



# PHARMACOVIGILANCE: A COMPARATIVE STUDY REGARDING SIDE EFFECTS OF COVISHIELD AND COVAXIN AT A GADHINGLAJ RURAL AREAS

Dr. Ismail S. Pasha<sup>2</sup>, Mr. Omprakash P. Jadhav<sup>3</sup>, Mr. Sonu B. Tandale<sup>1\*</sup>, Mr. Aniket C. Suryawanshi<sup>1</sup> Ms.  
Sadhana R. Bamane<sup>1</sup>

<sup>1</sup>Student, <sup>2</sup> Principal, <sup>3</sup> Assistant professor

Yashwant Redekar College of Pharmacy (B.Pharm & D.Pharm), Nesari, Kolhapur Maharashtra 416504

## Abstract

In India, a COVID-19 immunization campaign is presently underway. India completed the world's largest vaccination programme against the corona virus illness (COVID-19) for approximately 300 million priority groups on January 16, 2021, and rolled out the world's largest immunization movement. People were amazed as to why so many people were unaware of the distinctions between these two vaccines, despite the government's efforts to hold on to trust and motivate people to take the COVAXIN and COVISHIELD vaccines, both of which were developed in India for COVID-19. However, preliminary studies revealed that both the Indian and Chinese vaccines were efficacious and safe in the first phase of the vaccination campaign. Both the Indian vaccinations have since received Emergency Use Authorization (EUA) from the Drugs Controller, the regulatory agency and the producers in India's DCGI are keeping an eye on the regulatory guidelines of the vaccine development and the ability to swiftly detect and act on any new safety information and post-treatment adverse events of COVID-19. We screened a large group of people who have been immunized with both doses of COVID-19 at Nesari village and nearby villages (all volunteers over the age of 18). The collected data was analyzed for volunteers immunized with both types of vaccines, viz., COVISHILD and COVAXIN. We concluded by screening 25 Covishield and Covaxin users aged 18 to 25. Based on patient profiles after treatment, we came to know which vaccine has a superior profile. Vaccines have shown different profiles with regard to side effects, age and gender related effects.

**Keywords:** Pharmacovigilance, COVID-19, Adverse Drug events, Covishield, Covaxin.

## INTRODUCTION<sup>1</sup>

The World Health Organization (WHO) defines pharmacovigilance as "the pharmacological science and activities related to the detection, assessment, understanding, and prevention of adverse effects or any other drug-related problem." Drug effects must be monitored both before and after they have been successfully tested. and it was put on the market. Pharmacovigilance is the process of monitoring and evaluating the quality of drugs as well as recognizing

and preventing side effects from medications. Pharmacovigilance is the process of monitoring the safety of pharmaceuticals. Assessing information from health-care providers, pharmaceutical firms, and other sources on patients in order to have a better understanding of the drug's hazards and benefits. Pharmaceutical In creating new pharmaceuticals, companies invest millions of dollars and a large amount of time. They also spend a lot of money on clinical research before approving and releasing pharmaceuticals to the general public. It is commonly acknowledged that the use of information technology (IT) has increasingly infiltrated and altered the fields of health care and clinical medicine, allowing doctors to perform their profession and provide patient care with improved quality, efficiency, and cost-effectiveness. It is also a well-known fact that clinical safety practices have been infiltrated by technology, resulting in the establishment of worldwide pharmacovigilance. Detection systems for safety signals. The transformational power of information technology and the adoption of health information technology have radically altered the way clinical research, medicine, and pharmaceuticals are conducted. "Monitoring for safety" In today's atmosphere, pharmacovigilance is pushing new frontiers, and it's a good thing. It's no longer adequate to just keep track of negative incidents, as well as efficacy and quality standards.

## **COVID-19<sup>2</sup>**

The novel severe acute respiratory illness corona virus 2 has produced Corona Virus Disease 2019 (COVID-19), a global health, social, and economic calamity (SARS-CoV-2). It had happened before. A cluster of pneumonia cases was first reported and diagnosed in Wuhan, China, in December 2019. Of unknown origin (Lu et al., 2020). The outbreak, dubbed 2019 novel corona virus (2019nCoV) at the time, spread swiftly and killed millions of people around the world. India initiated the COVID-19 vaccination programme on January 16, 2021, with three vaccinations now approved. Emergency public-use drugs include COVAXIN, Covishield, and the recently approved Sputnik-V.2.

