ORIGINAL ARTICLE

ACCEPTANCE AND TOLERABILITY OF COVID-19 VACCINE IN HEALTHCARE WORKERS AT A GOVERNMENT INSTITUTE IN KARACHI PAKISTAN

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ABSTRACT

Objective: The objective of this study is to assess the acceptance and tolerability of the government sponsored COVID vaccine among health care workers (HCWs) in a public sector hospital in Karachi in the province of Sindh.

Material and Methods: This is a cross sectional study. Questionnaire based online proforma designed on Google Forms in the English language. Shaheed Mohtarma Benazir Bhutto Institute of Trauma in Karachi, Pakistan over the 3 weeks' study duration. The online form link was sent via short messaging service (SMS) to mobile phone numbers of HCWs. The survey was voluntary, confidential and anonymous.

Result: A total of 283 HCW's submitted the online questionnaire. 184 (65%) expressed confidence in the vaccine, 99 (35%) had concerns regarding vaccination. 268 (94.7%) HCWs had received vaccination when surveyed. A significant number of HCWs who had been confident in the vaccine have recommended it to others (69% vs. 30%, p value <0.001). Concerns about vaccine related side effects were the most common apprehension (28.2%). Adverse effects were reported in 163 (60%) of which the most common were injection site pain in 58 (35.5%). HCWs that had fear of the vaccine were significantly more likely to experience adverse effects as compared to those who had confidence in the vaccine (p value 0.001).

Conclusion: Good vaccine acceptance in two-thirds of healthcare workers with the majority affirming that they will recommend it to others. No serious adverse events attributable to the vaccine were reported.

Keywords: COVID 19, Vaccine, Healthcare workers.

BACKGROUND

The SARS-CoV2 pandemic is a worldwide public health emergency.[1] The first confirmed case of COVID-19 in Pakistan was reported on 26th February 2020. As of May 15th 2021, there are over 800,000 cases and more than 18,000 deaths reported in the country.[2]

COVID-19 vaccines became available worldwide within one year of the pandemic and were approved for immediate roll out.[3,4] There are now more than 100 countries worldwide where emergency vaccination has started.[5] China donated the Sinopharm vaccine to Pakistan which is an inactivated vaccine, and vaccination commenced on February 3rd 2021 with healthcare workers the first to receive the vaccine.[6] The government guidelines stipulated that Sinopharm was not approved for pregnant and lactating women.[7]

Healthcare workers are frontline workers during the COVID-19 pandemic and serve as role models for the community regarding vaccine acceptance. Prior to the government's mass vaccination efforts in Pakistan, a positive response and high acceptance rate among HCWs was reported in a survey conducted in Rawalpindi and Islamabad.[8] However, once vaccination was launched, the response amongst healthcare workers was found to be sluggish, prompting a notice by the provincial government of Sindh mandating all government healthcare workers to either get vaccinated or face cancelation of a special COVID monthly allowance.[9]

Internationally as well, vaccine hesitancy has been demonstrated in HCWs.[10] Several countries conducted surveys to assess HCW willingness to receive the COVID 19 vaccine and hesitancy was reported from France, United Kingdom, United States and even China where the pandemic originated.[11-14]

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The aim of this study is to assess the acceptance and tolerability of the government sponsored COVID vaccine among health care workers in a public sector hospital in Karachi in the province of Sindh.

MATERIAL AND METHODS

This is a cross sectional study of healthcare workers at the Shaheed Mohtarma Benazir Bhutto Institute of Trauma in Karachi, Pakistan, which was designated by the government as a COVID center for management of patients with severe and critical disease in April 2020. Contact information of HCWs was obtained from the Human Resources department. Data was collected from 17th March till 6th April 2021.

The study design was a questionnaire based online proforma designed on Google Forms in the English language. This is the official working language of the institution. The online form link was sent via short messaging service (SMS) to mobile phone numbers of HCWs who fit the inclusion criteria. The survey was voluntary, confidential and anonymous, with the assurance that the name, mobile number or any other respondent identifier will be electronically hidden from view.

Inclusion criteria were healthcare workers above the age of 18 years that were employees at the Institute of Trauma and whose official work was conducted in the English language. HCWs were classified into two groups, based on their patient contact. One group was of those HCWs that provide direct patient care such as doctors, nurses, respiratory therapists, physiotherapists, OT technicians, radiographers. The second group was of those HCWs that have little or no direct patient contact and work as administrative staff, pharmacists, biotechnologists, clerical staff, as well as those that work in the departments of Human Resources, Accounts, Procurement, CSSD, IT, Engineering, and Fire and Safety. Those HCWs that do not read or write English proficiently were excluded on the basis of language, such as janitorial staff, security guards, ward assistants, cafeteria workers, laundry workers and car park attendants.

