

**A COMPARITIVE STUDY  
ON THE EFFICACY & EFFICIENCY OF  
COVAXIN AND COVISHIELD**

**Dissertation Submitted to**



**The IIHMR University, Jaipur**

**for the partial fulfilment for the award of the degree of**

**Master of Business Administration (MBA)**

**in**

**Hospital & Health Management**

**by**

**Dr Amrita Singh**

**Under the Supervision and Guidance of**

**Dr Goutam Sadhu**

**2023**

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## **DECLARATION BY STUDENT**

I hereby declare that this dissertation titled Comparative analysis on the efficacy & effectiveness of Covishield & Covaxin. It is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Dr Amrita Singh

Date: 05-06-2023

## **CERTIFICATE**

This is to certify that Dr Amrita Singh in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur has successfully completed her Project at FIGmd, an MRO Company, Pune (Maharashtra) during 22 February 2023 – 22 May 2023.



Place: Pune

Preceptor: Dr. Devanshi Gulati

Date: 02/06/2023

Name of the organization: MRO Corp

## **CERTIFICATE**

This is to certify that dissertation titled Comparative analysis on the efficiency & effectiveness of Covishield & Covaxin is a record of the research work undertaken by Dr Amrita Singh in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific, and analytical.

Dr Goutam Sadhu  
Faculty Guide  
IIHMR University, Jaipur  
Date:05-06-2023

Dr Mahendra Kumar  
School Dean  
IIHMR University, Jaipur  
Date: 05-06-2023

## **ABSTRACT**

The study's primary goal is to evaluate and compare how these two COVID-19 vaccinations were carried out. The goal is to determine whether they are effective in preventing COVID19 infection, lowering the severity of symptoms, and reducing hospitalizations and deaths.

The research method was based on two studies. In Primary study, at first a list of potential respondents was developed & their contact details like phone number, email, whatsapp, facebook accounts the researcher or family members (including extended family members) have. Then afterwards, age was confirmed & a list was prepared between 18-65years. Keeping in view the lesser respondent rate for e-survey, as well as refusal, the friends who were not included in the final list were further be asked to share the survey tool to their contacts. Out of 125 people, 117 responded to the survey & the rest did not respond.

For secondary data, we did literature review using different search engines like Google Scholar, Pub-med, Research Gate & various generals, press release magazines, brochures, pamphlets, CDs, & written documents. (e.g., Inc42, Daily Hunt etc.). Data was be analysed using different excel tools in terms of distribution, percentages & averages & represented in graphical & table format. Clinical trials were conducted on Covaxin and Covishield to assess its effectiveness and safety. The effectiveness of Covishield is bit higher than Covaxin, but it is debatable to compare the efficacy & effectiveness of both the vaccines in general.

**KEYWORDS** - COVID-19; Covishield, Covaxin, Clinical Trials; SARS-CoV-2; Convalescent Plasma Therapy; Monoclonal Antibodies; Vaccine

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## **CHAPTER 1- INTRODUCTION**

**1.1 History.** The novel human coronavirus disease 2019 (COVID-19) was first reported in Wuhan, China, in 2019, and subsequently spread globally to become the fifth documented pandemic since the 1918 flu pandemic. Coronavirus, brought about by the SARS-CoV-2 Covid, is an infectious sickness that started in Wuhan, China in December 2019 and has since turned into a continuous pestilence. China has started three huge endeavours to figure out the beginning of the flare-up, remembering early examinations of suggestive cases for the area, natural inspecting from the Huanan food area and different business sectors, and nitty gritty reports on the species sold at the Huanan market and their objections after its conclusion.

Coughing, sneezing, and speaking are the primary methods by which the virus is spread, with droplets typically falling to the ground or onto surfaces rather than traveling long distances through the air. Although it is possible to transmit the disease by touching contaminated surfaces and then the face, it is relatively uncommon. The virus is most contagious within the first three days of onset of symptoms, but it can also spread from asymptomatic individuals before symptoms appear. By September 2021, almost two years after COVID-19 was first identified, there had been more than 200 million confirmed cases and over 4.6 million lives lost to the disease.<sup>1</sup>

**1.2 World Scenario.** The first official cases of COVID-19 were recorded on the 31 December, 2019, when the World Health Organization (WHO) was informed of cases of pneumonia in Wuhan, China, with no known cause. On the 7th of January, the Chinese authorities identified a novel coronavirus, temporally named 2019-nCoV, as the cause of these cases. Weeks later, the WHO declared the rapidly spreading COVID-19 outbreak as a Public Health Emergency of International Concern on the 30th of January 2020. It was not until the following month, however, on the 11th of February that the novel coronavirus got its official name COVID-19. Nine days later, the US Centre for Disease Control and Prevention (CDC) confirmed the first person to die of COVID-19, a man in his fifties who lived in Washington state.

In the first months of COVID-19, Global health authorities, government agencies, and the public were unsure of how the disease would spread and how it would impact everyday life. On the 1st of March, 2020, the United Nations released \$15 million in funds to support the global COVID-19 response. A week later, on the 7th of March, cases of COVID-19 reached 100,000. Several days after that, on the 11th of March, COVID-19 was declared a pandemic by the WHO. COVID-19 rapidly transformed from being a severe problem seemingly confined to China, to a global health emergency almost overnight.<sup>2</sup>

**1.3 Indian Scenario.** The first case of COVID-19 infection reported in Kerala, India. On January 27, 2020, a 20-year-old female presented to the Emergency Department in General Hospital, Thrissur, Kerala, with a one-day history of dry cough and sore throat. There was no history of fever, rhinitis, or shortness of breath. She disclosed that she had returned to Kerala from Wuhan city, China, on January 23, 2020 owing to COVID-19 outbreak situation there. She was asymptomatic between January 23 and 26. On the 27<sup>th</sup> morning, she felt a mild sore throat and dry cough. She did not give a history of contact with a person suspected or confirmed with COVID-19 infection. She did not visit the Huanan Seafood Wholesale Market; however, she gave a history of travel from Wuhan to Kunming by train where she noticed people with respiratory symptoms in railway station and train. She received the instructions from the Kerala State authorities to visit a healthcare facility if she develops any symptoms because of the travel history to China.<sup>3</sup>

The coronavirus disease (COVID-19) pandemic, which originated in the city of Wuhan, China, has quickly spread to various countries, with many cases having been reported worldwide. As of May 8th, 2020, 56,342 positive cases have been reported in India. India, with a population of more than 1.34 billion - the largest population in the world - had difficulty in controlling the transmission of severe acute respiratory syndrome coronavirus among its population. Multiple strategies were highly necessary to handle the outbreak; these include computational modeling, statistical tools, and quantitative analyses to control the spread as well as the rapid development of a new treatment. The Ministry of Health and Family Welfare of India has raised awareness about the outbreak and has taken necessary actions to control the spread of COVID-19. The central and state governments took several measures and formulating several wartime protocols to achieve this goal. Moreover, the Indian government implemented a 55-days lockdown throughout the country that started on March 25th, 2020, to reduce the transmission of the virus. This outbreak was inextricably linked to the economy of the nation, as it dramatically impeded industrial sectors because people worldwide were cautious about engaging in business in the affected regions.<sup>4</sup>

**1.4 World without Vaccination.** The officially reported COVID-19 deaths estimated were 18.1 million deaths due to COVID-19 occurred without vaccinations worldwide during the first year of the COVID-19 vaccination programme. Of these, vaccination prevented 14.4 million deaths due to COVID-19, representing a global reduction of 79% of deaths (14.4 million of 18.1 million) during the first year of COVID-19 vaccination.<sup>5</sup>

**1.5 Vaccination.** To lessen the impact of COVID-19 and bring an end to the pandemic, efforts were made to control the virus's spread and develop effective treatments and vaccines continue worldwide. The first COVID-19 vaccine administered worldwide was the Pfizer-BioNTech vaccine. It was cleared for emergency use in the UK and handed over to the first recipient, Margaret Keenan, on 8 December 2020. In India, the vaccination campaign against COVID-19 started on January 16, 2021. The first vaccine administered in India was Covishield, a locally manufactured version of the Oxford-AstraZeneca vaccine. The first recipient in India was a healthcare worker named Manish Kumar, who received the vaccine at the Indian Institute of Medical Sciences (AIIMS) in Delhi. It should be noted that different countries started vaccination programs at different times and used different vaccines depending on availability and clearance in their regions.

Coronavirus immunizations assume a critical part in relieving the effect of the continuous pandemic. They were made to protect against COVID-19, which is caused by the SARS-CoV-2 virus. The goal of these vaccines is to activate the body's immune system, giving it tools that needs to better recognize and combat the virus. These immunizations have gone through thorough testing and assessment in clinical preliminaries to guarantee their security, viability, and quality.

Inoculation crusades mean to oversee Coronavirus immunizations to whatever number qualified people as could be expected under the circumstances. Priority is given to medical care laborers, the old, people with hidden ailments, and other high-risk populaces. Not only does vaccination safeguard individuals, but also aids in the development of herd immunity, reduces the spread of the disease throughout the community, and ultimately brings an end to the pandemic.

