



## **Prevalence of Adverse Reactions to Different COVID-19 Vaccinations among Karachi Residents**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. The study was thought by author HAM, who also wrote the protocol and the first draft of the manuscript, as well as the sampling and statistical analysis. The authors AF and AB were in charge of the literature searches and drafting of the manuscript. TM helped with the manuscript writing. Authors UZ and SK completed all of the final settings and facilitated with the statistical analysis. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Background:** Coronavirus disease 2019 (COVID-19) pandemic emerged in Karachi and rapidly spread throughout Pakistan since February 26, 2020.

**Objectives:** Vaccination is currently one of the most effective COVID-19 eradication approaches. The purpose of this study was to gather data on the adverse effects of the COVID-19 vaccine.

**Methodology:** It was an observational study that was carried out between the 11th and 23rd of April 2021, and the participants were Karachi residents. We looked at the proportion of self-

reported local and systemic adverse effects within seven days of immunization in people who filled out Google forms and received one or two doses of the vaccine.

**Results:** The vaccination ratio for male was slight higher than females. Participants aged between 51 to 60 years and 41 to 50 years had higher number of vaccinations. Sinopharm is by far the most widely used vaccine. After the first dose of vaccination, the majority of participants complained of fever, chills, muscle pain, and arm pain, whereas after the second dose, the majority of participants had no symptoms, with a few participants complaining of fever, chills, diarrhea, and muscle pain.

**Conclusion:** The first and second doses' post-vaccination adverse effects were mild and predictable, and there were no hospitalizations; this data can help lessen vaccine hesitancy.

**Keywords:** Covid-19; Covid-19 vaccination; vaccination adverse effects; COVAX; sinopharm; sinovac, astrazeneca; cansino, sputnik; pakvac.

## 1. INTRODUCTION

In February 2020, WHO named the new coronavirus as Coronavirus Disease 2019 (COVID-19). The COVID SARS-CoV-2, is an enveloped RNA virus, that first originated in Wuhan, China, and since then it has spread to over 213 countries and regions. On the 11th of March, 2020, the World Health Organization (WHO) declared COVID-19 a pandemic [1]. And, as of the 17th of April 2020, there have been 1,995,983 cases and 131,037 deaths [2].

Because of the sudden increase in COVID infection, WHO issued a warning about the pandemic's escalation, stating that it took 67 days to reach 100,000 cases from the first case reported, 11 days to reach the second 100,000, four days to the third 100,000, and only two days to the fourth 100,000 [3]. As a result, the abrupt rise in the pandemic cases has had a significant impact on communities around the world, compelling governments to impose strict lockdowns along with the compulsion of important measures such as mandating the use of face masks and sanitization, or quarantine to prevent the spread of viral burden [4].

The COVID infection patients usually present with number of distressing symptoms but there were reports of people who have been infected to SARS-CoV-2 but did not report COVID-19 symptoms. Moreover, in certain cases, the viral burden of the asymptomatic individuals was equitable to that of symptomatic individuals, indicating a similar potential for viral transmission. And also, the incidence of symptomless SARS-CoV-2 infection, had also remained unknown [5,6].

Considering the significant viral burden and spread in both the symptomatic and asymptomatic, there are currently no antiviral

drugs treatment that has been proven by the WHO to be efficient against COVID-19. Nevertheless, there are indeed a number of medications that can be repurposed to cure COVID-19 [7]. In this situation vaccination remains the most effective COVID-19 eradication initiatives, saving millions of lives each year. Furthermore, the best solution is only an effective, safe vaccine that does not cause severe toxicities. Because there is no effective and approved COVID-19 treatment, a race to develop began, with 259 COVID-19 vaccine projects underway as of November 11, 2020(8). Because of the rapid development of vaccines, vaccine safety concerns have grown over time. However, immunization remains the most appropriate and cost-effective primary care for disease control in the current scenario; thus, vaccines against COVID-19 are regarded as necessary for limiting and controlling COVID-19.[9, 10].

However, vaccine hesitancy and rejection are the major concern, prompting the World Health Organization (WHO) to list this uncertainty as one of the top ten health threats in 2019 [11]. According to various studies, the reasons of vaccine hesitancy include religious grounds, personal views, and safety issues due to widespread myths, such as the link between vaccines and autism, brain damage, infertility etc. [12]. As a result, it is critical that front-line healthcare professionals fully comprehend the available safety data and feel confident in providing strong advice based on scientific evidence.

To the best of our knowledge, no previous published work has assessed the side effects of various COVID-19 vaccinations hence, the purpose of this article is to identify the side effects associated with COVID 19 vaccines in the population of Karachi.