Minimum sample size of 354 participants was calculated based on a previous estimate of a study conducted in the USA with 95% of confidence level with 5% margin of error. Approval was taken from the Ethical Review Committee of Shaheed Mohtarma Benazir Bhutto Institute of Trauma Karachi, Pakistan (ERC# 000019). Consent form was not required as participation was entirely voluntary and healthcare workers could choose to simply disregard the survey.

The timing of the survey was chosen to coincide with the ongoing vaccination drive when many healthcare workers were receiving their first and second doses and was a period of concerns and queries as well as of any vaccine related adverse events.

The online Google form link was analyzed for simple frequencies. Further analysis was performed using SPSS version 24. For continuous variables such as age, the median with IQR was calculated. For categorical variables such as age groups, gender, occupation, and vaccination related questions, the frequency and percentage were reported. To analyze the relationship between HCWs and vaccine confidence, we applied Chi-square test or fisher's exact test for age group, gender, HCWs with and without patient contact and category of HCW. Probability value p-≤0.05 was taken as significant.

RESULTS

A total of 283 persons submitted the online questionnaire over the 3 weeks study duration. Of 283, 71 % were males. Median age [IQR] was 30 years [28-34]. The largest single group was of nurses with 89 (31.4%), whereas doctors comprised 47 (16.6%). Only 12.3% reported any co-morbidity. Of 283 HCWs, 184 (65%) expressed confidence in the vaccine but 99 (35%) had concerns and fears regarding vaccination**.** Overall, 268 (94.7%) HCWs had received vaccination when surveyed, and 171 (60%) reported that they would recommend the COVID-19 vaccine to others (Table-1**)**.

Table-2 shows the comparison between the 2 groups who expressed confidence in the vaccine with those that did not. Age was not statistically important. Males had higher acceptance of the COVID-19 vaccine (78% vs 21%, $p < 0.001$). Of all the categories of HCWs, OT technicians demonstrated the highest confidence in the COVID 19 vaccine (p value 0.03). Of 283, 202 (70%) HCWs reported direct patient contact and had the same level of confidence in the COVID-19 vaccine as those that did not have patient contact (73% vs 26%, $p = 0.053$). 66 (23%) out of 283 had contracted COVID prior to vaccination. However, there was no significant difference in vaccine acceptance between HCWs who had been infected with COVID-19 and those who had

not. Similarly, when comparing those HCWs that reported a patient, family member, relative or friend who had contracted COVID-19 or died from it with those HCWs that had not reported such, there was no significant difference in vaccine confidence. Of the 99 HCWs that had reported concerns and fears about the vaccine, out of them 93.9% received vaccination and 43.5% said they would recommend the vaccine to others. A significant number of HCWs who had been confident in the vaccine have recommended it to others (69% vs 30%, p value <0.001)

Concerns about vaccine related side effects was the most common apprehension (28.2%), followed by a lack of confidence in the Chinese vaccine (20.8 %) as shown in Figure-1. Of 268 HCWs that received vaccination, adverse effects were reported in 163 (60%) of which the most common were injection site pain in 58 (35.5%) and headache in 39 (23.9%) Figure -2. HCWs that had fear of the vaccine were significantly more likely to experience adverse effects as compared to those who had confidence in the vaccine (p value 0.001) Table-3.

Table 1: Characteristics of Healthcare Workers Surveyed Regarding COVID-19 Vaccination (n=283)

Variable	Frequency (%)
Age (years)	
Median [IQR]	30 (28-34)
≤ 30 years	151 (53.4%)
≥ 31 years	132 (46.6%)
Gender	
Male	201 (71.0%)
Occupation	
Nurse	89 (31.4%)
Doctor	47 (16.6%)
OT Technician	40 (14.1%)
Pharmacist	17 (6.0%)
*Others	90 (31.8%)
Comorbidity	
None	248 (87.6%)
Allergies	19 (6.7%)
Hypertension	6 (2.1%)
Hypothyroidism	4 (1.4%)
Diabetes	3 (1.1%)
Heart disease	2 (0.7%)
Kidney disease	1 (0.4%)
Health Care Workers in direct patient contact	
Yes	202 (71.3%)
No	81 (28.6%)
Did you have any fears about COVID-19 vaccination?	
Yes	99 (35.0%)
No	184 (65.0%)
Would you recommend the vaccine to others?	
Yes	171 (60.4%)
No	112 (39.6%)

*Others include staff in the departments of Administration, Human Resources, Accounts, Research, Radiology, Information Technology, CSSD, Biotechnology, Engineering, Fire and Safety and Clerical.