By utilizing the force of inoculation, worldwide endeavours were centred around controlling the spread of Coronavirus, saving lives, and re-establishing cultural and financial predictability. In addition to other preventative measures like wearing masks, maintaining good hygiene, and adhering to local health guidelines, vaccinations were an essential tool in our collective fight against the pandemic.

There are two vaccines: -

- COVISHIELD
- COVAXIN

## **COVISHIELD**

Covishield is a Coronavirus immunization that has been created to battle the worldwide pandemic brought about by the SARS-CoV-2 infection. It is a vaccine containing a viral vector that boosts the body's immune system to protect against COVID-19.

The ChAdOx1 adenovirus vector, which is derived from a chimpanzee-specific weaker version of the common cold virus, serves as the basis for Covishield. This vector has been altered to convey the hereditary material of the spike protein of the SARS-CoV-2 infection. When the antibody is controlled, the altered adenovirus vector enters cells and educates them to deliver the spike protein. The immune system responds to this protein, resulting in the production of antibodies and immune cells capable of neutralizing the SARS-CoV-2 virus in the event that it is encountered again.

To guarantee Covishield's quality, safety, and efficacy, it underwent stringent testing and evaluation in clinical trials. It has been remembered for public vaccination missions to shield people and networks from the effect of Coronavirus. Covishield is injected intramuscularly, requiring typically two doses spaced several weeks apart. By reducing the disease's burden and contributing to the collective objective of achieving herd immunity, it gives people hope for a safer and healthier future.

## **COVAXIN**

Covaxin is a natively created Coronavirus immunization produced by Bharat Biotech, an Indian biotechnology organization. The development of Covaxin involved inactivating the live SARS-CoV-2 virus, rendering it non-infectious while retaining its ability to stimulate an immune response. This makes it a whole-virion inactivated vaccine that targets the SARS-CoV-2 virus that causes COVID-19. After that, the vaccine's active ingredient is this virus that has been inactivated. Covaxin is injected intramuscularly, requiring typically two doses spaced a few weeks apart.

The essential objective of Covaxin is to get a safe reaction against the SARS-CoV-2 infection, empowering the body to perceive and kill the infection all the more actually whenever experienced from here on out. Covaxin's primary objective is to elicit an immune response against the SARS-CoV-2 virus, allowing the body to more effectively recognize and eliminate the virus in the event that it is encountered again. India's vaccination campaign against COVID-1 has been aided by covaxin, which has played a significant role in the country's vaccination efforts.

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## **1.6 BENEFITS OF GETTING VACCINATED**

- COVID-19 vaccines were developed for mistreatment science that has been around for many years. The COVID 19 vaccine works and is safe. They will stop you from getting the COVID-19 virus and spreading it.
- Even if you do contract COVID-19, getting the vaccine can help keep you from getting seriously ill.
- Coronavirus immunizations do not appear to be trial. They went through every one of the predetermined phases of clinical preliminaries. Top to bottom testing and recognition have shown that these antibodies square measure safe and are effective.
- Being ill can protect those around you, especially those who are more likely to contract COVID-19-related illness.
- If you contract COVID-19, you run the risk of passing it on to loved ones, which could result in severe illness, according to the World Health Organization. Getting an immunogen against COVID-19 might be safer.

**Table 1.6 COVID-19 VACCINATION PROGRAMME**

|                     |                                                                                                                                                                                                                                  |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Date</b>         | 17 January 2021 - present                                                                                                                                                                                                        |
| <b>Country</b>      | India.                                                                                                                                                                                                                           |
| <b>Reason</b>       | Covid-19 Outbreak                                                                                                                                                                                                                |
| <b>Goal</b>         | Immunisation of Indian population against COVID- 19                                                                                                                                                                              |
| <b>Budget</b>       | 350000 Milion                                                                                                                                                                                                                    |
| <b>Organisers</b>   | Government of India (GOI),<br>State Governments of India,<br>Indian Council of Medical Research lpp.                                                                                                                             |
| <b>Participants</b> | <ul style="list-style-type: none"><li>• There were 218,873,616 people who received at least one dosage of Covaxin, Oxford–AstraZeneca vaccine, or Sputnik V vaccine.</li><li>• Covaxin, Oxford–AstraZeneca vaccine, or</li></ul> |

|                |                                                                                                                                                                                             |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | Sputnik V vaccine have been given to about 50,086,783 people.                                                                                                                               |
| <b>Outcome</b> | <ul style="list-style-type: none"> <li>• At least one dose has been given to 16% of the Indian population.</li> <li>• Approximately 4% of India's population has got both doses.</li> </ul> |
| <b>Website</b> | MoHFW Home                                                                                                                                                                                  |

## **CHAPTER-2**

### **REVIEW OF LITERATURE**

#### **2.1 RESEARCH PAPERS REFERRED-**

Several studies have compared the effectiveness and efficacy of these two vaccines.

A study conducted in India **on immunogenic and reactogenic efficacy of Covaxin and Covishield: a comparative review** by S Das, SS Kar, S Samanta, found that Covishield was more effective than Covaxin in preventing symptomatic COVID-19 infections, with an efficacy of 63.09% compared to 50.38% for Covaxin. However, both vaccines showed high efficacy in preventing severe disease, hospitalization, and death. SARS-CoV-2, an RNA virus, was first identified in Wuhan, China, in December 2019. The WHO declared COVID-19 a global pandemic in 2020, prompting the development of safe and effective vaccines. India initiated a vaccination campaign in 2021 with Covaxin and Covishield, with Covishield showing 90% efficacy and Covaxin with 80% efficacy.<sup>6</sup>

The study on **Effectiveness of BBV152/Covaxin and AZD1222/Covishield vaccines against severe COVID-19 and B.1.617.2/Delta variant in India, 2021: a multi-centric hospital-based case-control study** was done by Tarun Bhatnagar & Shirshendu Chaudhuri assessed the effectiveness of BBV152 Covaxin and AZD1222 Covishield vaccines in preventing severe COVID-19 in India. Results showed 85% VE for complete vaccination and 71% for BBV152/Covaxin, with the highest VE observed at 6-8 weeks.

The findings can guide public health policies and vaccination strategies to control COVID-19 spread. t highlights the importance of timely administration of two doses and the optimal interval between the doses. The findings of this study can guide public health policies and vaccination strategies aimed at controlling the spread of COVID-19 in India.<sup>7</sup>

The study on **Effectiveness of COVID-19 vaccine (Covaxin) against breakthrough SARS-CoV-2 infection in India** by Priyamadhaba Behera, Arvind Kumar Singh, Sonu Hangma Subba, Arjun Mc, Dinesh Prasad Sahu, Pradnya Dilip Chandanshive in India assessed the effectiveness of Covaxin, a COVID-19 vaccine developed by the Indian Council of Medical Research and Bharat Biotech Ltd, in preventing breakthrough SARS-CoV-2 infections among healthcare workers. The study included 670 participants and used a test-negative matched case-control design. After adjusting for age, gender, and previous history of COVID-19, the vaccine showed a modest effectiveness of 22% in preventing breakthrough infections. The findings can guide public health policies and vaccination strategies to control COVID-19 spread among healthcare workers in India.<sup>8</sup>

This study on **Effectiveness of Covid-19 vaccines (Covishield™ and Covaxin®) in healthcare**

**workers in Mumbai, India: A retrospective cohort analysis** by Aashish Contractor, Shashikala Shivaprakash, Anjali Tiwari, Maninder Singh Setia, Tarang Gianchandani analyzed data from 2762 healthcare workers in Mumbai, India, from January to October 2021, to assess the effectiveness of COVID-19 vaccination in reducing infection rates among healthcare workers. The study-maintained vaccination records and tested HCWs at least once a week and when symptomatic. The incidence rate was 0.067/100 person-days, with a higher rate in the unvaccinated/partially vaccinated group compared to the fully vaccinated group. The vaccine effectiveness (VE) for full vaccination was 70%, while the VE in completely vaccinated and with a history of previous infection was 88%. Only 11 HCWs required hospitalization, and none reported any severe adverse events after vaccination. The study found that complete vaccination reduced the rate of infection, particularly severe infection, in HCWs even during the severe delta wave in the country. Hospitalization rates were very low among those infected, and none died. Previous infection with COVID-19 and complete vaccination had a significantly higher effectiveness in preventing infection. The findings can guide public health policies and vaccination strategies to control COVID-19 spread among healthcare workers in India. It also emphasizes the importance of continued monitoring of vaccine effectiveness in real-world settings, particularly among high-risk groups like healthcare workers.<sup>9</sup>

**The Inactivated vaccine Covaxin BBV152: A systematic review** by Tousief Irshad Ahmed, Saqib Rishi, Summaiya Irshad, Jyoti Aggarwal, Karan Happa, and Sheikh Mansoor examines 25 studies on Bharat Biotech's Whole Virion Inactivated Corona Virus Antigen BBV152 (Covaxin), India's indigenous response to the SARS-CoV-2 pandemic. The results show promising immunogenicity and a 93.4% efficacy against severe COVID-19. However, Covaxin's immunogenicity performance is mediocre, with lower efficacy than Covishield. The review suggests exploring heterologous prime-boost vaccination with a combination of an inactivated and adenoviral vector-based vaccine for future variants. The findings can guide public health policies and vaccination strategies to control COVID-19 spread in India and other countries. Further research is needed to explore Covaxin's potential in heterologous prime-boost vaccination and its effectiveness against emerging SARS-CoV-2 variants.<sup>10</sup>