## **COVID-19 vaccination<sup>4</sup>**

Vaccines are a critical tool in the fight against COVID-19, with the potential to save lives and put an end to the epidemic. Vaccines contribute to the development of T-cell and B lymphocyte immunity to SARS-CoV-2. Developing a vaccine for a nCoV presents significant challenges. However, thanks to strong international collaborations, researchers from around the world have been able to develop innovative, safe, and effective COVID-19 vaccines in a relatively short period of time.

## **COVAXIN<sup>4</sup>**

Covaxin is an inactivated vaccine, meaning it is made up of corona viruses that have been killed, making it safe to use (BBC, 2021). Bharat Biotech is a vaccination company that has been around for 24 years. The corona virus is a corporation that exports to 123 countries and has 16 vaccines based on the corona virus in its portfolio. The sample was isolated at India's National Institute of Virology. Immune cells will continue to recognize the foreign substance. The immune system generates antibodies against the pandemic virus after being given a dead virus. The two doses are separated by four weeks. Temperatures ranging from 2 to 8 degrees Celsius can be used to keep the vaccine. The temperature is a degree Celsius. The vaccination had an efficacy rate of 81 percent, according to preliminary findings from the vaccine's phase 3 trial. Bharat (BBC, 2021). Bharat Biotech claims to have a 20-year supply of 1 million Covaxin doses and plans to produce 700 million doses at its four facilities in two cities by the end of the year (BBC,2021).

## **COVISHIELD<sup>4</sup>**

The Serum Institute of India, the world's largest vaccine maker, is producing the Oxford-Astra Zeneca vaccine locally. It asserts that it can Every month, more than 60 million doses are produced. (BBC, 2021). A weak strain of the common cold A chimp virus (known as an adenovirus) is used. to develop the vaccine. It has been changed to resemble the Corona virus, despite the fact that it cannot be replicated to make people sick. The vaccine causes the immune system to create antibodies and prepares the patient to fight any corona virus infection. The vaccine is administered in two doses, separated by four to twelve weeks. It may be kept safely at temperatures ranging from 2 to 8 degrees Celsius. and conveniently located in existing health-care settings such as doctors' offices (BBC, 2021). The Pfizer-Biotech vaccine, which is currently used in a number of countries, must be kept indefinitely. It is frozen at -70°C and can only be transported a few times, posing a unique problem in India. Temperatures in the summer might reach up to 5 degrees Celsius (BBC, 2021).

## Efficacy of vaccines reported in clinical trials<sup>7</sup>—

In an ongoing experiment in India, COVAXIN has been proven to develop immunity after two doses given 28 days apart. According to the company, the phase 3 experiment took place on There were about 25,800 people in attendance. COVAXIN had an interim effectiveness of 81% in preventing COVID-19 in mice. Those who had never been infected before, after completing the immunization programme (BB, Phase 3). (2021 outcomes). According to a recent study, COVISHIELD's vaccination effectiveness reached 82.4 percent after a second dosage in those who had a 12-week or longer dosing interval (95 percent confidence). If the two dosages were administered less than 6 weeks apart, the effectiveness ranged from 62.7 percent to 91.7 percent. Only 54.9 percent of the people were affected.(Wise J.2021) The data has been presented in table 1.

	COVISHIELD	COVAXIN
Dose Interval	12-16 weeks	4-6 weeks
Clinical efficacy	Efficacy rate 82.4%	Interim efficacy 81%
Targeted Population	This vaccine is available to people over the age of 18.	This vaccine can only be given to people above the age of 18.
Storage condition	2-8 Centigrade	2-8 Centigrade
Regulatory approval	DCGI granted approval for emergency restricted use.	DCGI allowed COVAXIN for Restricted use in emergency situations.

Table no 1. Vaccine efficacy

## Safety<sup>7</sup>

According to an interim analysis and a preliminary examination of the clinical trial safety data, severe, major, and medically relevant adverse events occurred in COVAXIN. It was done in small numbers and was evenly distributed between the vaccine and placebo groups. The following were the most commonly reported adverse events during the clinical trial:

- Injection site swelling and pain
- Headache
- Fever
- Vomiting
- Muscle ache
- Eczema.

