

Post effects associated with SARS-CoV-2 vaccination among health care workers in Pakistan

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ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic has witnessed the rapid development of vaccines produced simultaneously from various countries. However, these vaccines were shrouded by a set of myths ranging from serious effects to change of human deoxyribonucleic acid (DNA). Pakistan was one of the countries to start vaccination early and the front-line workers were first to be vaccinated. We undertook to study the vaccinated health care workers for the post effects of vaccines they received. The methodology adopted was through a structured questionnaire comprising 12 questions covering almost all the possible post effects. This was circulated among health care workers of Pak-Emirates Military hospital and Army Medical College/National University of Medical Sciences, Rawalpindi, Pakistan. Fever was the most frequently encountered post effect, followed closely by pain at site of injection, headache and fatigue. There was a strong association between age and post effects of vaccination. No life threatening or serious side effects were experienced by health care workers indicating that benefits of vaccine outweigh its adverse effects especially with emergence of new variants. No participant required hospitalization following immunization. Therefore, vaccination against severe acute respiratory syndrome corona virus (SARS-CoV-2) should be carried out on priority basis in order to avoid severe COVID-19 infection.

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1. INTRODUCTION

The end of year 2019 saw the emergence of novel severe acute respiratory syndrome corona virus (SARS-CoV-2) from Wuhan, China which spread rapidly leading to global pandemic as declared by WHO on March 11, 2020 [1]. With pandemic came a huge plethora of challenges for individuals and countries but especially for health care systems. The world saw health care systems collapsing in developed world but specifically for developing countries it was a nightmare [2]. SARS-CoV-2 killed more people in a short span than HIV did in a decade [3].

To overcome this crisis the development of the coronavirus disease 2019 (COVID-19) vaccine was carried out at an extremely rapid rate leading to rollout of vaccines in December, 2020 after approval from regulatory authorities, a mere nine months after the start of pandemic [4]. Vaccines normally take years for development if not decades and are granted approval after years of research and safety trials. Development of safe and efficacious covid vaccine was a landmark event for this pandemic crisis [5]. Rapid development of vaccine lead to fear and apprehension among general population regarding its side effects [6], [7].

The main aim of vaccine is to reduce serious side effects of SARS-CoV-2 i.e. to reduce infection rate, severity of disease, hospitalization and death [8], [9]. The SARS-CoV-2 vaccination started in Pakistan at the same time as globally with health care workers and priority groups being the first to be vaccinated. Healthcare workers (HCWs), though are backbone of the health systems are also the most vulnerable and exposed population because of frequent contact with patients [10]. HCWs experienced a wide range of symptomatology post vaccination, with most symptoms being non-life threatening. Therefore, the main objective of our study was to determine the post effects of COVID-19 vaccine among healthcare workers in Pakistan [11].

A wide range of post vaccination effects were experienced by health care workers ranging from fever, headache, pain at site of injection, anxiety but in spite of wide array of post effects the benefits of vaccine outweigh its post effects [12]. As the COVID-19 pandemic continues, with new variants emerging each day vaccine is the only effective intervention which can prevent infection therefore it is critical to improve the efficacy, availability and safety of available vaccine. Studies on large scale should be done on priority to study long and short-term side effects of these vaccines.

2. RESEARCH METHOD

We undertook to study the vaccinated healthcare workers for the post effects of vaccines. The methodology adopted was through a questionnaire comprising 12 questions related to demographic data and all possible side effects of vaccine which was circulated among the health care workers of the Pak-Emirates Military Hospital and Army Medical College/National University of Medical Sciences Rawalpindi, Pakistan from May 29 to June 29, 2021.

The study groups included doctors, paramedical staff, interns, consultants, residents of several specialties, and laboratory technicians. Informed consent was obtained and confidentiality of data was maintained at all times. The participants were allowed to withdraw from the study at any moment and no data were saved before the participant submitted their answers completely. Participants in this study were not supported financially or given any other incentives.

The questionnaire consisted of two parts first part was related to demographic variables including gender, age, weight, height, profession. Second part comprised vaccine related questions including post vaccination side effects i.e., pain at site of injection, swelling, itching, headache, muscle pain, fever, tiredness, diarrhea, nausea, vomiting, breathlessness, skin rash, fainting episode, anxiety and time and duration when the post effects were experienced i.e., after 1st dose or second dose and how long they lasted.