**A study on the Persistent Health Issues, Adverse Events, and Effectiveness of Vaccines during the Second Wave of COVID-19: A Cohort Study from a Tertiary Hospital in North India** by Upinder Kaur, Sapna Bala, Aditi Joshi assessed COVID-19 vaccine effectiveness, adverse events of significant concern (AESCs), and persistent health issues among individuals receiving COVID-19 vaccines. The study found that two doses of the vaccine had a maximum effectiveness of 17% in preventing COVID-19 occurrence. Individuals with only one dose had a 1.27-times increased risk of COVID-19. Prior SARS-CoV-2 infection provided strong protection, while full vaccination reduced the risk of moderate-severe COVID-19 by 57%. Lung disease had a 2.54-times increased risk of moderate-severe COVID-19, regardless of vaccination status. AESC events were observed in 33 out of 2544 vaccine recipients (1.3%). The study highlights the need for focused research on



the association between asthma and hypothyroidism with COVID-19 outcomes and the effectiveness of COVID-19 vaccines against emerging variants of SARS-CoV-2.<sup>11</sup>

A case-control study by Chandramani Singh, Bijaya Nanda Naik, Sanjay Pandey, Bijit Biswas, Binod Kumar Pati, Manisha Verma and Prabhat Kumar Singh was conducted in Bihar, India, to evaluate the effectiveness of COVID-19 vaccines in preventing infection and reducing disease severity. The study involved individuals aged 45 and above, diagnosed with COVID-19 and attending the All India Institute of Medical Sciences (AIIMS) in Patna. Controls were individuals who tested negative for SARS-CoV-2. The adjusted VE for partial and full vaccinations was 52.0% and 83.0%, respectively. Vaccinated individuals had shorter hospital stays and lower disease severity compared to unvaccinated individuals. The study found that approximately four out of every five fully vaccinated individuals were protected from contracting SARS-CoV-2 infection, resulting in shorter hospital stays and decreased disease severity.<sup>12</sup>

The study on **Effectiveness of Covishield vaccine in preventing Covid-19 – A test-negative case-control study** by Stuti Pramod, Dhanajayan Govindan, Premkumar Ramasubramani, Sitanshu Sekhar Kar, Rakesh Aggarwal evaluated the vaccine effectiveness (VE) of Covishield, similar to AstraZeneca, in preventing laboratory-confirmed Covid-19. A test-negative case-control design was used, and 360 case-control pairs were compared. Results showed that one dose and two doses of Covishield provided 49% and 54% protection, respectively. The VE for moderately severe cases requiring oxygen therapy was 95%. The Covishield vaccine demonstrated significant protection against Covid-19, with a higher rate of protection observed in severe forms.<sup>13</sup>

A study on **COVISHIELD (AZD1222) Vaccine effectiveness among healthcare and frontline Workers of Indian Armed Forces: Interim results of VIN-WIN Cohort Study** by Subhadeep Ghosh,<sup>a</sup> Subramanian Shankar,<sup>b,\*</sup> Kaustuv Chatterjee,<sup>c</sup> Kaushik Chatterjee,<sup>d</sup> Arun Kumar Yadav,<sup>e</sup> Kapil Pandya,<sup>f</sup> Vani Suryam,<sup>g</sup> Sunil Agrawal,<sup>h</sup> Sougat Ray,<sup>i</sup> Vivek Phutane,<sup>j</sup> and Rajat Datta<sup>k</sup> states that India initiated its COVID-19 immunization program on January 16, 2021, with 1.59 million Health Care Workers and Frontline Workers receiving the COVISHIELD vaccine (AstraZeneca). The VIN-WIN cohort study analysed data from 1,595,630 individuals, with 95.4% partially vaccinated and 82.2% fully vaccinated by May 30, 2021. The study found a reduction of approximately 93% in breakthrough COVID-19 infections with the COVISHIELD vaccine. The corrected VE against infections was estimated to be between 91.8% and 94.9%.<sup>14</sup>

A study on **Effectiveness of the ChAdOx1 nCoV-19 Coronavirus Vaccine (Covishield) in Preventing SARS-CoV2 Infection, Chennai, Tamil Nadu, India, 2021** by Sharan Murali,

Manikandanesan Sakthivel, Kamaraj Pattabi, Vettrichelvan Venkatasamy, Jeromie Wesley Vivian Thangaraj, Anita Shete, Alby John Varghese states that in Chennai, Tamil Nadu, India, evaluated the effectiveness of two doses of the ChAdOx1 nCoV-19 vaccine, <sup>15</sup>Covishield, in preventing COVID-19 infection among individuals aged 45 and above. The study enrolled 69,435 individuals, with 21,793 aged 45 and above. The coverage of Covishield was 18% for 18+ and 31% for 45+ individuals.

Genetic analysis revealed the presence of the delta variant and its sub-lineages. The effectiveness of Covishield against COVID-19 in the  $\geq 45$  age group was estimated to be 61.3% at least 2 weeks after receiving the second dose. Future studies should account for emerging variants and newer vaccines to ensure effective protection against COVID-19 infection. (Refer Annexure)

## **2.2 LEARNINGS FROM REVIEW OF LITERATURE**

### **1. Vaccine Development and Background:**

- Provide an overview of Covaxin and Covishield, including their development process, technology platforms used, and manufacturers (Bharat Biotech and Serum Institute of India, respectively).
- Discuss the importance of COVID-19 vaccination and the need for comparative studies to assess the efficacy and efficiency of different vaccines.

### **2. Efficacy:**

- Evaluate the clinical trials of Covaxin and Covishield, highlighting the study design, sample size, participant demographics, and endpoints used to measure efficacy.
- Compare the vaccine efficacy results reported in the literature, including the prevention of symptomatic COVID-19, severe disease, hospitalization, and mortality.
- Consider the variations in efficacy against different SARS-CoV-2 variants (e.g., Alpha, Beta, Delta) and any available data on vaccine effectiveness against emerging variants.

### **3. Safety and Adverse Events:**

- Assess the safety profiles of Covaxin and Covishield based on clinical trial data, post-authorization monitoring, and real-world evidence.
- Discuss common and rare adverse events reported with each vaccine, including local and

systemic reactions, allergic reactions, or any other safety concerns.

- Compare the incidence and severity of adverse events between the two vaccines.

#### **4. Immunogenicity and Duration of Protection:**

- Review the literature on immune responses elicited by Covaxin and Covishield, such as the development of neutralizing antibodies, cellular immune responses, and T-cell activation.
- Examine the duration of protection provided by each vaccine, including data on antibody persistence and potential need for booster doses.

#### **5. Vaccine Deployment and Public Health Impact:**

- Discuss the global and national deployment strategies for Covaxin and Covishield, including their availability, distribution, and accessibility in different countries.
- Evaluate the impact of these vaccines on reducing COVID-19 cases, hospitalizations, and mortality rates, based on real-world evidence and observational studies.
- Consider the socioeconomic factors influencing vaccine uptake, public acceptance, and vaccine hesitancy for both Covaxin and Covishield.

#### **6. Cost and Manufacturing Considerations:**

- Analyse the cost-effectiveness and affordability of Covaxin and Covishield, considering factors such as vaccine procurement, production scale, and global pricing.
- Discuss the challenges and successes in manufacturing these vaccines, including capacity, supply chain logistics, and technology transfer.

### **2.3 GAPS IDENTIFIED-**

- No such study shows that efficiency of covishield is more or vice-versa.
- Initially, one of the main challenges was the limited supply of vaccines, which caused difficulties in ensuring widespread access and distribution.
- Vaccine hesitancy refers to the reluctance or refusal to get vaccinated despite the availability of vaccines.
- Ensuring equitable access to vaccines across different regions and populations has been a significant challenge.
- The emergence of new variants of the SARS-CoV-2 virus raises concerns about their potential impact on vaccine effectiveness.

## **CHAPTER-3. METHODOLOGY**

### **3.1 RESEARCH QUESTIONS-**

- **RQ1-** What are the factors that affect the efficacy & effectiveness of Covishield & Covaxin in protecting against COVID-19?
- **RQ 2-** What is the duration of protection offered by Covishield & Covaxin against COVID-19?
- **RQ3-**What is the public perception & acceptance of Covishield & Covaxin in terms of efficacy & safety?

### **3.2 STUDY OBJECTIVES-**

- **RO 1-**To evaluate the efficacy & effectiveness of Covishield & Covaxin in protecting against COVID-19
- **RO 2-** To examine the duration of protection offered by these two vaccines against COVID-19 virus.
- **RO 3-**To evaluate the safety of Covishield & Covaxin including the possible side effects (if any).

### **3.3 METHODOLOGY-**

Purposive sampling was used. This study was carried out in two parts respectively-

- In primary study, data was collected through questionnaire & responses of the participants were recorded.
- In the secondary study, literatures review was done & articles and journals were referred.

### **3.4 THE RESEARCH METHOD-**

The research focuses on understanding efficiency & effectiveness of Covaxin & Covishield. This study was conducted in College of Military Engineering, Pune in India to document the adverse and systemic reactions following exposure to the vaccine and to study the efficacy & effectiveness of covaxin & covishield.

