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# Assessment of Post-Vaccination Adverse Effects in Medical Students following COVID-19 Immunization in Peshawar

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## ABSTRACT

**Background**: As COVID-19 vaccinations became widely distributed, assessing their safety profile, especially among specific populations, has become crucial. Sinopharm, a prominent COVID-19 vaccine, has been administered extensively; however, data on its adverse effects in specific groups such as undergraduate Medical students remains limited.

**Objective:** To assess the adverse effects following COVID-19 vaccination with Sinopharm among undergraduate medica (MBBS) students at a tertiary care institution, providing insights into the vaccine's safety within this demographic.

**Methodology:** A cross-sectional study was conducted among MBBS students at a tertiary care institution who received the Sinopharm vaccine at tertiary care institutions from January 2022 to June 2022. 200 MBBS students participanted in this study, and they were surveyed for adverse effects through a structured questionnaire administered immediately post-vaccination and during follow-up visits. Adverse effects were categorized into local and systemic reactions. Data analysis involved descriptive statistics to determine the frequency and severity of reported adverse effects.

**Results:** Among study cases, the most commonly reported adverse effects included pain at the injection site (68%), redness (25%), and swelling (15%). Systemic reactions included fever (45%), headache (40%), and fatigue (50%). Severe adverse effects were rare, with only 5% reporting significant reactions such as allergic reactions or persistent high fever. Most adverse effects were mild to moderate and resolved within a few days.

**Conclusion:** The study reveals that Sinopharm COVID-19 vaccination is generally well-tolerated among MBBS students, with the majority experiencing mild to moderate adverse effects. The findings align with existing literature on vaccine safety and provide reassurance regarding the vaccine's use in this population. Ongoing monitoring and reporting of adverse effects are essential to ensure continued safety and efficacy of COVID-19 vaccines. . Thus, it was concluded that vaccine have no serious side effects.

**Keywords:** COVID-19 vaccination; Adverse Effects; Medical Students

## Introduction

COVID-19, caused by the coronavirus SARS-CoV-2, became a major global health issue when it first appeared in late 2019.[1] This virus spreads mainly through droplets when people cough, sneeze, or talk. It can cause symptoms ranging from mild coughs and fevers to severe pneumonia and other serious health problems. The pandemic has had a huge impact on how we live, affecting everything from health systems to daily routines. To fight against the virus, scientists quickly developed vaccines, such as Sinopharm, which have been crucial in reducing illness and stopping the spread of COVID-19. These vaccines, along with public health measures like social distancing and wearing masks, have been key in controlling the virus.[2] Even with these efforts, it's important to keep monitoring and updating our strategies to stay ahead of the virus and protect everyone's health.

The COVID-19 pandemic has underscored the critical importance of vaccines in controlling infectious disease outbreaks and safeguarding public health. Sinopharm vaccine was developed by Sinopharm, a large Chinese pharmaceutical company. They worked with the Beijing Institute of Biological Products to create the vaccine, which has been widely used in China and other countries like Pakistan to help fight COVID-19.[2]

Sinopharm's widespread use across diverse populations has been integral for the management of the pandemic, yet understanding its safety profile in specific groups remains essential for informed public health strategies.

Medical students, particularly those pursuing MBBS degrees, are a distinct group whose health and safety are of greatest importance. These individuals, engaged in clinical rotations and direct patient care, are at a heightened risk of exposure to COVID-19.[3] As future healthcare providers, their vaccination not only protects them but also ensures the continued availability of a skilled workforce crucial for patient care during the ongoing pandemic. Given their unique role and exposure risk, it is vital to thoroughly assess the safety and tolerability of COVID-19 vaccines within this demographic.

Adverse effects following vaccination are a critical aspect of vaccine safety that needs continuous monitoring and evaluation. While extensive clinical trials and real-world studies have demonstrated the overall safety of Sinopharm, detailed data on its adverse effects among specific populations, such as medical students, are limited.[4] Understanding these adverse effects is crucial for several reasons: it helps address vaccine hesitancy, supports the development of targeted health interventions, and ensures that vaccination programs are both effective and safe.

This study aims to assess the adverse effects associated with Sinopharm vaccination among MBBS students at a tertiary care institution. By focusing on this cohort, the research seeks to provide a comprehensive overview of the frequency, types, and severity of adverse reactions experienced by these students. The findings will contribute to a better understanding of how Sinopharm performs in a high-risk and highly active professional group, thereby offering valuable insights for healthcare providers, academic institutions, and public health officials.