## COVISHIELD<sup>7</sup>

It was also found to be safe and well-tolerated in clinical trials done in various nations (Phase I and Phase III) (United Kingdom, Brazil, and South Africa). In India, a Phase I/II clinical trial with 1600 individuals has begun (Clinical Trial Registry of India, 2021). The most common types of unsolicited reactions recorded with COVISHIELD were:

- Injection site reactions such as pain, itch, swelling,
- tenderness, redness, warmth

- Among the systemic reactions are
- Feverishness
- Chills
- Fatigue
- Malaise
- Headache
- Arthralgia
- Myalgia (SII, 2021)

### **The Risk-benefit ratio of both vaccines was maintained. Bleeding and clotting events following COVID<sup>7</sup>**

Vaccination The Union Health Ministry has received a report from the National AEFI Committee on Bleeding and Clotting Events. Over 2300 instances were recorded on the COWIN Platform following a small COVID vaccination campaign in India, with just 700 of them being deadly. A number of serious side effects have been documented (MoHFW, 2021). Only 26 of these reports were reported to be probable thromboembolic events following Covishield immunization injection, after the AEFI Committee thoroughly examined all of them. As a result, the data reveals two minor but substantial thromboembolic risk factors. Following the injection of Covaxin, however, no potential thromboembolic events have been documented. a vaccination (MoHFW, 2021).

### **OBJECTIVES<sup>8,9,10</sup>:**

- The major goals of pharmacovigilance are to demonstrate the efficacy of medications by tracking their adverse effect profiles from the lab to the pharmacy for many years.
- The discovery and quantification of previously undetected adverse drug reactions.
- Identification of patient subgroups at higher risk of ADRs (risk based on dose, age, gender, and underlying condition).
- To encourage the use of medications in a sensible and safe manner.
- In this study, COVISHILD and COVAXIN are compared.
- After-vaccination-side-effects research
- A study of adverse effects among people of various ages
- To research vaccines that have fewer adverse effects.

### **Role of vaccine-vigilance during COVID vaccination<sup>7</sup>**

During this difficult COVID-19 moment, our country is fighting the virus by producing a large number of COVID-19 vaccinations, leading the largest vaccination effort, and maintaining social distance at the same time. Being a teacher is a demanding task. Handled. At the same time, the vaccine, which has been approved for limited use in an emergency situation, must be continuously watched. Hundreds of millions of individuals are affected. Their COVID-19 vaccine is given to them on a daily basis. Many of them may have had a negative experience or a major adverse occurrence, but it is critical to disclose it because it will assist the agency in lowering the dangers associated with vaccinations. We have the AEFI Program in India. The Ministry of Health and Family Welfare's Immunization Division has taken a few initiatives to improve the national AEFI surveillance system for COVID-19 immunizations. They have a National AEFI Committee that keeps a careful eye on the non-serious and serious cases. COVID-19 vaccination side effects have been recorded. The assessment of causation is carried out by a select group of skilled physicians and healthcare professionals. The information is gathered. For the public's benefit, the MoHFW portal is updated on a regular basis.

### **Material and method<sup>13,14,17</sup>**

The study was done in Nesari and adjacent villages among those who had received both doses of COVID-19 vaccination. All volunteers over the age of 18 who lived in a close village to the hospital and were willing to participate in the survey were included, and the information gathered was examined. We made contact with a large number of people during the

survey to collect information on the side effects, age, and sex of people who have been vaccinated with both types of vaccinations, such as covishield and covaxin. So we take 25 people who are covishield and covaxin, all of whom are over the age of 18. Then we look at the side effects of vaccines in relation to their age. We know which vaccine has fewer adverse effects after comparing the two vaccines.

Candidates selection	A total of 25 people, ranging in age from 18 to 31, 31 to 60, and over 60, were chosen to receive two doses of COVID-19.
Questionnaire	Prepare a question bank to collect survey data. The questions concern names, ages, vaccination names, and vaccine side effects.
Data collection	Data is gathered using a survey form and a question bank.
Data study	Separate the data from the covishield and covaxin vaccines, record it in a chart, and graph it.
Compilation of data	Make a decision based on the side effects of covishield and covaxin.