All the participants who consented to the study were included. A self-administered online survey form [or google form] will be used as a tool to gather the primary data.

The e-survey tool has two sections: **Consent and then the main part.**

- If the respondent gives consent, the main part will open. Otherwise, the survey was closed after the consent part saying thanks.
- The tool was pre-tested with some friends who did not belong to CME, PUNE. Afterwards, the questionnaire was being circulated & also filled by me through telephonic conversations & by meeting them.
- In this research, we deal with how different vaccines have helped in dealing with different types of viruses and diseases.

In this study,

- Research Methods: Qualitative & Quantitative
- Data collection: Secondary, Books, Journals, Website.

### **3.5 STUDY DESIGN**

My study was observational in nature (Comparative Study).

### **3.6 METHOD FOR RESEARCH**

The two primary types of research methods used were qualitative and quantitative methods. Both approaches were utilized to meet the requirements of this study's research.

Non-numerical data was examined using the qualitative method, while numerical data, facts, and figures were examined using the quantitative method. This work made use of both methods to comprehend the statistical components and link them to theoretical data.

### **3.7 METHOD FOR DATA COLLECTION:**

#### **Primary data:**

- A self-administered online survey form [or google form] was used as a tool to gather the primary data.
- The e-survey tool has two sections: Consent and then main part. If the respondent gave consent, the main part had opened. Otherwise, the survey was closed after the consent part saying thanks.
- The tool was pre-tested with some friends who did not belong to CME, PUNE.

#### **Secondary data:**

- Literature review using various search engines like Google scholar, Pub-med, Research gate and various journals; Press release magazines, brochures, pamphlets, CDs, and written documents. (e.g., Inc 42, Daily Hunt etc.).

### **3.8 DATA SOURCE**

The questionnaire was the most important data source for this study. Also, Existing comparative studies for Covaxin and Covishield served as essential references. Scientific journals and publications have compared the two vaccines for providing individual data on Covaxin and Covishield. These studies offered insights into the vaccines' efficacy, immunogenicity, and adverse effects.

### **3.9 Data Analysis-**

For the data examination, in this study utilized a subjective procedure of study. I have summed up the meeting answers and have drawn the outcomes. In this, all the responses were taken into consideration. There are a total of 25 questions that were asked to the participants & only the most relevant for the study were considered.

- Firstly, the entire data was put into spreadsheet to make it easier for analysis. The complete analysis was done using MS-excel. The questions which seem relevant were primarily considered & result for them was drawn on priority. Formula was used to carry out the percentage.
- As there were a total of 117 participants out of 125 who participated in the survey.
- So,  $117/125 \times 100 = 93.6\%$  people took part voluntarily in this survey.

- And on 117 participants the questionnaire was conducted based upon their responses.
- Percentage was calculated using the basic mathematical formula & graphs were drawn (pie-charts & histograms)
- **Formula (%) = VALUE/ TOTAL VALUES\*100**

Hence, calculated using this formula & graphs were plotted, respectively.

### **3.10 ETHICAL ISSUES:**

When conducting research, ethical considerations take precedence throughout the study. Throughout the course of the research, privacy and confidentiality have been upheld whenever possible.

In addition, the confidentiality of the data is maintained, and no sensitive information that could compromise the personal information of participants is disclosed.

Few things were also taken into consideration-

- 1) Voluntary participation was ensured. Consent form was used. No incentives were provided to the respondents and participation was voluntary.
- 2) All data was either computer or smart phone entered thus minimizing errors of data entry.

## **CHAPTER-4. RESULT**

### **4.1 Age Distribution Of The Respondents**

**Figure 1: Age Distribution Of The Respondents**

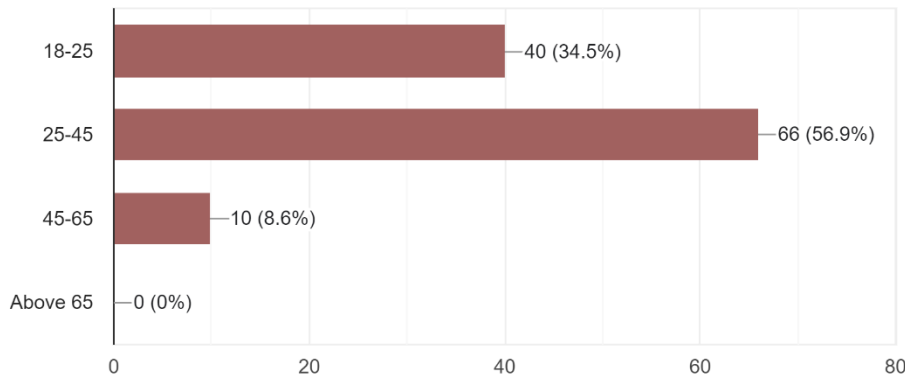
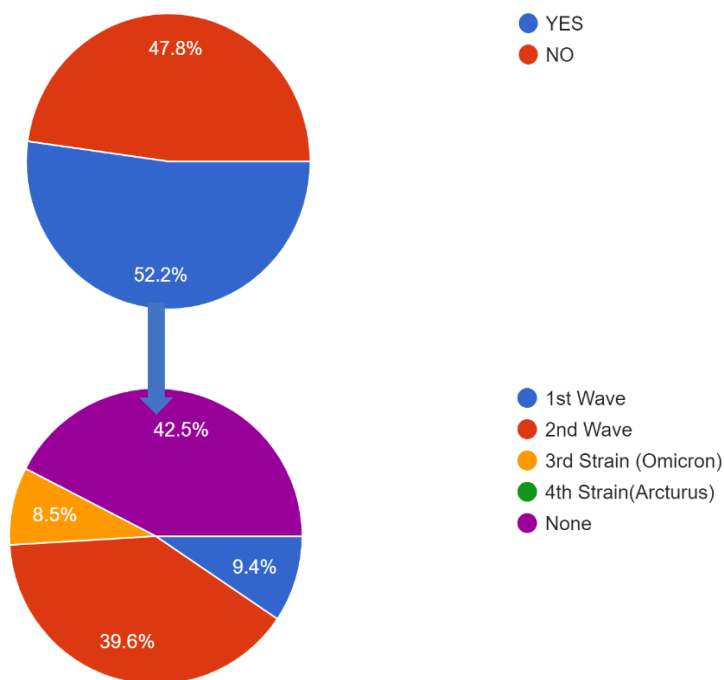


Fig1 depicts that around three-fourth (56.9%) respondents out of 117 fall under the age group of 25-45yrs, more than one-third (34.5%) respondents comes under the age group of 18-25yrs, rest 8.6% comes under 45-65 yrs. None were found to be in the age group of above 65yrs.

### **4.2 PEOPLE EXPERIENCED COVID**

**Figure 2: PEOPLE EXPERIENCED COVID**

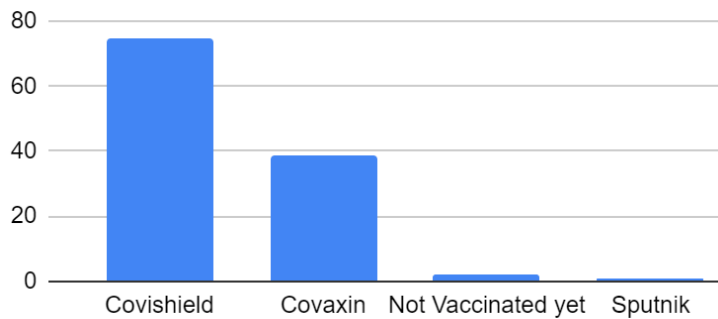


**Fig 2** reflects that there were a total of 64 male, accounting for 54.7% & 53 females that accounts for 45.3% out of 117 who participated. 60 participants were affected during COVID-19, which turns out to be 52.2%. out of which - 9.4% got affected in first wave, 39.6% got affected in second wave, 8.5% & none in the fourth wave. There was a total of 45 participants who were not affected in any wave, which accounts to 42.5%



### 4.3 TYPE OF VACCINATION RECEIVED

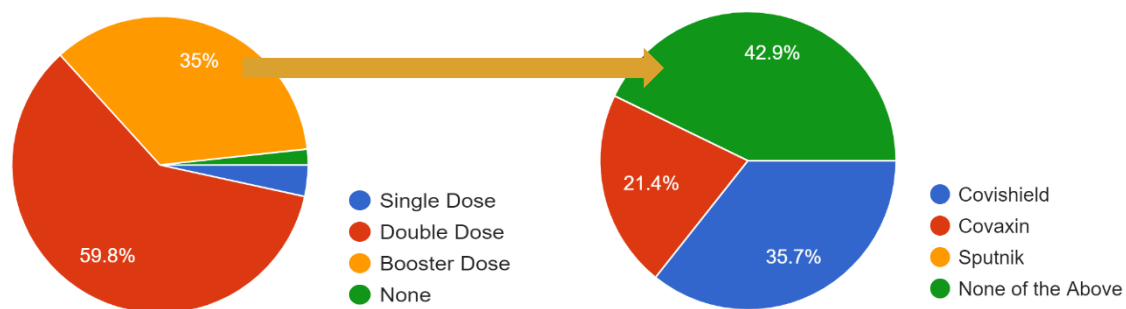
**Figure 3: TYPE OF VACCINATION RECEIVED**



**Fig 3.** According to the data provided, most participants, 75 out of 117 (64.1%), received the Covishield vaccine. Following closely behind, 39 participants (33.3%) received the Covaxin vaccine. A small number of participants received the Sputnik vaccine. Surprisingly, there are still 2 participants (1.7%) who have not received any vaccination yet. These numbers reflect the distribution of vaccines among the participants, highlighting the prevalence of Covishield and Covaxin as the primary choices, with a smaller number opting for Sputnik, while a few individuals remain unvaccinated at this point.