## 2. METHODOLOGY

This is a web-based cross-sectional survey. The target population in the present study were resident of Karachi, Pakistan who were at least 18 years old. Google forms was used to create a questionnaire. The link was then shared with the residents of Karachi through various social media groups.

The survey began on 11<sup>th</sup> April 2021 and ended on 23<sup>rd</sup> April 2021. During this time, 2000 participant became the part of the study via snowball sampling technique. The questionnaire was completed individually by the participants in an estimated average time of five to ten minutes. In each and every case, research ethics standards were met by presenting information needed. Participants who were immunized with the COVID-19 vaccine during the early immunization phase of a government policy were eligible for this research. Participants must have gotten the most recent dosage of the vaccination, the first or second dose, no more than thirty days prior to filling out the questionnaire.

Participants who were immunized in countries other than Pakistan were not included in this study. The collected answers were excluded from the final sample if the subjects met one of the exclusion criteria (being underage, not vaccinated or living out of Karachi, Pakistan). Participation was entirely voluntary and without remuneration.

There were total 6 questions that were closed-ended, with tick boxes provided for responses

and all were treated as categorical variables. No open ended question was included to avoid irrelevant data it is also time consuming and low response rate is usually observed in these participant.

The questionnaire inquired about the:

- Participants' demographics (e.g., age, gender, weight, professional group)
- Occurrence of COVID infection before Vaccination
- Application of COVID vaccination
- Type of COVID Vaccination
- Dose of COVID Vaccination
- Perceived side effect of vaccination after each dose

### 2.1 Statistical Analysis

SPSS version 20 was used to analyze the data. Descriptive analyses were performed for all variables. The Shapiro–Wilk test was used to test normal distribution of continuous variables. The categorical variables were represented as frequencies and percentages.

## 3. RESULTS

This research comprised 2000 individuals, who were all immunised against COVID-19 viral Infection with either first dose or both doses. Out of the 2000 participants, 1064 were male with 53.2% whereas remaining 936 were females with 46.8%.

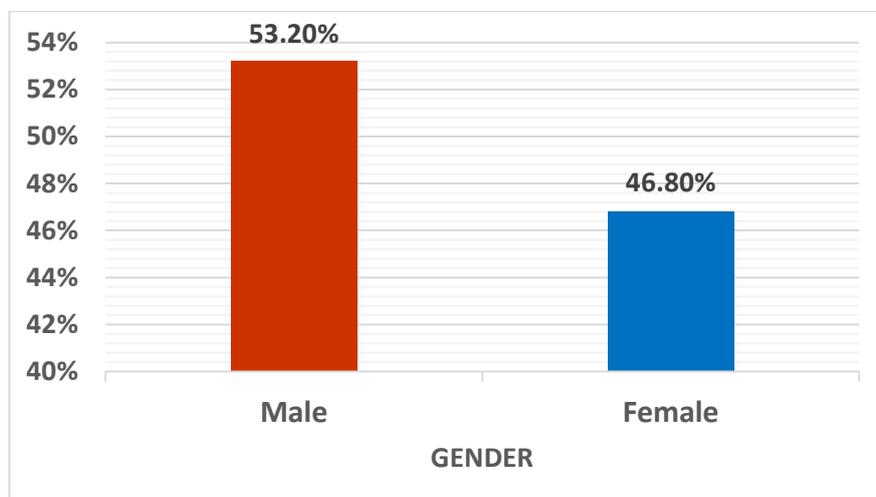


Fig. 1. Genderwise Prevalance of Covid 19 Vaccination

The participants' ages were divided into six groups, which are as follows:

- a) Age of 20 years or less
- b) Between the ages of 21 and 30 years
- c) Between the ages of 31 and 40 years
- d) Between the ages of 41 and 50 years
- e) Between the ages of 51 and 60 years
- f) Age 61 and above

Participants aged between 51 to 60 years were vaccinated at a rate of 28% with 560 individuals, followed by 41 to 50 years at a rate of 27% comprising 540 individuals, those between 31 to 40 years were vaccinated at a rate of 24% with 480 individuals, and 61 and older at a rate of 15% with 300 individuals.

Pakistan has so far approved five Covid vaccines: Sinopharm, Cansino, Sinovac, Sputnik

and AstraZeneca. Among the 2000 participants 30% were administered with Sinopharm, 26% with Cansino, 21% with AstraZeneca, 20% with Sinovac.