Inclusion criteria for his study were health care workers who had received COVID- 19 vaccination. Unvaccinated health care workers and those who have had active disease were excluded from the study. All statistical tests were executed using the Statistical Package for the Social Sciences (SPSS) version 27.0. One way ANOVA was applied and p-value was calculated. P-value less than 0.05 were taken as significant. For continuous variables mean and standard deviation were calculated and for categorical variables percentages were calculated.

3. RESULTS AND DISCUSSION

A total of 627 health care workers participated in this study. Out of which 372 (59.3%) were males and 255 (40.7%) were female. Among them 267 (42%) experienced post vaccination effects. Majority of study population consisted of medical interns 474 (75.6%) followed by consultants and residents 97 (15.5%) and 56 (8.9%) paramedical staff. Majority 188 (70.41%) experienced post effects after the first dose 54 (18.81%) experienced symptoms after second dose and remaining 24 (8.98%) after both doses. Maximum number of study population (92%) belonged to younger age group i.e. less than and equal to 35 years age bracket. The demographic data is represented by Table 1.

Table 1. Demographic data of healthcare workers in a tertiary care setting who had received COVID-19 vaccine

Variable	Outcome	Frequency	Percentage
Gender	Male	372	59.3
	Female	255	40.7
Age	≤35 years	580	92.5
	≥35 years	47	7.5
Profession	Medical intern	474	75.6
	Doctor	97	15.5
	Nurse	26	4.1
	Laboratory technicians	30	4.8

Around 95% of study population received Sinopharm vaccine followed by SinoVac 1.4%, Sputnik V 1.3% and Oxford-AstraZeneca 0.6%. A very small minority around 0.3% of population received Pfizer–BioNTech. Most common side effects experienced by participants was fever 127 (47.56%), followed by localized pain at injection site 126 (47.19%), headache 114 (42.69%), generalized fatigue 77 (28.8%), GIT symptoms 22 (8.23%), injection site swelling 18 (6.74%), anxiety 13 (4.86%), and skin rash 5 (1.87%). P-value was calculated and less than 0.05 was taken as significant. Post effects of SARS-CoV-2 on basis of age are shown in Table 2.

Table 2. Prevalence of the side effects of COVID-19 vaccine among healthcare workers

Variable	Outcome	≤35 years	≥35 years	Total (267)	Significance*
Post effects of SARS-CoV-2 vaccination	Fever	119	8	127 (47.56%)	0.003
	Injection site pain	125	1	126 (47.19%)	0.005
	Headache	109	5	114 (42.69%)	0.082
	Fatigue	76	1	77 (28.8%)	0.008
	Injection site swelling	10	8	18 (6.74%)	0.221
	Anxiety	10	3	13 (4.86%)	0.300
	Nausea	10	0	10 (3.74%)	0.265
	Diarrhea	6	1	7 (2.62%)	0.320
	Vomiting	5	0	5 (1.87%)	0.342
	Skin rash	4	1	5 (1.87%)	0.365
	Duration				
	<24 hours	177	13	190 (71.61%)	
Dose	24 to 72 hours	59	5	64 (23.97%)	
	>72 hours	17	0	17 (6.36%)	
	After first dose	174	14	188 (70.41%)	
	After second dose	52	2	54 (18.81%)	
	After both doses	23	1	24 (8.98%)	

*One Way ANOVA used with a significance of <0.05

Majority (70.41%) of study population experienced adverse effects after first dose and 18.81% after second dose and 8.98% after both doses. The time period at which symptoms first appeared and their duration varied. The 71.61% experienced symptoms within 24 hours of vaccine administration 23.97% between 24 to 72 hours and 6.36% experienced symptoms after 72 hours.

Towards the end of 2020, vaccination process started globally and in Pakistan. This country was one of the countries to start vaccination early. The government did an excellent and efficient job of not only procuring it but also linking it to national data base through short message service (SMS).