### 4.4 TYPES OF DOSE

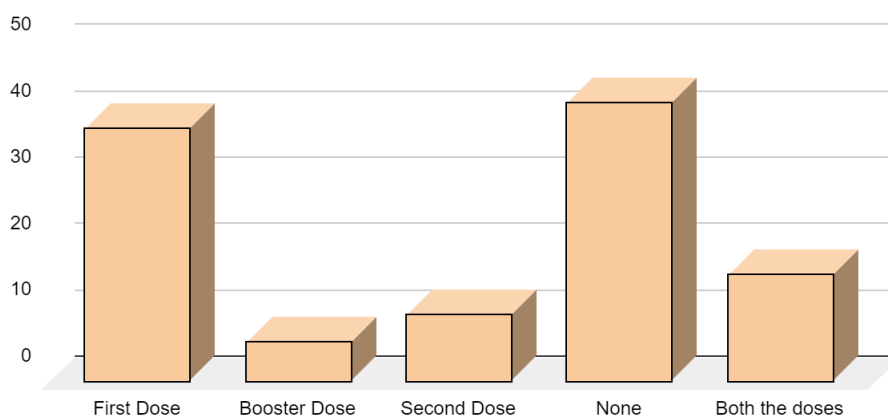
**Figure 4- Types & Frequency of vaccine**



**Fig 4** states that out of the 35% - which is 30 participants who received the booster dose maximum participants preferred covishield over covaxin due to their preferred advantages.

### 4.5 ADVERSE EFFECT AFTER RECEIVING THE DOSE

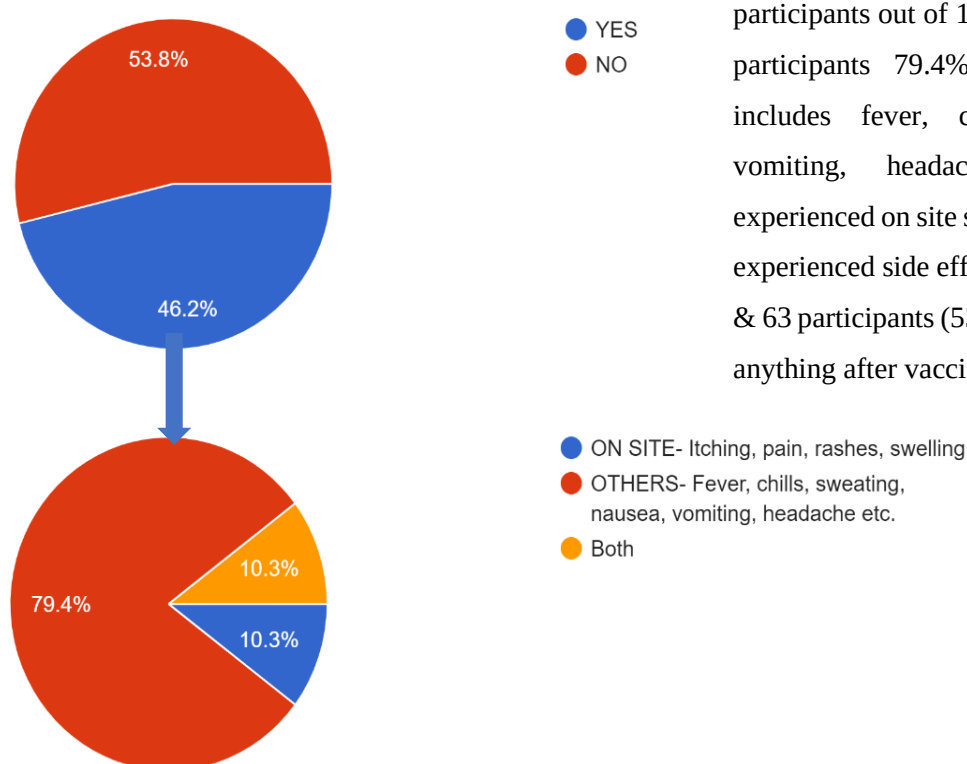
**Figure 5: ADVERSE EFFECT AFTER RECEIVING THE DOSE**



**In Fig5** the maximum affect of adversity was seen after first dose which is 38 out 117 accounting to 33% and the rest comparatively lesser affect which is 10 for dose 2 (9%), for both the doses – 16 (15%) and the rest showing no adverse effects – 42(37%).

#### **4.6 SIDE EFFECTS AFTER RECEIVING VACCINE**

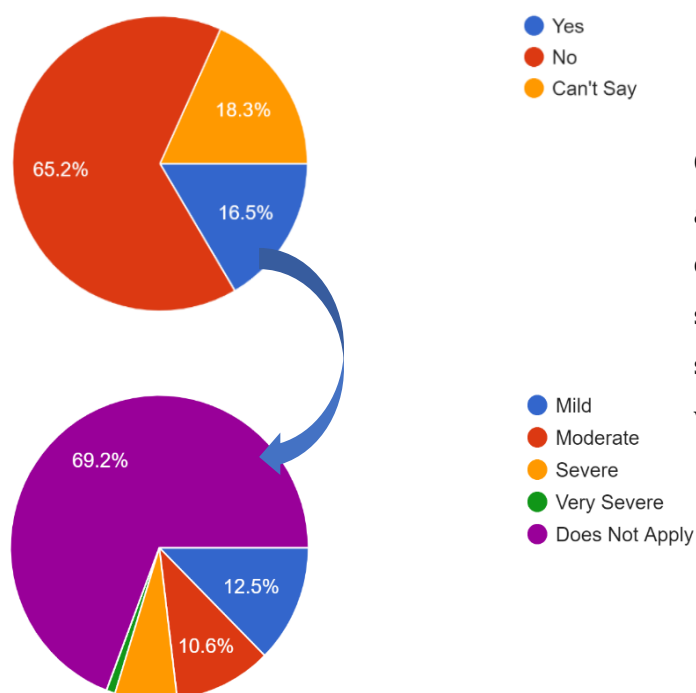
**Figure 6: SIDE EFFECTS AFTER RECEIVING**



**Fig 6.** Reflects that there are a total of 54 participants out of 117 (46.2%) - Out of 46.2% participants 79.4% have side effects that includes fever, chills, sweating, nausea, vomiting, headache etc. 10.3% have experienced on site symptoms & both who have experienced side effects after receiving vaccine & 63 participants (53.8%) have not experienced anything after vaccination.

#### **4.7 SUFFERED WITH COVID AFTER VACCINATION**

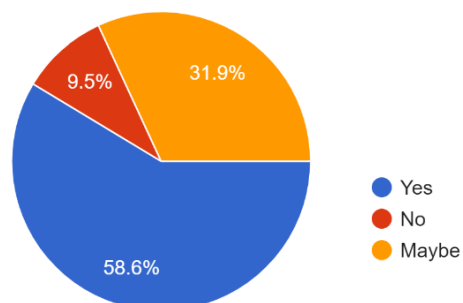
**Figure 7: SUFFERED WITH COVID POSRT VACCINATION**



Out of 117 participants, 19 suffered from covid after vaccination. Fig7 implies that (16.5%)- out of which 12.5% showed mild symptoms, 10.6% showed moderate symptoms & rest 70% with no symptoms. & 75 did not suffer from Covid post vaccination. (65.2%).

#### **4.8 SAFETY AGAINST COVID AFTER VACCINATION**

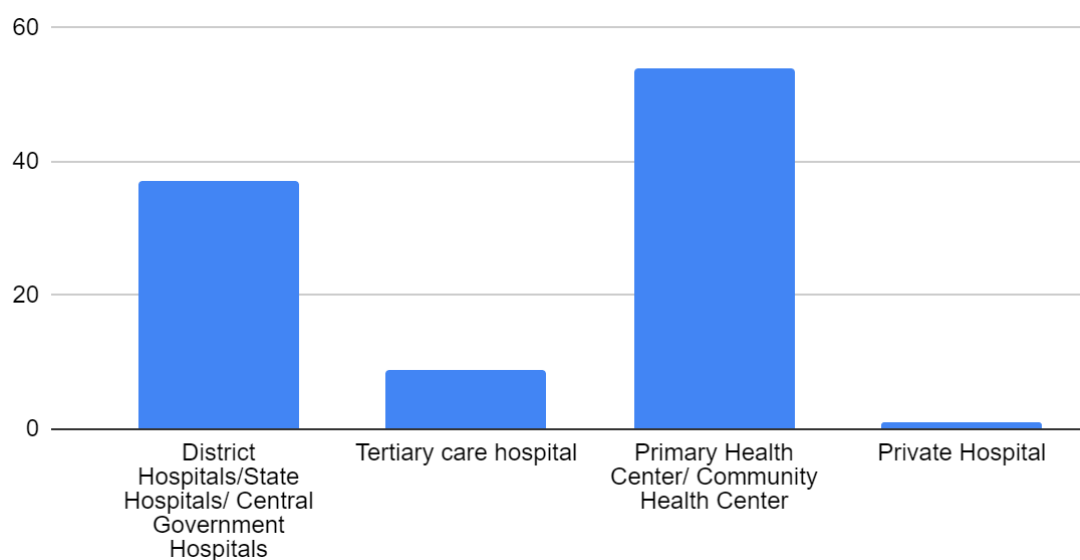
**Figure 8: SAFETY AGAINST COVID AFTER VACCINATION**