Covishield (Age between 18-30)				
Case no	Age	Sex	Side effect	
			Dose-1	Dose-2
1	21	F	Fever, Muscle pain, Fatigue, Chills	Pain at Injection site
2	22	F	Fever, red-black patch at injected site	Pain at Injection site
3	18	M	Fever, Muscle pain	None
4	22	M	Fever, Muscle pain	None
5	22	F	Fever, Muscle Pain	Pain at Injection site
6	21	F	Chills, Fever, Muscle Pain	Pain at Injection site
7	22	M	Chills, Fever, Muscle Pain	None
8	27	F	None	Muscle Pain
9	25	F	Muscle Pain, Fever, Fatigue	Muscle Pain, Fatigue
10	28	M	Fever, Vomiting, Fatigue	Fever
11	23	M	Fever, Muscle Pain, Chills	None
12	20	M	Fever, Pain at injection site	None
13	21	F	None	None
14	20	M	Fever, Chills	Pain at Injection site
15	21	F	None	Mild Pain at Injection site
16	24	F	Fever, Chills	None
17	23	F	Muscle Pain	None
18	24	M	Fever, Muscle Pain, Fatigue, Chills	Fever, Pain at Injection site
19	20	M	Fever, Muscle pain	None

20	21	F	None	None
21	20	F	None	None
22	20	M	Fever, Pain at injection site	None
23	23	F	Muscle Pain, Headache	None
24	22	M	Fever, Pain at injection site	None
25	28	M	Muscle Pain ,Fever	Muscle Pain

Table no.2

Covaxin (Age between 18-30)				
Case no	Age	Sex	Side effect	
			Dose-1	Dose-2
1	23	M	None	Muscle Pain
2	21	M	None	None
3	23	M	None	None
4	20	F	Fever, Headache, Muscle Pain	None
5	26	M	None	None
6	23	F	None	None
7	21	M	None	None
8	21	M	None	None
9	21	M	None	None
10	21	M	None	None
11	22	M	Muscle Pain	None
12	25	M	Muscle Pain, Fever	None
13	19	M	None	None
14	30	F	None	Fever
15	29	M	None	None
16	30	F	None	None
17	20	M	Fever, Pain at injecting site	Pain at injection site
18	23	F	Fever, Chills, Fatigue	Fever
19	22	F	None	None
20	21	M	None	None
21	19	M	Fever, Headache	Pain at injection site
22	18	F	None	None
23	20	M	Fever, Fatigue, Pain at injection site	None
24	25	F	None	None
25	29	F	None	None

Table no 3.

Covishield (Age between 31-60)				
Case no	Age	Sex	Side effect	
			Dose-1	Dose-2
1	40	F	Muscle Pain	Muscle Pain
2	46	F	Fever, Muscle Pain, Headache	Fever, Muscle Pain, Headache
3	45	F	None	None
4	45	F	Muscle Pain, Chills	None
5	42	F	Fever, Muscle Pain, Headache	None
6	39	F	Vomiting, Fever, MusclePain, Headache	None
7	45	M	None	None
8	35	F	Headache, Muscle Pain, Vomiting, Fever	None
9	31	F	Fever, Headache, Fatigue	Fever, Headache, Fatigue
10	42	M	Fever, Muscle Pain, Vomiting, Headache,	Fever, Muscle Pain
11	38	F	Fever, Muscle Pain	Muscle Pain, Fever
12	60	M	Fever, Muscle Pain	Fever, Muscle Pain
13	33	M	Fever, Muscle Pain	Headache
14	45	F	Fever, Muscle Pain, Headache	Headache, Fever, Muscle Pain
15	60	M	None	Fever, Muscle Pain, Headache
16	47	M	Fever, Fatigue, Body pain	None
17	60	F	None	Fever, Headache, Muscle pain
18	35	M	Fever, Muscle pain	Fever, Muscle pain
19	33	F	Fever, Muscle pain, Weakness	Fever, Muscle pain, Weakness
20	58	F	Fever, Muscle pain	Muscle pain
21	60	F	None	None
22	49	M	Chills, Muscle pain, Fever	None
23	40	F	None	None
24	45	F	Fever, Chills, Fatigue	Pain at injection site
25	590	M	Pain at injection site	None

Table no 4.