Table-2: Univariate Association of Variables with Fear of COVID-19 Vaccination Amongst Healthcare Workers

Variables	Total n=283	Fear of COVID-19 Vaccination		*p*-value
		No (n=184)	Yes (n=99)	
Age				
≤ 30years	151	94 (51.0%)	57 (57.5%)	0.179
>30years	132	90 (48.9%)	42 (42.4%)	
Gender				
Male	201	145 (78.8%)	56 (56.5%)	**<0.001**

Female	82	39 (21.1%)	43 (43.5%)	
Profession				
Others	90	56 (30.4%)	34 (34.3%)	0.501
Nurse	89	53 (28.8%)	36 (36.3%)	0.191
Doctors	47	32 (17.3%)	15 (15.1%)	0.629
OT Technicians	40	32 (17.3%)	8 (8.0%)	**0.032**
Pharmacist	17	11 (0.54%)	6 (6.0%)	0.978
HCW in contact with patients				
Yes	202	135 (73.3%)	67 (67.6%)	0.312
No	81	49 (26.6%)	32 (32.3%)	
Have you had COVID-19?				
Yes	66	39 (21.1%)	27 (27.2%)	0.249
No	217	145 (78.8%)	72 (72.7%)	
Did you ever have a patient, family member, relative or friend who had COVID-19?				
Yes	129	78 (42.3%)	51 (51.5%)	0.142
No	154	106 (57.6%)	48 (48.4%)	
Has any of your patient, family member, relative or friend died due to COVID-19?				
Yes	44	23 (12.5%)	21 (21.2%)	0.054
No	239	161 (87.5%)	78 (78.7%)	
Are you COVID-19 vaccinated?				
Yes	268	175 (95.1%)	93 (93.9%)	0.675
No	15	9 (4.8%)	6 (6.0%)	
Would you recommend the vaccine to others?				
Yes	171	128 (69.5%)	43 (43.4%)	**<0.001**
No	112	56 (30.4%)	56 (56.5%)	

Table-3. Adverse effect and covid vaccine fear amongst HCWs

Adverse effects due to vaccine	N=268	COVID vaccine fear		
		No	Yes	
Yes	163	92 (56.4%)	71 (43.5%)	**0.001**
No	105	83 (79.0%)	22 (20.9%)	

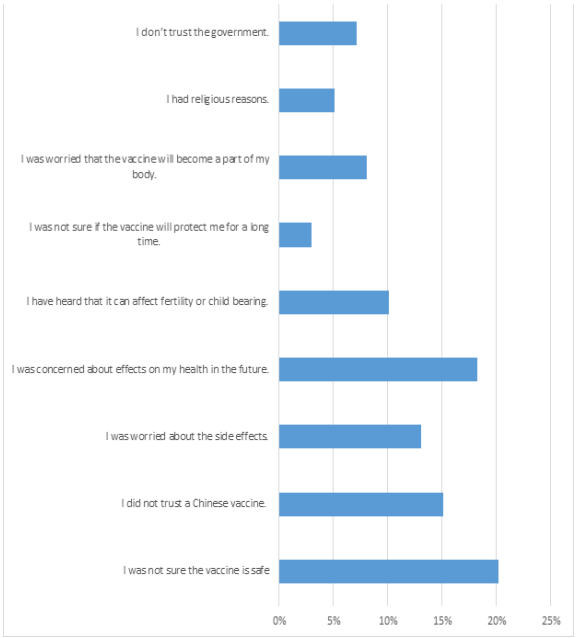

Figure-1: Fears and concerns expressed by healthcare workers regarding the COVID vaccine n=99.

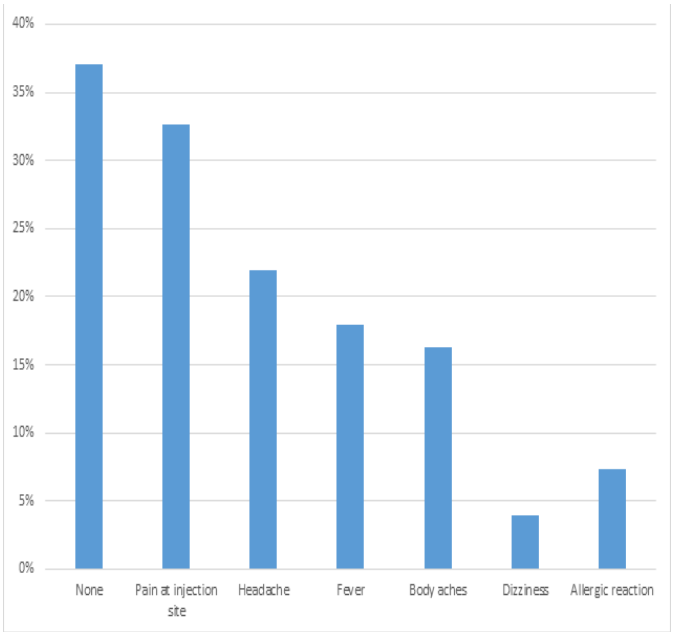

Figure-2: Post vaccination adverse effects in healthcare workers n=268.