**Fig 8.** Implies that Out of 117 participants, 66 were confident of vaccine , 15 were not confident & rest 46 were unsure about the confidence in Vaccination

#### **4.9 ACCESSIBILITY TO VACCINATION**

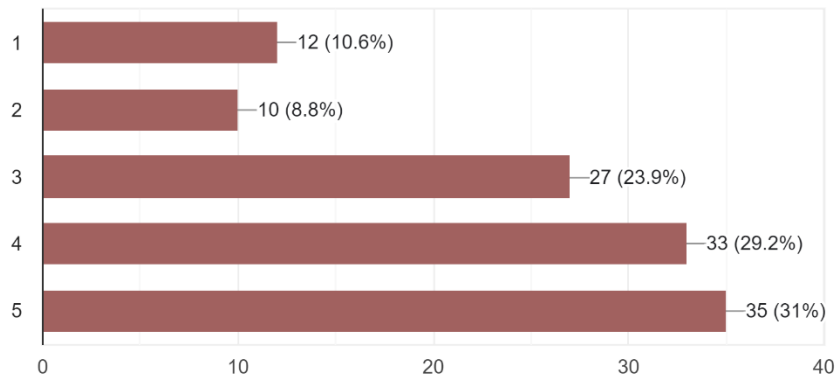
**Figure 9: ACCESSIBILITY TO VACCINATION**



It is evident from Figure 9 that around 50% had access to primary health centre & 30 % had access to Govt Hospitals & the rest preferred tertiary and private health facilities for the vaccination.

#### **4.10 CONFIDENCE IN VACCINATION**

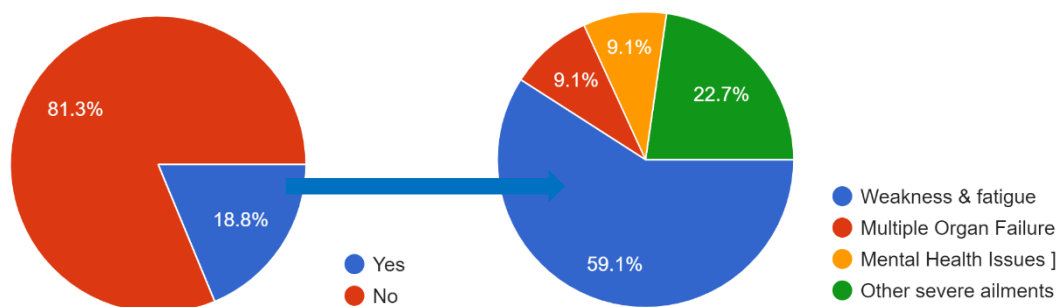
**Figure 10: CONFIDENCE IN VACCINATION**



**Fig 10.** Implies that Here a scale of 1-5 is taken. Where 1 indicates least confident and 5 indicates most confident. Hence, if we observe it on an average around 60% of participants (4-5) feel confident about the vaccination, which accounts to majority being very confident of vaccine.

#### **4.11 SIDE EFFECTS FOLLOWING A MEDICAL CONDITION**

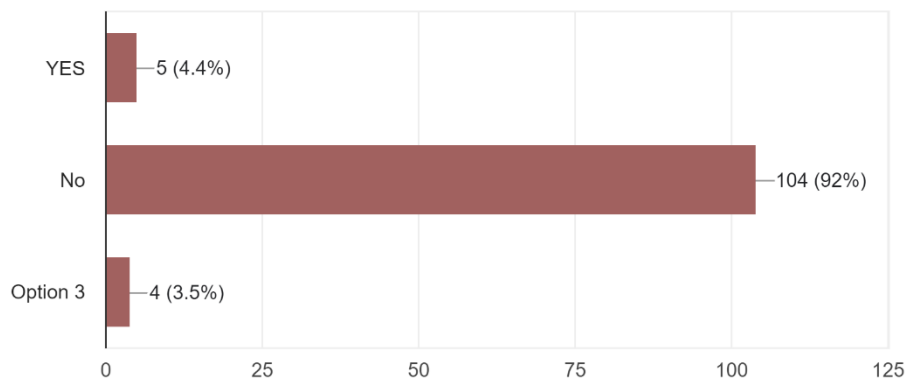
**Figure 11: SIDE EFFECTS FOLLOWING A MEDICAL CONDITION**



**Fig 11** reveals that participants with a medical condition around 19% suffered with side affects following the vaccination where in around 60% faced weakness & fatigue, around 10% faced mental illness & multiple organ failures & the rest faced other severe ailments.

#### **4.12 BEEN HOSPITALISED FOR ANY MEDICAL CONDITION FOLLOWING COVID**

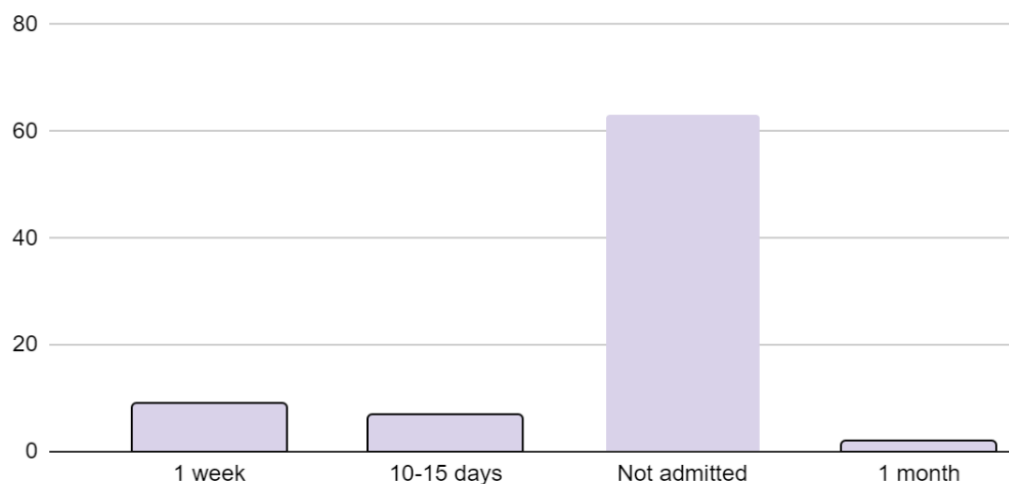
**Figure 12: BEEN HOSPITALISED FOR ANY MEDICAL CONDITION FOLLOWING COVID**



It is evident from Figure12 that participants who were hospitalised following were very less accounting to just 5% (5 participants) & the rest weren't hospitalised.

#### **4.13 ALOS AT HOSPITAL FOR COVID TREATMENT**

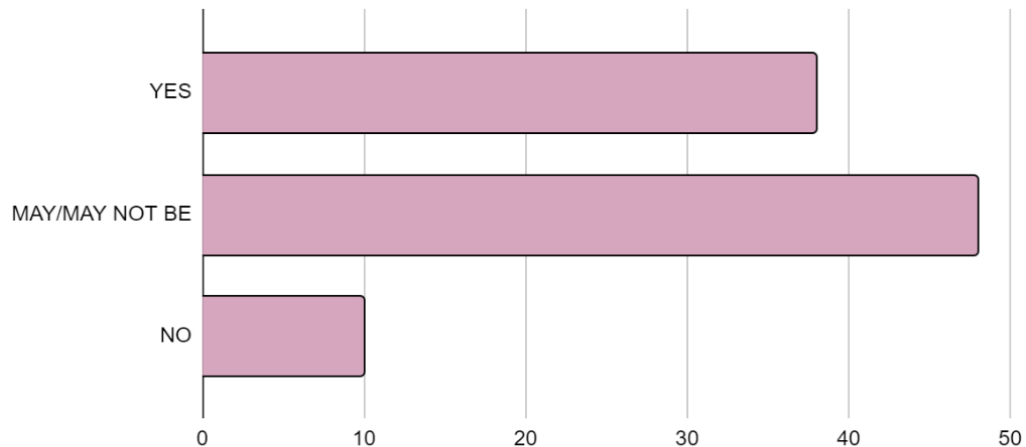
**Figure 13: ALOS AT HOSPITAL FOR COVID TREATMENT**



**Fig 13.** Clearly states that participants who were hospitalised for one week were around 10, & for 10-15 days were around 8. It is significant that around 65 participants were not hospitalised & very less participants were admitted over a month for treatment.

#### **4.14 Effectiveness of booster (& if it should be taken mandatorily by each & every individual)**

**Figure 14: Effectiveness of booster (& if it should be taken mandatorily by each & every individual)**



**Fig 14** reflects that 42 participants out of 117 have felt the effectiveness for booster dose, while only 15 participants denied the same & the rest were not sure about its effectiveness.