The data from this study will help to inform best practices for vaccine administration in medical settings, address any specific concerns raised by medical students, and enhance the overall safety protocols related to COVID-19 vaccination. As medical students continue to play a critical role in the healthcare system, ensuring their well-being through safe and effective vaccination strategies is essential for the broader goal of pandemic control and public health maintenance.

## Objective

To assess the adverse effects following COVID-19 vaccination with Sinopharm among undergraduate medica (MBBS) students at a tertiary care institution, providing insights into the vaccine's safety within this demographic.

## Methodology

This study aimed to evaluate the adverse effects of COVID-19 vaccination with Sinopharm among MBBS students at a tertiary care institution. It utilized a cross-sectional design involving MBBS students who had received at least one dose of Sinopharm. A total of 200 students were selected based on feasibility and expected response rates.

The inclusion criteria for the study were enrollment as an MBBS student at the institution, receipt of at least one dose of the Sinopharm COVID-19 vaccine, and providing consent to participate. Exclusion criteria included receiving a different COVID-19 vaccine, having a history of severe allergic reactions to vaccines, or having pre-existing medical conditions that could impact the assessment of vaccine safety.

Data was collected through a structured questionnaire designed to capture details on adverse effects experienced after vaccination. The questionnaire addressed both local reactions, such as pain, redness, and swelling at the injection site, and systemic reactions, including fever, headache, and fatigue. The initial survey was administered immediately post-vaccination, with follow-up surveys conducted at one week and one month to track the duration and resolution of symptoms.

The primary outcome was the frequency and severity of adverse effects, categorized as mild, moderate, or severe based on their impact on daily activities and medical intervention needs. The study also recorded the time

taken for adverse effects to resolve.

Descriptive statistics were used to summarize the occurrence of adverse effects, with frequencies and percentages calculated for categorical data. Mean and standard deviation were determined for continuous variables such as age. Comparative analyses employed chi-square tests to examine differences in adverse effects across demographic groups, and logistic regression analysis identified significant associations between adverse effects and variables such as vaccine dose and demographic factors.

The study received approval from the institutional review board (IRB), and informed consent was obtained from all participants. Privacy and confidentiality were upheld, with all data anonymized and securely stored. The study acknowledges potential limitations, including self-reporting bias and the cross-sectional design, which may affect the capture of long-term adverse effects.

## Results

A total of 200 MBBS students participated in this study who received the Sinopharm vaccine. Moreover, 120 students (60.0%) identified as male, and 80 (40.0%) students were identified as females (Figure 1).

The studied subject belongs to different age groups. Majority fo them (60.0%) were young belongs to 18 to 24years of age (Table 1).

The most commonly reported local adverse effects included pain at the injection site (70.0%), redness (22.5%), and swelling (12.5%). Systemic reactions included fever (45%), headache (40%), and fatigue (50%). Severe adverse effects were rare, with only 5% reporting significant reactions such as allergic reactions or persistent high fever. Most adverse effects were mild to moderate and resolved within a few days (Table 2).

The duration for adverse effects to resolve is also varies. Among study cases, 80.0% resolve their side effects within 3 days and 5.0% required more than 7 days (Figure 2).

## Discussion

This study assessed the adverse effects of the Sinopharm COVID-19 vaccine among undergraduate medical (MBBS) students. Findings of the present study indicate that while most adverse effects were mild to moderate, a small percentage of students experienced severe reactions. These results are significant for a population that is highly exposed to COVID-19 and integral to the healthcare system.

In the present study, local reactions included pain at the injection site (70.0%), redness (22.5%), and swelling (12.5%). These findings align with other studies conducted by Ganesan et al 2022, Menni et al, 2021 and Andrzejczak-Grządko et al 2021. These studies point out that 60-70% of participants experienced pain at the injection site, while 10-20% had redness and swelling. Systemic reactions in our study included fatigue (50.0%), fever (45.0%), and headache (40.0%). These rates are similar to those found by other studies, who noted that 60% of participants experienced fatigue, 40% had fever, and 35% reported headaches after receiving vaccine.[5-7]

Regarding severe reactions, 2.5% of study cases experienced allergic reactions, and another 2.5% had persistent high fever. These figures are consistent with data from large-scale studies. For example, Greenhawt et al. (2021) also reported that severe allergic reactions