<b>Covaxin (Age between 31-60)</b>				
<b>Case no</b>	<b>Age</b>	<b>Sex</b>	<b>Side effect</b>	
			<b>Dose-1</b>	<b>Dose-2</b>
1	40	F	None	None
2	45	F	Fever, Nausea, Fatigue, Body Pain	Muscle Pain
3	41	F	None	Headache
4	32	F	Body Pain	None
5	42	F	None	None
6	32	F	Fever, Fatigue, Muscle pain	Muscle Pain, Fatigue
7	42	F	None	None
8	47	M	None	None
9	35	M	None	None
10	55	F	None	Mild Muscle pain
11	32	F	Fever	Muscle pain
12	38	M	None	Fever
13	35	M	None	None
14	42	M	None	None
15	35	F	None	None
16	43	M	None	None
17	36	F	None	None
18	35	M	None	None
19	31	F	None	None
20	40	M	Fever, Muscle Pain	Fatigue
21	45	M	Fever, Nausea, Headache	None
22	50	F	Fever, Pain at injection site	Pain at injection site
23	32	M	None	None
24	55	F	Fever, Headache	None
25	43	F	None	None

Table no.5

<b>Covishield (Age Above 60)</b>				
<b>Case no:</b>	<b>Age</b>	<b>Sex</b>	<b>Side effect</b>	
			<b>Dose-1</b>	<b>Dose-2</b>
1	61	F	Fever, joint pain	Muscle Pain
2	68	M	None	None
3	90	F	None	None

4	65	F	None	Muscle Pain
5	70	F	Muscle Pain	None
6	68	F	None	None
7	85	M	Fever, Muscle Pain	None
8	77	F	Fever, Muscle Pain	None
9	60	F	None	None
10	72	M	None	None
11	70	M	None	Muscle pain
12	71	F	None	None
13	70	M	None	None
14	61	F	Pain at injection site	Pain at injection site
15	62	F	Fever, muscle pain, Fatigue	Muscle pain
16	65	F	Vomiting, Fever, Dysentery, Fatigue	Fatigue, Pain at injection site
17	63	F	Fever, Fatigue, Headache	Fever, Muscle pain
18	60	F	Fever, Muscle pain	None
19	63	F	None	None
20	70	M	Fever, Muscle Pain, Headache,	Pain at injection site
21	80	F	Fever, Fatigue, Pain at injection site	Fatigue, Body Pain
22	71	M	None	None
23	64	M	Fever, Joint Pain	Fever
24	67	F	Fever, Muscle Pain, Pain at injectionsite	Fever, Headache
25	62	M	Fatigue, Pain at injection site	Fever, Headache

