n=16, 3.8%).

PPE is of extreme importance especially in these times of pandemic to protect and control the spread, and it is the responsibility of administration to ensure adequate supply of PPE [23,24]. WHO also mentioned that the current global PPE stockpile is insufficient, particularly for medical masks and respirators, gowns and goggles. Furthermore, stockpiling and panic buying will result in further shortages of PPE globally [9]. This was also observed in our study that only 28.9% (n=121) HCW had N95 masks, 37.7% (n=158) had gowns, goggle/eye shields were available only to 20.5% (n=86), and shoe covers only to 24.3% (n=102). However surgical masks and gloves were available to 87.1% (n=365) and 70.2% (n=294) respectively. More shockingly these essential supplies were not even enough for those who were working in isolation units, those who should have 100%

availability of all PPE. More than half of the HCW assigned duties in isolation units were not having N95 masks, shoe covers, and goggles/eye shields. WHO highly recommend hand hygiene by using soaps and sanitizers to control the spread of the disease [25] but 16.5% (n=69) respondents were not provided hand sanitizers by HCF.

This study was conducted during the first wave of COVID-19 outbreak in Pakistan. At that time the disease knowledge was limited, and information was rapidly evolving. As the disease advances, new policies are developed and implemented. Our findings can assist the HCA to understand the needs of HCWs during a disease pandemic.

5. CONCLUSION

We identified serious concern in the source of information but despite that, the knowledge and awareness level were quite acceptable among our study respondents. During this pandemic condition, it is very important that greater efforts to be taken for training campaigns for HCWs as well as wider population for better control of this outbreak.

CONSENT

Online consent was taken from each participant prior to the filling of questionnaire.

ETHICAL APPROVAL

Ethical approval was taken from Ethical Committee of Peoples Medical College Hospital Nawabshah (SBA), through letter EC/No. 431.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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