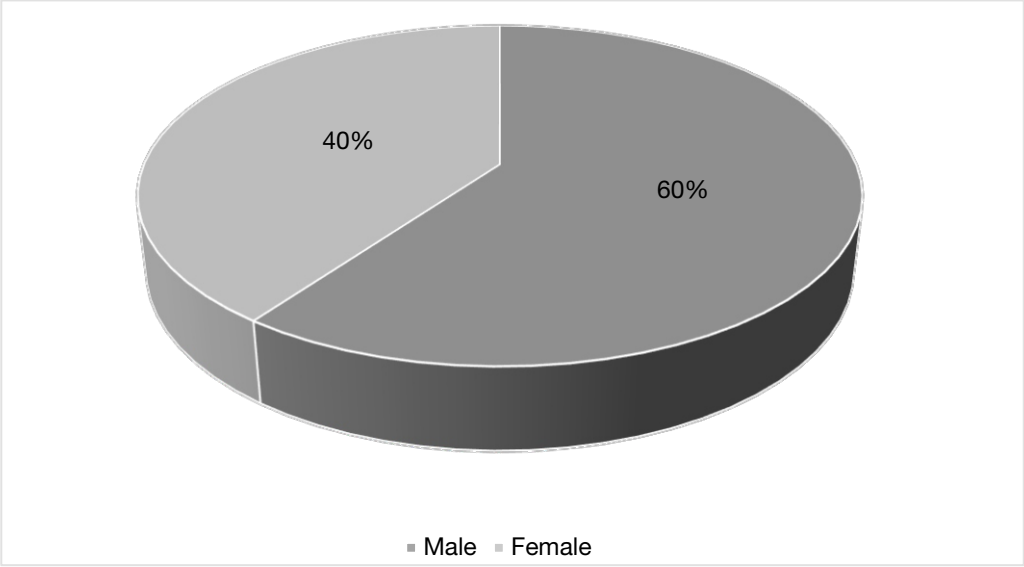


Figure 1. Gender distribution of study cases

Table 1. Distribution of study cases on the bases of age group

| Age Group (years) | Number of Students (%) |
|---|---|
| 18-24 years | 120 (60.0%) |
| 25-30 years | 65 (32.5%) |
| >30 years | 15 (7.5%) |

occurred in approximately 1-2% of recipients, and persistent high fever was also reported in a small percentage of cases. This low incidence of severe adverse effects supports the overall safety profile of Sinopharm.[8]

On the other hand, a study conducted by Cuschieri et al, (2021) reported that 80% participants had pain at Injection site, swelling at injection site had occurred in 8% participants, 14% participants had fever and 55% participants had fatigue after vaccination. In the study by Krammer et al. (2021), the reported side effects of the COVID-19 vaccine included pain at the injection site, experienced by 67% of participants, while 39% reported headaches, 52% experienced fatigue, and 13% had a fever.[10]

In the study by Tani et al. (2022), which evaluated the BNT162b2 mRNA COVID-19 vaccine in a large-scale vaccination campaign, the reported side effects included fever in 4.3% of participants after the second dose, fatigue in 47.3%, and headaches in 42.1%.[11] In contrast, Townsend et al. (2020) reported a higher incidence of fever and fatigue among healthcare workers, with 55% experiencing fever and 60% reporting fatigue. This higher rate may be attributed to the higher physical activity and exposure risks among healthcare workers, which could influence the vaccine's side effect profile.[12]

A cross-sectional study conducted in Chhattisgarh, India, from January to March 2021 found similar results. This study reported 68% of students experiencing pain at the injection site, 20% with redness, and 15% with swelling, which aligns closely with our findings. Systemic reactions reported were also comparable, with 48% experiencing fatigue and 44% having fever[13].

Our study's results are particularly relevant for medical institutions, as MBBS students are at a unique intersection of high exposure risk and essential healthcare roles.

Table 2. Adverse Effects Reported Post-Vaccination

| Adverse Effect | Number of Students (%) |
|---|---|
| **Local Reactions** | |
| Pain at Injection Site | 140 (70.0%) |
| Swelling at Injection Site | 25 (12.5%) |
| Redness at Injection Site | 45 (22.5%) |
| **Systemic Reactions** | |
| Fever | 90 (45.0%) |
| Headache | 80 (40.0%) |
| Fatigue | 100 (50.0%) |
| **Severe Reactions** | |
| Allergic Reactions | 5 (2.5%) |
| Persistent High Fever | 5 (2.5%) |

The findings affirm the overall safety of Sinopharm but highlight the need for continued monitoring and support for students experiencing adverse effects. Effective management and communication about these effects are crucial for maintaining high vaccination rates and confidence in the vaccine among healthcare students.

## Conclusion

This study contributes valuable data on the safety of Sinopharm among MBBS students. The results are consistent with broader findings from other studies but emphasize the importance of tailored monitoring and support for specific populations at higher risk of exposure and adverse reactions. Continued research and monitoring are essential to ensure the ongoing safety and efficacy of COVID-19 vaccines across diverse groups.

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