Following the first dose of the covid 19 vaccine, the majority of participants experienced fever (39.9%), followed by muscle pain (28.9%), chills (19.8%), arm pain (18.8%), and breathlessness (17.6%), diarrhea (8.7%). Only a few participants reported cough and flu (1.6%), fatigue (1.2%), chest pain (1.0%), headache (1.0%), abdominal pain (0.6%), swelling in the legs (0.2%) and arms (0.3%), multiple bruises (0.2%), and productive bleeding (0.2%).

Moreover, among the 2000 participant 30.9% had no symptoms within the seven days of the vaccination.

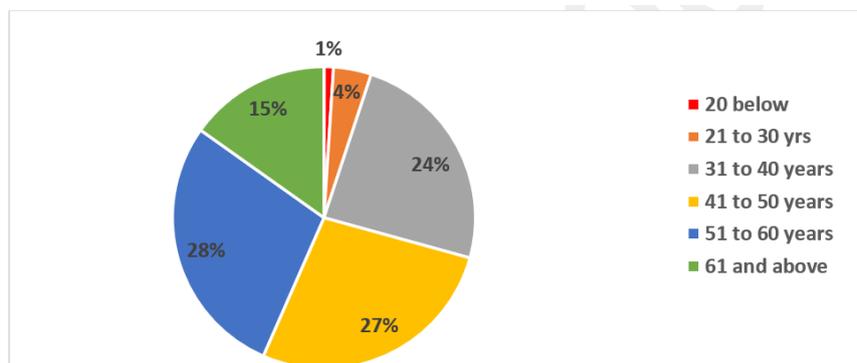


Fig. 2. Prevalence of Covid 19 Vaccination among Age Groups

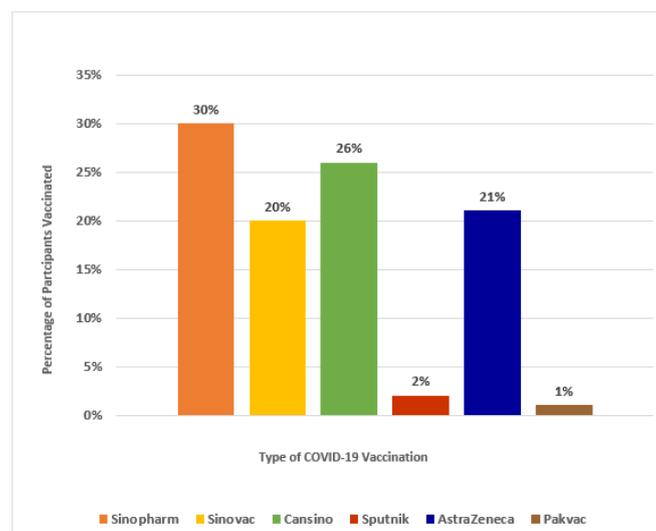


Fig. 3. Prevalence of Common Covid 19 Vaccination among population of Karachi

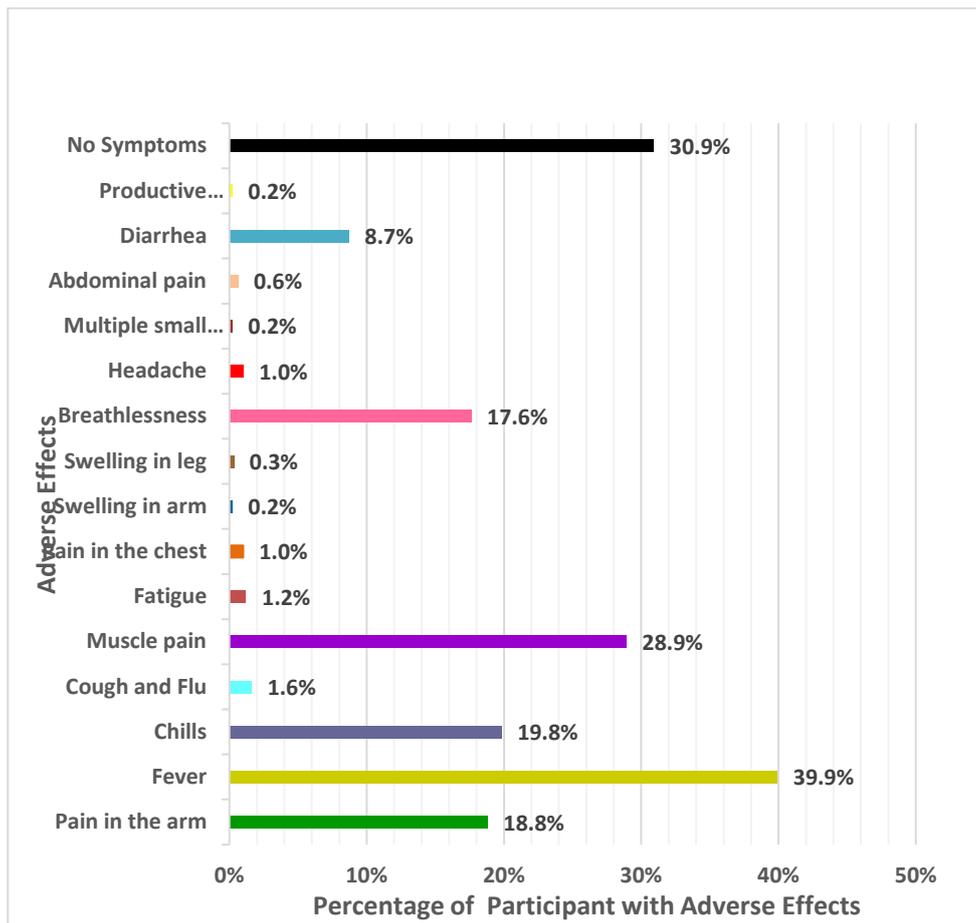


Fig. 4. Prevalance of Covid 19 Vaccination Adverse Effect after First dose

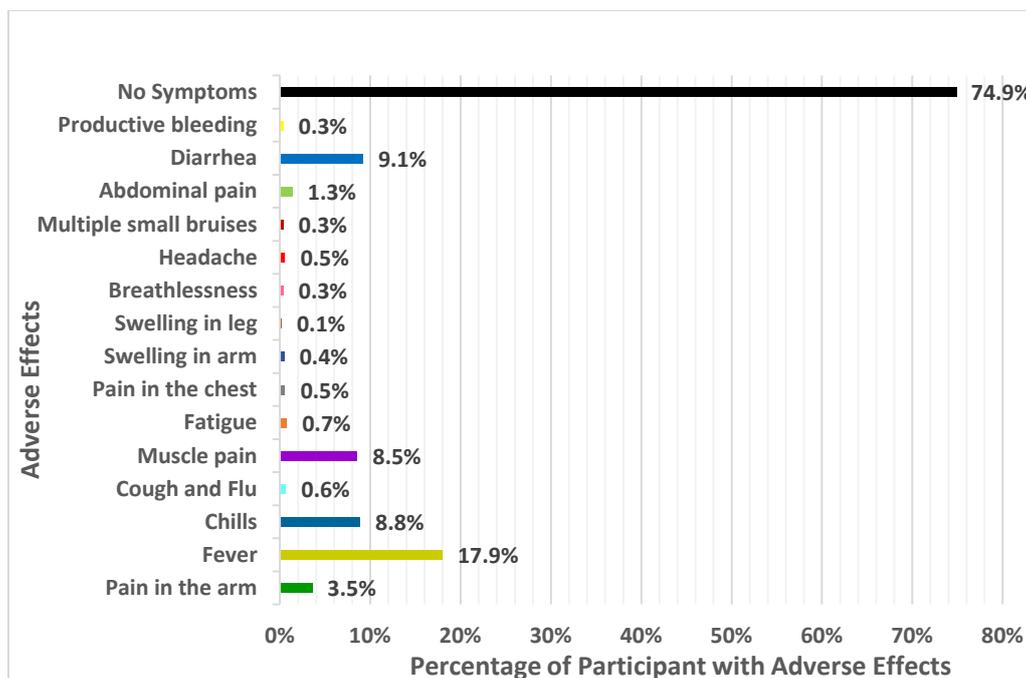


Fig. 5. Prevalance of Covid 19 Vaccination Adverse Effect after Second dose

Among the 1160, the majority of participants had no symptoms after the second dose of the Covid 19 vaccine (74.9%). Some participants experienced fever (17.9%), followed by diarrhea (9.1%), muscle pain (8.5%), chills (8.8%), arm pain (3.5%), abdominal pain (1.3%), breathlessness (0.3%), cough and flu (0.6%), fatigue (0.7%), chest pain (0.5%), headache (0.5%), swelling in the legs (0.1%) and arms (0.4%), multiple bruises (0.3%), and productive bleeding (0.3%).

#### 4. DISCUSSION

Since the coronavirus infection (COVID-19) has devastated the whole world, the need for vaccination against it, has grown considerably (2). The vaccine's development and efficacy data are still in works however, it is believed that early vaccinations are said to be preventive against severe disease, which will not only save a large number of fatalities but also reduce the strain on health-care systems. More information is needed to define the function of vaccinations in containing the pandemic, which will be obtain over time.