Table no.6

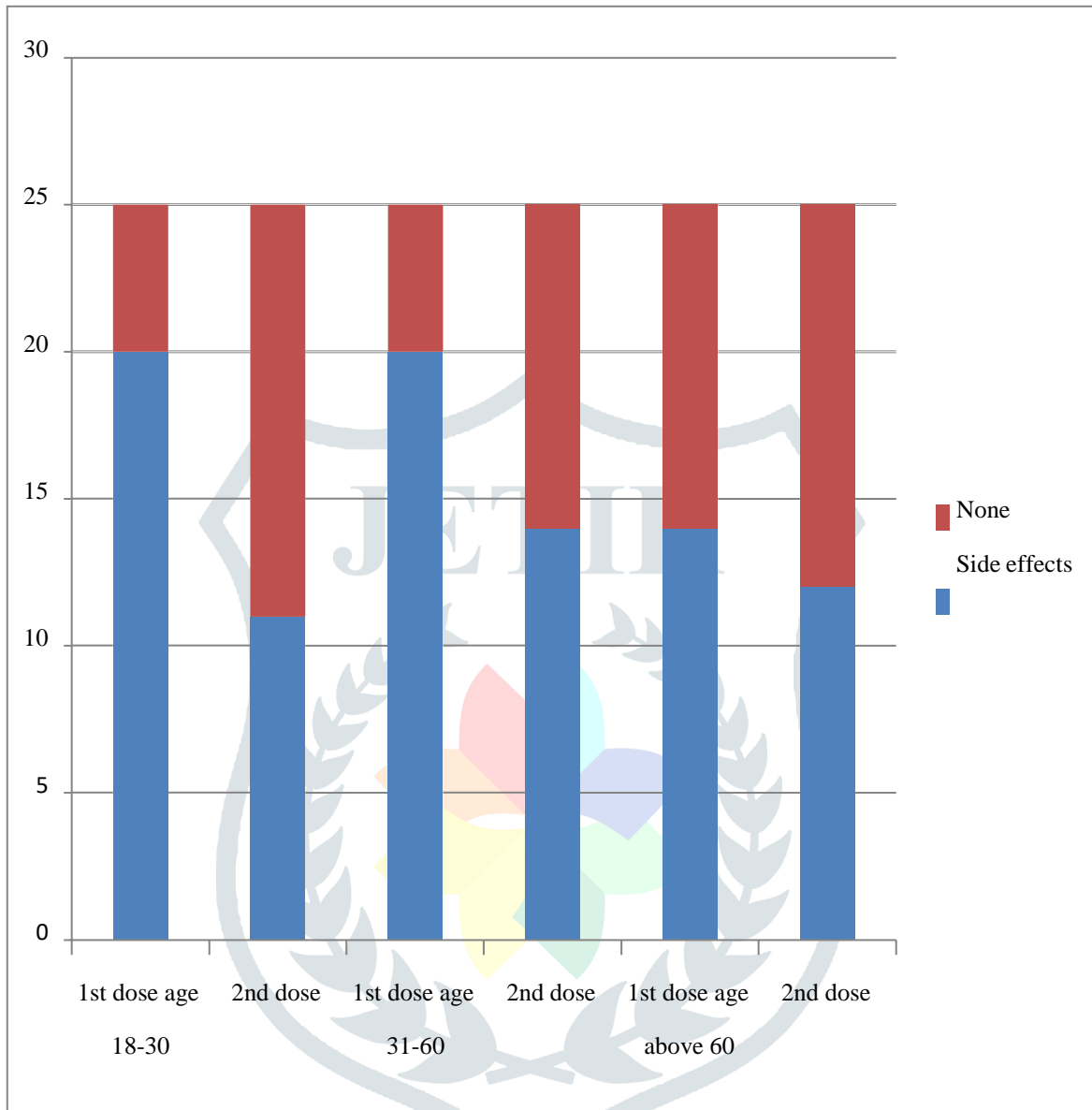
Covaxin Above 60 )				
Case no	Age	Sex	Side effect	
			Dose-1	Dose-2
1	61	M	None	None
2	65	M	None	None
3	60	F	Fever, Pain at injection site	None
4	70	M	Fever, Fatigue	Pain at injection site
5	63	F	Joint Pain	None
6	68	F	None	None
7	71	F	Fever	Headache
8	66	M	None	None

9	60	F	None	None
10	80	F	None	None
11	73	M	None	None
12	77	M	None	None
13	61	F	Pain at injection site	None
14	62	F	Muscle Pain	None
15	67	M	None	None
16	79	M	Fever	Fatigue
17	62	M	None	None
18	80	F	None	None
19	70	M	None	None
20	66	F	Muscle Pain	None
21	64	F	None	None
22	73	M	Pain at injection site	None
23	75	M	None	None
24	61	F	None	None
25	61	F	None	None