DISCUSSION

This survey of healthcare workers reported that 60% expressed trust in the vaccine, which is almost identical to the survey done prior to the mass vaccination campaign in healthcare workers in Pakistan. Our results are also comparable to international surveys which found that physicians in Greece and France are between 60 and 90 percent willing to get vaccinated, while nurses in Hong Kong, China and France are similarly between 60 and 90 percent willing to get vaccinated.[8, 15-17]

Our study demonstrated that male HCWs are more accepting of vaccination similar to that of US healthcare workers.[18] Unlike Michelle *et al*, we found no substantial difference in vaccine acceptance between patient-facing HCWs and those who hadn't (14). In a French study, 79.6% of over 2000 healthcare workers reported that they would recommend COVID-19 vaccination to their patients whereas in our study two-thirds of HCWs said they would recommend the COVID-19 vaccine to others.

As per government policy, our public sector institute mandated vaccination for healthcare workers, with punitive action if there is failure to comply. Other countries have also found it necessary to adopt a similar strategy. Recently the Italian government made vaccination for healthcare workers compulsory or face suspension.[19] This raises ethical concerns. Public health ethics principles view mandatory vaccination policies in adults as a measure of last resort.[20] However, experience with influenza has shown that vaccine mandates have led to increased vaccination uptake in healthcare workers.[21] These studies have paved the way for mandatory COVID vaccination. On the one hand, compulsory vaccination of HCWs may seem to be justified in the midst of a crippling pandemic. Almost one quarter of the healthcare workers in our study reported having had COVID-19 and HCWs have been demonstrated to be the source of spread of COVID in healthcare settings.[22] There are inherent expectations of healthcare workers that they are obligated to keep their patients safe, have a duty to care for them, and to set an example to the public.[23]

On the other hand, a blanket mandatory COVID vaccination policy for HCWs, whether imposed by government or employer, may not be as readily acceptable to HCWs if they feel that their government or institution has failed to protect them due to lack of robust COVID related policies, adequate personal protective equipment (PPE), safe ventilation, and training in infection control as may occur in developing countries such as Pakistan. Furthermore, they may fear that their vaccinated status may require them to work with COVID-19 patients.[24]

It is notable that amongst HCWs surveyed who expressed fears and concerns regarding the COVID vaccine, the majority were vaccinated. Mandatory vaccination succeeded in achieving high rates of vaccination in our institution.

Safety of the vaccine was the topmost concern amongst healthcare workers. Recent reports of a blood clotting disorder with the Astra Zeneca vaccine has fueled distrust in the COVID vaccine.[25] We reported 60% of side effects of vaccine but none were serious. The most commonly reported side effect to the COVID-19 vaccine in our study included discomfort at the injection site. A limitation of our study is that we did not ask for specification of the severity or duration of pain at the injection site and whether it was more than can be expected of an intramuscular injection. Headache, fever, and myalgias were also reported. A small number reported an allergic reaction and once again our questionnaire did not capture the nature of the allergic reaction. None of our healthcare workers, however, are known to have suffered an anaphylactic or syncopal episode post-vaccination. Our findings are similar to those reported worldwide, with no serious adverse events.[26]

CONCLUSION

Our study demonstrated good vaccine acceptance in two-thirds of healthcare workers with the majority affirming that they will recommend it to others. No serious adverse events attributable to the vaccine were reported. High vaccination numbers were achieved at our institution due to strict implementation of the mandatory vaccination policy of the government. However, the government must reciprocate with proactive steps to raise awareness about the vaccine's significance and safety, as well as to tackle misinformation rampant on social media and dispel myths about the COVID-19 vaccine. Most importantly, the government must ensure a safe work environment for healthcare workers to further boost their confidence in government sponsored vaccination and to ensure their support during this and future pandemics.

AUTHOR CONTRIBUTION

Sadia Ishaque: Conception, the acquisition, analysis, interpretation of data and manuscript writing

Sunil Kumar Dodani: Conception, Analysis and interpretation of data

Humera Ismail: Data collection and analysis

Sana Amir Ali: Data collection and analysis

Shehla Baqi: Revised critically for important intellectual content

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