In early February 2021, Pakistan began rolling out COVID19 vaccination across the country.

China has provided the country with Sinopharm and Cansino vaccines, and it will also receive vaccines as part of the COVID19 Vaccines Global Access (COVAX) initiative. Since around April 27, approximately 2 million doses had been administered throughout the country.

Even after a year of crisis, there is still insufficient understanding of the various impacts of COVID-19 on men and women, including youth and children, due to a lack of comprehensive sex-, age-, and disability-disaggregated data (SADDD) on test, cases, mortality, and vaccines.

The COVID-19 Sex-Disaggregated Data Tracker comprises 11 Asian Pacific nations. Among them only two countries (India and Bangladesh) reported sex-disaggregated immunisation statistics (at least one dose). The sex distribution of individuals who received at least one dose of vaccination till April 2021 reveals that males (52% in India, 63% in Bangladesh) outnumber women in both nations. Pakistan, on the other hand, is one of the nations with the greatest number of confirmed cases but has yet to publish any sex-disaggregated statistics for the previous

several months. Inconsistent data reporting has contributed significantly to the region's large gap in sex-disaggregated statistics (13). In the current study, it was found that 53.20% of the participants were males, while the remaining 46.80% were females, which is comparable to our neighbouring nations India and Bangladesh, which have virtually identical cultural values.

Due to the restricted availability of COVID-19 vaccine, WHO advised that health workers at high risk of exposure and the elderly be prioritised for immunisation. [14]. Therefore, with this recommendation initially, Pakistani residents aged 50 and older, as well as health care employees, were vaccinated for free upon registration, which could be done either online or in person [15].

Our survey found that respondents aged 51 to 60 were among the 28% that is the maximum number who were vaccinated, which might be related to the fact that they were given the opportunity to be vaccinated first, after health-care personnel, followed by respondents aged 41 to 50 year with 27%, those aged 31 to 40 years with 24%, those aged 61 and above with 15%. Similarly, Malik et al. discovered that among individuals aged 18 to 30, 64.6% accepted the COVID-19 vaccine, rising to 71.2% in the 31-40 age group and 91.2% in the 51-60 age group [16].

The world is in dire need of more and more Covid-19 Vaccination in order to reduce global devastation and to halt this pandemic. Various organisations actively worked on developing viable vaccinations, and a worldwide collaboration has been formed [17].

The World Health Organization has authorised nineteen vaccinations for use in an emergency. Meanwhile, several nations are authorising various vaccines based on their unique criterion and Feasibility [18]. South Africa approved six vaccinations for emergency use, while Pakistan and the United Kingdom have approved five and three important vaccines, respectively [19, 20].

Pakistan has been able to offer six vaccinations from the list of possible vaccines, notably Sinopharm, Sinovac(China), Sputnik V (Russia), Cansino, and Astrazeneca [20].

In our study we found that Sinopharm (28%) is the most commonly administered vaccination

among the six options, followed by Cansino (26%), Astrazeneca (21%), and Sinovac (20%), with Sputnik and Pakvac receiving the least attention.

To combat the terrible consequences of the COVID-19 pandemic on mankind, it is not only critical to provide safe and effective Covid-19 vaccines but also to predict its side effects in the population.

The present study's findings indicate that after first dose of the covid vaccination the participants experienced either no symptoms or fever, muscle pain, chills and pain in the arm. Moreover, after the second dose most of the participants experienced no symptoms and only a few people had fever, chills and pain in the arm. Likewise, according to a research by et al, the majority of the vaccinations resulted in either no symptoms or some individuals suffered mild symptoms. The most common post-vaccination side effects were fever, fatigue/malaise, and headache/migraine (21).

## 5. CONCLUSION

COVID-19 vaccination will serve to protect against COVID-19 infection. One might indeed experience some side effects, which are normal indications when the body is constructing defences. These side effects may impair the ability to perform daily tasks, but they should subside within a few days. Some people experience no side effects. The most common side effects are Fever, chills, muscle pain and pain in the arm after first and the second doses. Serious complications that could lead to long-term health problems are extremely unlikely after any vaccination, including COVID-19 vaccination.

## 6. LIMITATIONS

- Large sample size and multi-center trials are necessary to have a better understanding of the adverse effects of different Covid-19 vaccines.
- Medical records of various hospitals were not included. So we do not know whether any body developed any serious side effects post vaccination and required admission.

## CONSENT

All the participant gave their informed consent for inclusion before they participated in the study.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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