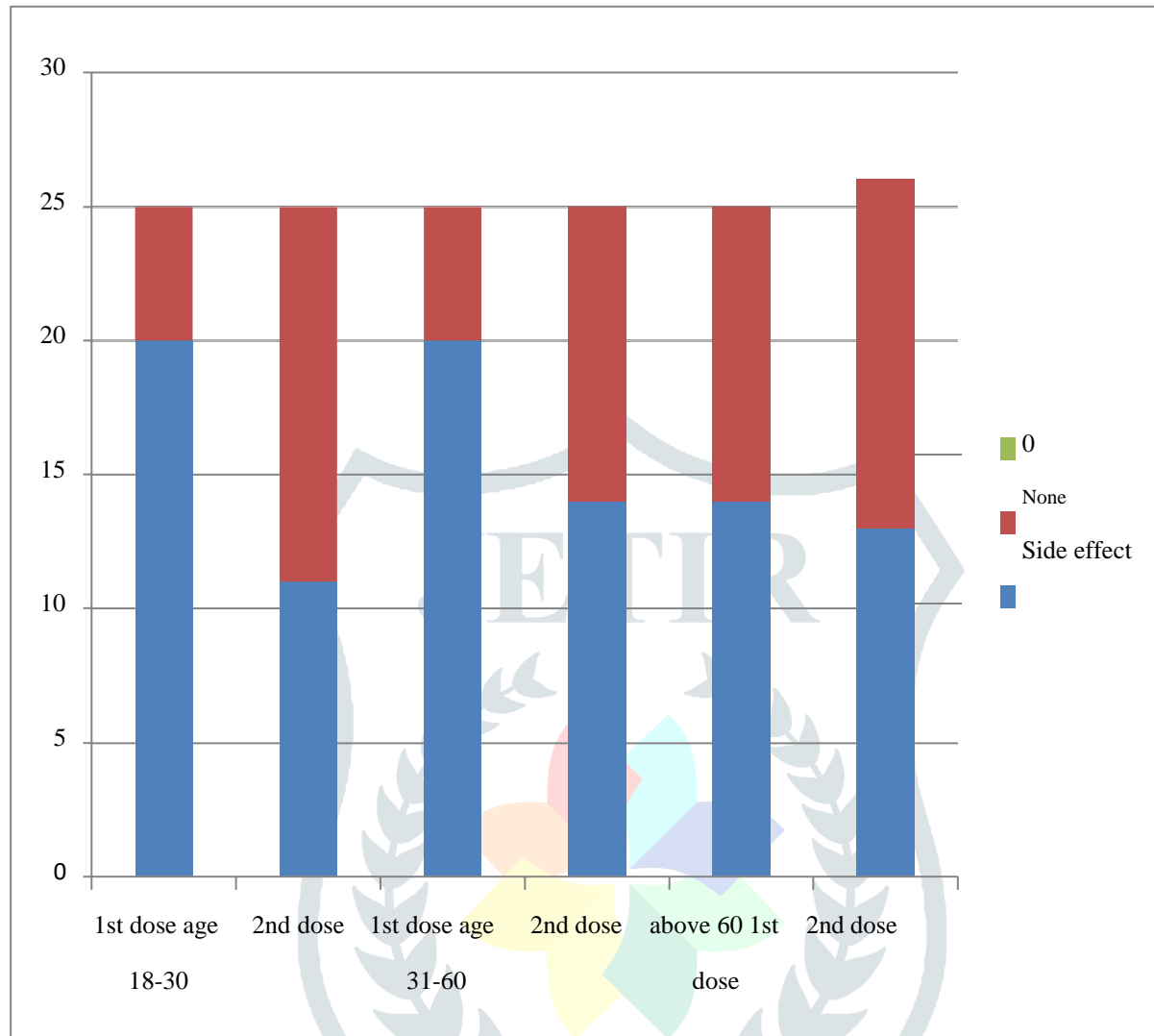
Table no.7

## Result and discussion<sup>15, 16</sup>

We have collected the information related to adverse effects of COVID vaccines at the end of the survey. Those between the ages of 31 and 60 have higher negative impacts than adults and the elderly. In most people, fever, muscle discomfort, and pain at the injection site are common side effects. Both vaccines' initial dose was found to have more side effects than the second dose, probably due to... The second dose is now available in all primary health care hospitals in almost all nearby areas. According to our research, Covishield has more unfavorable side effects than Covaxin. Vaccines: Covishield and Covaxin The following comparative graph depicts this information



**Comparative graph of covishield (1<sup>st</sup> and 2<sup>nd</sup> dose)**



Comparative graph of covaxin (1<sup>st</sup> and 2<sup>nd</sup> dose)

## Conclusion

Disease spreads from Wuhan to nearly three continents in 15 days, starting on January 11, 2020; it spreads 200 times faster than before. Both vaccines are efficient and safe in preventing COVID-19 infection. Although no major side effects from immunizations were documented during the survey, According to our study, covaxin has a better safety profile than covishield because covishield has more side effects.

## References

1. Ryali. Jithendra, Dinesh kumar. Pandurang, Bandaru Sowjanya, Vijayaraj Kumar. Perumal. Pharmacovigilance an overview (29 march 2011) Reference ID- PHARMATUTOR-ATR-1005 Page no. 8.
2. Mukhtar Ahmad Dar, Priyadarshani Chauhan, Pawan Kumar, Richa Chauhan, Krishna Murti, Jakara Charan, Velayutham Ravichandran, Sameer Dhingara, Safety, efficacy and Immunogenicity of covaxin, A Review (November 2021) Page no - 018-019 [Doi-10.7324/JAPS2021.1101103](https://doi.org/10.7324/JAPS2021.1101103), <https://www.japsonline.com>.