Hence, from the responses on the questionnaire(primary data) & the secondary data, it is found that Covishield is more effective than covaxin due to the following reasons-

- Due to less side effects than covaxin.
- Due to better availability at various healthcare facilities.

4.15

### **4.1.1 STUDY-1**

#### **To evaluate the efficacy & effectiveness of Covishield & Covaxin in protecting against COVID-19**

Referring to our data, around 75 out of 117 participants have received covishield & only 39 participants have received covaxin.

The following information about the vaccines' efficacy rates is essential:

| <b>COVISHIELD</b>                                                                                                              | <b>COVAXIN</b>                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| The effectiveness of this covid injection ranges from 70% to 90%.                                                              | If used in a phase 3 trial with Covaxin, it will have a 78% to 81% effect.                                                    |
| We request that you just utilize the inoculation under the oversight from specialists and that you adhere to their guidelines. | Nothing should be used unless the doctor has approved it, and the injection should only be performed under their supervision. |
| Covishield can only be used by people who are older than 12 years old.                                                         | These injections are only given to people who are over the age of 18.                                                         |
| Following 4 - two months following the subsequent antibody, you should rest for two to about fourteen days                     | You will receive this injection every four to six weeks.                                                                      |

### **4.1.2 STUDY-2**

#### **To examine the duration of protection offered by these two vaccines against COVID-19 virus.**

Covaxin, created by Bharat Biotech in India, was an inactivated immunization. Clinical preliminary information around then recommended that Covaxin gave assurance against Coronavirus after two dosages. Nonetheless, the length of security presented by Covaxin was not broadly considered or laid out by that point.

Covishield, created by the College of Oxford and AstraZeneca, was a viral vector immunization in light

of a chimpanzee adenovirus. The clinical preliminaries of Covishield showed that it gave assurance against Coronavirus after two dosages. The term of security presented by Covishield was additionally not set in stone during my last update.

It was critical to take note of that examination and concentrates on Coronavirus antibodies are progressing, and new data is continually arising. I would suggest counseling refreshed sources, for example, official wellbeing associations or late logical examinations for the most dependable and exceptional data on the length of assurance given by Covaxin and Covishield against Coronavirus.

### **4.1.3 STUDY-3**

#### **To evaluate the safety of Covishield & Covaxin including the possible side effects (if any)**

Covishield (Oxford-AstraZeneca vaccine) received emergency use authorization in India. Covaxin (Bharat Biotech vaccine) also underwent rigorous testing in clinical trials to establish its safety and effectiveness. Common side effects include pain at the injection site, headache, fatigue, muscle pain, fever, nausea, and joint pain. Severe allergic reactions to the vaccine are rare but possible but can occur.



## **CHAPTER-5. DISCUSSION**

The Coronavirus immunizations give security against the sickness by evoking a partner degree response to the SARS-Cov-2 infection. Immunity can be obtained through vaccination, lowering the likelihood of contracting the disease and its effects. This immunity will assist you in fighting the virus if you become infected.

The authors decided to divide this work into two parts for pedagogical and content reasons because the real panorama, including data creation, is considered a complicated topic that provides interfaces with numerous information sectors and global activities.

The philosophy part incorporated the initial two parts of a mechanical sort, as well as confined and RnD approaches, which were investigated in more noteworthy profundity for the ongoing paper. The excess three models, which relate to parts of money, cooperation programs, and the creation and production network for Coronavirus immunizations, will be examined in a future article.

As an outcome, a layout of the most evolved Coronavirus competitor immunizations will be given at time spans front and trailed by the two speed increase factors, as referenced prior, at stretches the extent of open development, and at stretches the knowledge of offering remarks future ways that for the occasion of inoculation projects to battle different pandemics and sicknesses.

Covaxin was an inactivated vaccine developed by Bharat Biotech in India. In clinical studies, Covaxin had shown efficacy against symptomatic COVID-19. Data from phase 3 clinical trials published by Bharat Biotech in March 2021 indicates an overall efficacy of 78% in mild, moderate and severe COVID-19.

It had also proven effective against multiple variants of SARS-CoV-2. Covishield was the local name of the Oxford-AstraZeneca vaccine, which was a viral vector vaccine. Clinical trials of Covishield have demonstrated its effectiveness in preventing symptomatic COVID-19.

Data from phase 3 studies in the UK, Brazil and South Africa showed an average efficacy of approximately 70-90 for two doses, depending on the dosing interval. Both vaccines have been widely used in vaccination campaigns around the world and have helped contain the spread of COVID-19.

Efficacy refers to the vaccine's ability to prevent disease, while efficiency refers to the overall effectiveness of the vaccination program, including factors such as distribution, administration, and public health impact. It should be noted that real data and ongoing studies have provided more information on the efficacy and effectiveness of these vaccines.

These vaccines had undergone rigorous testing and regulatory approval processes to ensure their safety and effectiveness. Monitoring agencies continue to collect data on their long-term effectiveness, actual outcomes, and responses to new options. For the most accurate and up-to-date information on the efficacy and effectiveness of Covaxin and Covishield, we encourage you to contact the official public health, research and regulatory agencies involved in the monitoring and evaluation of COVID-19 vaccines.

The initial clinical trials conducted by the manufacturers of both vaccines demonstrated promising results in terms of immunogenicity and safety. These studies provided the basis for emergency use authorization. Real-world effectiveness studies have been conducted to assess how the vaccines perform in real-world conditions. These studies evaluate the vaccines' ability to prevent COVID-19 infections, severe illness, hospitalization, and mortality. They also consider the effectiveness against different variants of the virus. These studies typically involve large cohorts of vaccinated individuals and analyse the outcomes in terms of vaccine effectiveness, side effects, and adverse events.

Several studies have focused on analyzing the immunological responses elicited by Covaxin and Covishield. These studies examine the production of antibodies and the cellular immune response generated by the vaccines. They also investigate the duration of immune response and the potential need for booster doses. As new variants of the SARS-CoV-2 virus emerge, researchers have also investigated the effectiveness of Covaxin and Covishield against these variants. Some studies have specifically evaluated the vaccines' ability to neutralize different strains, such as the Delta variant.

It is important to note that the findings of these studies may vary, and new research is continually being published. It is always recommended to refer to the most recent and authoritative sources for up-to-date information on the comparative efficacy and efficiency of Covaxin and Covishield. Additionally, it's advisable to consult healthcare professionals and official health agencies for guidance regarding vaccination choices and COVID-19 prevention strategies.

## **CHAPTER-6. CONCLUSION**

### **The efficacy & effectiveness of Covishield & Covaxin in protecting against COVID-19**

- Referring to our data, around 75 out of 117 participants have received covishield & only 39 participants have received covaxin.
- It is important to note that vaccine efficacy and effectiveness can vary based on several factors, including the study population, the prevalence of different variants, and the time elapsed since vaccination.
- Additionally, the efficacy and effectiveness of both Covishield and Covaxin against emerging variants, such as the Delta and other variants of concern, may evolve over time as new data becomes available.

### **To examine the duration of protection offered by these two vaccines against COVID-19 virus.**

- Covaxin, created by Bharat Biotech in India, was an inactivated immunization. Clinical preliminary information around then recommended that Covaxin gave assurance against Coronavirus after two dosages. Nonetheless, the length of security presented by Covaxin was not broadly considered or laid out by that point.
- Covishield, created by the College of Oxford and AstraZeneca, was a viral vector immunization in the light of a chimpanzee adenovirus. The clinical preliminaries of Covishield showed that it gave assurance against Coronavirus after two dosages. The term of security presented by Covishield was additionally not set in stone during my last update.
- It was critical to take note of that examination and concentrates on Coronavirus antibodies are progressing, and new data is continually arising. I would suggest counseling refreshed sources, for example, official wellbeing associations or late logical examinations for the most dependable and exceptional data on the length of assurance given by Covaxin and Covishield against Coronavirus.

### **To evaluate the safety of Covishield & Covaxin including the possible side effects (if any)**

- Covishield (Oxford-AstraZeneca vaccine) received emergency use authorization in India. Covaxin (Bharat Biotech vaccine) also underwent rigorous testing in clinical trials to establish

its safety and effectiveness. Common side effects include pain at the injection site, headache, fatigue, muscle pain, fever, nausea, and joint pain. Severe allergic reactions to the vaccine are rare but possible but can occur.

- As a result of the global emergency, these factors are likely to guide drug research and development, particularly during pandemics. In the light of the doubts among public following the vaccine's emergency approval, the study attempted to influence concerns regarding the vaccine's safety. The study's highlight is the absence of serious side effects and systemic effects that affected day-to-day activities.
- Our population's relatively lower severity of adverse effects and systemic effects may indicate better tolerability in this region. In India, there are currently no data on post-vaccination safety. It is debatable whether vaccination should be delayed until long-term safety data are available.
- In this unique circumstance, our review turns out to be more applicable in dispersing transient security information post-immunization. People will be benefitted from this when making the decision to self-vaccinate.