The Sinopharm vaccine was first to arrive in Pakistan prepared on the conventional virus attenuated technique, it was like elsewhere given to the front line health workers in first phase followed by other vaccines. Vaccination process started with HCWs being first to be vaccinated followed by priority groups Pakistan was one of the few countries that started its vaccination campaign promptly as a continuum for its early exceptional measures to control spread of COVID-19 pandemic [13]. Majority of our population received Sinopharm vaccine followed by Sinovac, Sputnik V, CanSino, Oxford-AstraZeneca and Pfizer-BioNTech vaccines.

In this study we studied the side effects experienced by health care workers who received COVID-19 vaccination. A wide range of post effects were experienced but fever and pain at site of injection was the main side effect reported by 47.6% and 47.1% of our study population respectively. Our results were comparable to a similar study conducted in Czech republic which showed pain at site of injection to be the most commonly reported effect [5]. Another study conducted in USA also showed similar results [11]. Similar results were shown by another study conducted in UAE [14]. A study done in Poland showed that 78% participants experienced soreness at site of injection which was comparable to our study [15]. In contrast to our study tiredness and fatigue was most common post effects demonstrated by a study conducted in Jordan [16]. This difference is most likely due to difference in study population. Our study population consisted of health care workers who are well aware of side effects associated with vaccination where as their study population consisted of general public.

In our study around 71.61% of participants experienced symptoms within 24 hours of immunization. Similar results were shown by a study done in India where 79% participants reported symptoms within the first 12 hours [17]. Vaccine's side effects experienced by our study population could be termed as either local or systemic reactions and the spectrum of severity ranged from mild to moderate [18]. All side effects experienced were of transient nature. No serious side effects were seen in our study population. All side effects were resolved by taking Non-steroidal anti-inflammatory drugs (NSAIDs). No participant required hospitalization [19]. Benefits of vaccination outweigh its side effects especially for health care workers as they are at most risk due to continuous exposure [20]. Similar mild effects were experienced by Nepalese health care workers [21]. In our study younger population i.e. less than 35 years exhibited more side effects as compared to other age groups. A study conducted in Germany on health care workers also showed comparable

results that younger age group were 1.22 times more prone to experience side effects [22]. In contrast Menni *et al.* in Britain showed that older population more than 56 years exhibited more side effects [22].

Compared to the non-pharmacological interventions vaccine did a very good job of controlling spread of SARS-CoV-2. The short lived side effects of COVID-19 vaccine are same as for all viral vaccines and resolve within two to three days as compared to risks which include significant morbidity and mortality [23]. With the emergence of different variants of SARS-CoV-2 especially delta variant termed as 'variant of concern' by World health organization and the havoc these different variants are causing globally and particularly in south East Asia, it is imperative to get vaccinated as early as possible [24], [25]. Therefore vaccination should be done on priority basis for all but especially for health care workers as they are exposed more and are at significant risk. Also contact with infected individual of any age increases the chance of acquiring COVID-19 infection so health care workers are at continuous risk due to patient interaction [26]. For now to overcome 4th wave of SARS-CoV-2 vaccination is the only weapon available to combat SARS-CoV-2 as no effective and specific treatment is available to treat this infection [27], [28].

The knowledge regarding post vaccination effects is still scarce among general population and efficacy of COVID-19 vaccines is debated in clinical trials. Thus to lower apprehension among general population regarding COVID-19 vaccine having knowledge about what to expect after vaccination will help. Majority of vaccines have shown efficacy and safety in clinical trials therefore health care workers should be vaccinated as early as possible for their own safety due to risky nature of their work [29], [30].

4. CONCLUSION

The research found that fever was the most frequently encountered post effect, followed closely by pain at site of injection, headache and fatigue. There was a strong association between age and post effects of vaccination. No life threatening or serious side effects were experienced by health care workers indicating that benefits of vaccine outweigh its adverse effects especially with emergence of new variants. No participant required hospitalization following immunization. Therefore, vaccination against SARS-CoV-2 should be carried out on priority basis in order to avoid severe COVID-19 infection.

Effective educational intervention and policy making should be done on large scale to remove the apprehensions of general population against COVID-19 vaccines. Vaccination process cannot succeed unless rate of vaccination uptake is a minimum of 70% to achieve herd immunity. General population should be educated that post effects of COVID-19 vaccine are very less as compared to debilitating effects of SARS-CoV-2. Further large studies should be done to study the efficacy and long-term side effects of vaccine.




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