3. By the Google Working together to tackle Corona virus Disease (COVID 19) <https://images.app.goo.gl/kHWdRwFqUHW8JL9B7>.
4. Mohd Akhtar Ali, M Kamraju. A study on covid-19 vaccination drive in India( april- june2021) vol 11 issue2 Page no 76-77 <http://www.researchgate.net/publication/352903714>
5. By the Google Working together to tackle Corona virus Disease ( COVID 19 ) <https://images.app.goo.gl/kHWdRwFqUHW8JL9B7>
6. By google COVAXIN- India's first indigenous covid- 19 vaccine: Bharat biotech <https://images.app.goo.gl/Z2J7Qm7wuCiug9js8>
7. Porus Rajpurohit, Manoj Singh, Praveen Boda. Research Article, Retrospective observational survey of adverse events following immunization comparing tolerability of covishield and covaxin vaccines in the real world. Journal of Pharmacovigilance and drugresearch journal home page www.jpadr.com( 29 july 2021 ) Doi No - 10.53411/jpadr- 2021.2.3.5 Page no 22-24 <https://www.researchgate.net/publication/354272036>
8. Ankur Rohilla, Nishant Singh, Vipin kumar Sharma, Amarjeet Dahiya, Ashok kushnoor Pharmacovigilance: Needs & objectives Volume\_2 oct- Dec.12 n (Journal of advanced pharmacy education & research) Page no .202 [www.japer.in](http://www.japer.in)
9. Lakshmi Anusha, M. Aashritha, K. teja & R. shridhar A review on pharmacovigilance & its importance, World journal of pharmacy & pharmaceutical science (15 Nov 2016) [Doi: 10.20959/wzpps20171/8280](https://doi.org/10.20959/wzpps20171/8280) (Page no .7)
10. Sangita fulchand Pawar, Vikram Limbaji musale Pharmacovigilance a review, International journal of advanced research (IJAR)236 [Doi no: 10.21474/IJAR01./10289](https://doi.org/10.21474/IJAR01./10289)
11. Chandrima Jeewandara, Achala kamaladasa, Deshni Jayathilaka Immune responses to a single dose of the AZD1 222/ Covishield vaccine in health care workers. <https://swachhindia.ndtv.com/tag/covid-19/>
12. Rayces A. Rather, To Tajimal Tajamul ISLAM Digvijay Pandey Development of vaccine against Coronavirous disease 2019 (Gvid 199 in India.) <https://theprint.in/health/covaxin-shows-81-interimefficacy-in-preventing-covid-bharat-biotechsays/615231/>
13. Mukhtar Ahmad Dar', Priyadarshani chauhan, Pawan Kumar, Richa chauhan, Krishna Murti, Jaykaran Charan, Velayuthan Ravichandiran, Sameer Shingra Safety, efficacy of immunogenicity of A\* In underline \* A review. Journal Applied Pharmaceutical Science 11(11);2021: 018-025
14. Soumendra Darbar, Sangita Agarwal & Snimoyee Saha – COVID19 vaccine. COVAXIN - India's First Indigenous effective weapon to Fight against Coronavirous. Parana Journal of Science & Education ( Gamma SE)-v\*7,n.3(70) 53 (1-9) April 22, 2021. ISSN:
15. Subhadeep Ghosh, Subramanian shankar, kaustuv chate r\_{j}\*e \* e COVISHIELD (A2D122) Vaccine effectiveness amona health care & frontline workere of India Armed forces. Interim results of VIN-WIN cohdet Study. <https://www.cdc.gov/>
16. Gajanan N. Sapkal, PhD, Pragya D. Yadav, PhD, Gururaj R. Deshpande, PhD - Inactivated COVID -19 vaccine 3B V/5 2 / COUAXIN effectively neutralizes sorently emerged underline 3. rfloor.7 ~ariant of SARS-CoV-2 <https://virological.org/t/>
17. Vipin kesharwani, mohd. Asad farooqui, Nikhil kushwaha, Ravi kesh singh, Pankaj kumar Jaiswal. An overview on pharmacovigilance:A key for Drug safety and monitoring Journal of Drug Delivery and therapeutics. Page no.131,DOI:<http://dx.doi.org/10.22270/jddt.v8i51970>