## **Chapter 7. SUGGESTIONS**

Following suggestions can be drawn from the study-

- ❖ **Conduct Research:** Continue to conduct rigorous studies and clinical trials to evaluate the effectiveness and duration of protection afforded by vaccines. This will help optimize the dosing regimen and identify potential immune gaps.
- ❖ **Variant surveillance:** Monitor and study emerging variants of the COVID-19 virus to ensure vaccines against these variants remain effective. Regular monitoring can help identify the need for vaccine modifications or booster doses.
- ❖ **Vaccine Boosters:** Assess the need for booster doses to improve and prolong immunization protection, particularly in high-risk or immune-compromised groups. Boosters can help boost your immune response against COVID-19.
- ❖ **Vaccine Distribution and Access:** Improving the efficiency of the vaccine distribution network to ensure universal and equitable access to vaccines. This may include improving logistics, cold chain management and strengthening vaccination infrastructure.
- ❖ **Vaccination Confidence and Education:** Continue public education campaigns to address vaccine hesitancy and misinformation and build vaccine confidence. Clear and accurate communication about the safety, efficacy and benefits of vaccines can help achieve higher immunization rates.
- ❖ **Collaboration and Production Capabilities:** Strengthen collaboration between vaccine manufacturers, research institutes and regulators to ensure efficient production, quality control and distribution of vaccines. Increased production capacity could help meet global demand for COVID-19 vaccines.
- ❖ **Vaccine Research and Development:** Invest in ongoing research and development to improve vaccine technology, including the development of new vaccine platforms or formulations that may provide higher potency, broader protection against variants, and more durable improvement in immunity. It is important to note that these proposals are not exhaustive, and that scientists, regulators and vaccine manufacturers play a key role in the implementation of vaccine modifications or improvements.

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- 
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# **ANNEXURE**

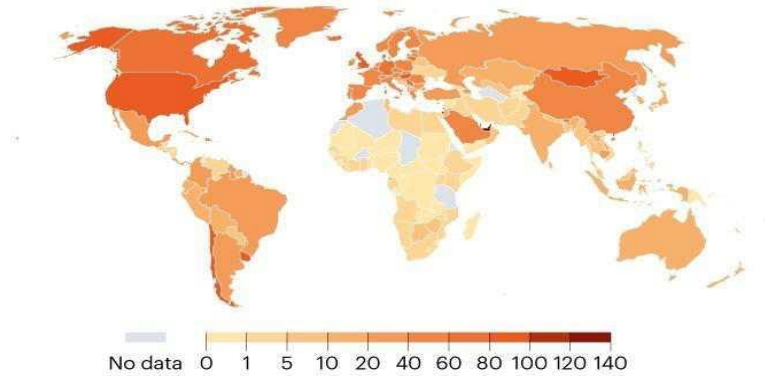
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# PHOTO GALLERY

**Image-3.16.1**

**GLOBAL DOSES**

Vaccine roll-outs are uneven across the world, as shown by the number of COVID-19 vaccine doses administered per 100 people in the total population\*.



**Image-3.16.4 COVISHIELD**



**Image-3.16.5 COVAXIN**



### 3.16.6 (A) COMPARISON BETWEEN COVISHIELD & COVAXIN

## **Covishield vs Covaxin**

### Comparison Chart

| Covishield                                                                                                          | Covaxin                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Developed by the University of Oxford and AstraZeneca, and locally manufactured by the Serum Institute of India.    | Developed by Hyderabad-based Bharat Biotech in collaboration with ICMR and Pune-based National Institute of Virology.                        |
| Covishield is a Recombinant COVID-19 vaccine based on Viral Vector Technology which uses the chimpanzee adenovirus. | Covaxin is a whole inactivated COVID-19 vaccine candidate developed from the Indian strain of novel Coronavirus and made using dead viruses. |
| The number of doses in each vial is 10.                                                                             | The number of doses in each vial is 20.                                                                                                      |
| Efficacy goes up to 90% when there is a gap of more than 28 days between the doses.                                 | An average efficacy of 60% to 70% based on the phase 3 clinical trials.                                                                      |
|                                                                                                                     |                                                         |



**Image-3.16.6 (B) COMPARISON BETWEEN COVISHIELD & COVAXIN**

# WHO SHOULDN'T TAKE VACCINE SHOTS

INDIA TODAY GROUP

**Don't take**

| COVAXIN                                                                                                                                                                                                                       | COVISHIELD                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>If you have</b>                                                                                                                                                                                                            |                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>History of allergies</li> <li>Fever</li> <li>Bleeding disorder</li> <li>Received another Covid-19 vaccine</li> <li>Serious health issue detected by vaccine shot supervisor</li> </ul> | <ul style="list-style-type: none"> <li>Severe allergic reaction after a previous dose of this vaccine</li> <li>Severe allergic reaction to any ingredient of the vaccine</li> <li>Mentioned medical conditions and supervisor says 'no'</li> </ul> |
| <b>If you are</b>                                                                                                                                                                                                             |                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>Immune-compromised</li> <li>On a medicine that affects your immune system</li> <li>Pregnant</li> <li>Breastfeeding</li> <li>Are under 18-years-old</li> </ul>                          | <ul style="list-style-type: none"> <li>Pregnant or breastfeeding</li> <li>Not sure and may prefer to consult your healthcare provider</li> </ul>                                                                                                   |

Source: Bharat Biotech and Serum Institute of India fact sheets

DIU

Image-3.7

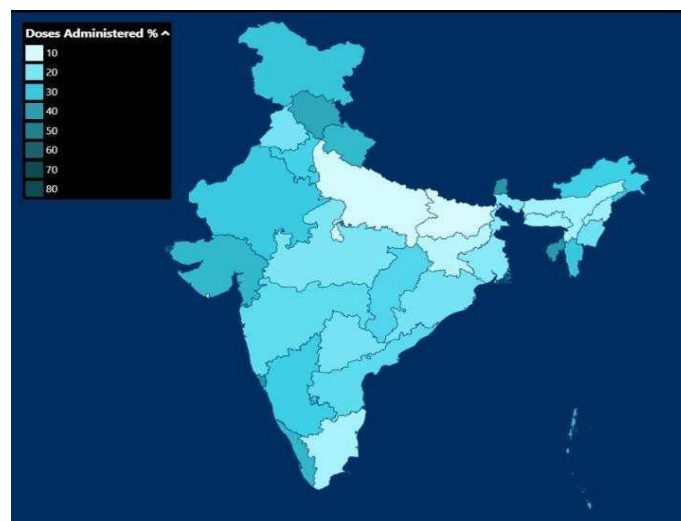


Image-3.17 COVID-19 VACCINE IN INDIA

## TABLES

### RESEARCH PAPERS REFERRED

| Authors & Years Published                                                                                                                                                    | Study Location     | Sample Size/ Source of Data                                                              | Key Findings                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Swarnali Das,</u><br><u>Sovan Samanta,</u><br><u>Jhimli Banerjee,</u><br><u>Biplab Giri &amp;</u><br><u>Sandeep Kumar Dash</u><br><br>2022                                | West Bengal, India | Government Database, Market Research Reports                                             | Covishield and Covaxin both should work well to elicit an immune response. However, their effectiveness against new COVID-19 variants requires additional research due to their distinct reactogenic profiles. |
| Emily Schueller, Eilli Klein, Garry Lin<br>2020                                                                                                                              | India              | Government Database Analysis                                                             | Before, during, or after the curfew of 21 days, the spread of Covid19 in India was unaffected by the closure.                                                                                                  |
| Khan Sharun, Kuldeep Dhama<br>2021                                                                                                                                           | India              | Covid19 Vaccine Portal, Online Database                                                  | India's ability to develop and mass produce inexpensive Covid19 vaccines will help meet global demand for vaccines without adding to the country's financial burden.                                           |
| <u>Abhijita Talukder,</u><br><u>Chayanika Kalita,</u><br><u>Nayanika Neog,</u><br><u>Chayanika Goswami,</u><br><u>Mrinal Kashyap Sarma,</u><br><u>Iswar Hazarika</u><br>2022 | India              | WHO EUL list, Phase 3 & 4 clinical trials, Government database, Bharat Biotech database, | It has been demonstrated that covaxin is generally safe and effective against COVID-19, and its effectiveness against newer strains of the virus is currently the subject of research.                         |

|                            |                   |                 |                                                                                                                                                                                                                                              |
|----------------------------|-------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            |                   |                 | Nonetheless, the viability and security of different antibodies against Coronavirus additionally shift, and the decision of immunization might rely upon variables like accessibility, neighborhood guidelines, and individual inclinations. |
| Kamala Thiagarajan<br>2021 | Tamil Nadu, India | Online Database | Efficacy rate of covaxin & covishield                                                                                                                                                                                                        |

#### **EFFICACY RATE BETWEEN COVISHIELD & COVAXIN**

| <b>COVISHIELD</b>                                                                                                              | <b>COVAXIN</b>                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| The effectiveness of this covid injection ranges from 70% to 90%.                                                              | If used in a phase 3 trial with Covaxin, it will have a 78% to 81% effect.                                                    |
| We request that you just utilize the inoculation under the oversight from specialists and that you adhere to their guidelines. | Nothing should be used unless the doctor has approved it, and the injection should only be performed under their supervision. |
| Covishield can only be used by people who are older than 12 years old.                                                         | These injections are only given to people who are over the age of 18.                                                         |
| Following 4 - two months following the subsequent antibody, you should rest for two to about fourteen days                     | You will receive this injection every four to six weeks.                                                                      |