Original Article

A Retrospective Study on Adverse Events Following COVID-19 - Vaccines (AEFI) Reported to ADR Monitoring Centre in a Tertiary Care Health Centre, Andhra Pradesh

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Abstract

Background: Vaccination against COVID-19 is going around globally to prevent the incidence of COVID-19 disease and its complications. As there have been no large-scale research studies about AEFI following COVID-19 vaccines, our plan of action was to examine and assess the clinical patterns that occur after COVID-19 immunization and determine which COVID-19 vaccine has a lower frequency of side effects. AEFI

Methods: This is a retrospective study of the AEFIs reported with COVID-19 vaccines (1st or 2nd dose or both) at the Government General Hospital, Guntur, AP, from Jan 16th, 2021 – October 31st 2021 after obtaining prior approval of the Institutional Ethics Committee (IEC) and PvPI, Ghaziabad. The ADR monitoring facility in Guntur collected and evaluated the adverse incidents reported using descriptive statistics in MS Excel. The results were presented in bar and pie charts.

Results: AMC received a total of 575 Adverse Events Following Immunization (AEFIs) after COVID-19 vaccinations were given. The most frequently detected adverse events following immunization (AEFIs) were fever, recorded in 21.9% (136 cases), headache in 20.9% (120 cases), nausea and vomiting in 4.3% (25 cases), and rashes in 2.1% (12 cases). The bulk of the Adverse Events Following Immunization (AEFIs) were moderate and occurred in individuals aged between 28 and 37 years. Adverse local responses were noted following the administration of the initial dosage of Covishield.

Conclusion: In this study, most of the negative events reported were non-serious. The incidence of adverse events following Covaxin was few compared to Covishield. The mean occurrence of symptoms was 0 to 4 days.

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Additionally, it is necessary to continue conducting longitudinal surveys in the field of pharmacovigilance to thoroughly examine any potential long-term negative effects of vaccines.

Keywords: AEFI, COVID-19 vaccines, Pharmacovigilance, COVISHIELD, COVAXIN.

Introduction

The SARS-CoV-2 virus, which caused the COVID-19 pandemic, continues to be highly prevalent. The development of and its worldwide health consequences prompted the creation of a secure vaccination. This pandemic is an ongoing crisis that necessitates the immediate implementation of immunization in the country. (1)

There have been 35 million confirmed cases of COVID-19 globally as of 24 January 2022, with 5 million fatalities, according to the World Health Organization (WHO). A total of around 200,000 new cases of the coronavirus were recorded in April and May of 2021, prompting the acceleration of the vaccination program (Covishield, Covaxin) among the public of our country. The COVID-19 pandemic, caused by the SARS-CoV-2 virus, continues to be prevalent. The development of a safe vaccine was prompted by the appearance of and its worldwide health consequences. This pandemic is an ongoing crisis that has necessitated the swift implementation of immunization across the country (9).

Various types of vaccines are available based on viral components; mRNA (Pfizer, Moderna), viral vector (Johnson and Johnson, Covishield), and inactivated vaccines (Covaxin). In India, only Covaxin and Covishield were available (2).As of June 2024, 220 crores of vaccine doses had been administered as per Ministry of Health and Family Welfare (covid19dashboard.mohfw.gov.in/), Gov of India.

On January 16, 2021, a vaccination program against COVID-19 was launched in India, with a focus on healthcare professionals. Vaccines were given to healthcare staff in the first phase and the senior population in the following phase according to protocol. Covishield (Serum Institute of Pune) and Covaxin (Bharath Biotech) were the vaccines used. The necessity to closely observe trends in adverse events in the general population has taken precedence over the previously mentioned acceptable safety profile of randomized control trials. Although the database did capture a small number of significant adverse events, the vast majority of reported adverse events were mild reactions (after COVID-19 vaccination).

Vaccine-related adverse effects can be categorized as mild, moderate, or severe reactions, depending on the seriousness of the symptoms and the level of intervention needed. Among the minor side effects, fever and injection site pain were the most prevalent adverse effects following immunization. Other side effects reported were nausea, vomiting, headache, muscle aches or myalgia and diarrhoea are among the minor side effects that have been recorded (3). The database includes reports of serious adverse outcomes such as stroke, seizures, thromboembolic events, and cardiac problems. (2)

The remarkable and swift progress in the creation of COVID-19 vaccines using an innovative platform, coupled with their quick production on a large scale, presents a distinct difficulty in monitoring the safety of these vaccines. Vaccine pharmacovigilance is crucial for closely monitoring any adverse events that may occur after COVID-19 vaccination, as well as detecting any changes in the patterns or trends of adverse drug reactions (ADRs). This surveillance is essential for ensuring safety and upholding confidence within the community. The data and information obtained from vaccine pharmacovigilance can be valuable for identifying and reducing avoidable adverse events following immunization (AEFI) and enhancing the prescribers' understanding of how to manage them efficiently. All Adverse Events Following Immunization (AEFI) are sent to the Adverse Drug Reaction (ADR) Monitoring Centre (AMC) for further transmission to the Pharmacovigilance Programme of India (PvPI), located at the Indian Pharmacopoeia Commission (IPC) in Ghaziabad, using the vigiflow software.

The ADR Monitoring Centre was created in 2013 at Guntur Medical College (GMC)/ Government General Hospital (GGH), a Tertiary Care facility, that reported approximately over 5000 Adverse Drug Reactions (ADRs) up until now. In 2021, it was acknowledged as one of the top 10 pharmacovigilance

centres in India and the system gathers ADR and AEFI data from Guntur General Hospital (GGH) and other facilities in the area and then captures these reports in ADR reporting forms and uploads them to PvPI, IPC, Ghaziabad using Vigiflow software.

The purpose of this study is to gather, examine, and assess the clinical patterns of adverse events following immunization (AEFI) that occur after the administration of COVID-19 vaccines. These AEFI cases have been reported to our Adverse Drug Reaction (ADR) monitoring centre, which is located at a Tertiary Care Teaching Hospital.

Methods

A retrospective and observational study was undertaken at the ADR Government General Hospital, Guntur, following the acquisition of ethics approval and PvPI, Ghaziabad. The ADR monitoring center gathered and analysed the adverse events reported after COVID-19 vaccinations. The study population included individuals who received doses of COVID-19 vaccinations (Covishield, Covaxin: 1st dose, 2nd dose, or both) and experienced adverse events. These events were reported to the ADR monitoring center at Government General Hospital, Guntur. The study spanned 10 months, commencing on January 16, 2021, and concluding on October 31, 2021.

The Adverse Events Following Immunization (AEFI) that occurred after administering COVID-19 vaccinations were recorded and documented in the AEFI forms at the ADR monitoring centre (AMC) of the Tertiary care teaching hospital in Guntur, Andhra Pradesh. These records were then uploaded to PvPI Vigiflow.

Statistical analysis

The acquired data was evaluated utilizing descriptive statistics and presented in the form of frequencies and percentages. Data are shown employing bar and pie charts as necessary, utilizing the M.S. Excel program.

Results

From January 16, 2021, to October 31, 2021, a total of 306 people who received the vaccine reported 575 adverse events to the ADR Monitoring Centre. The study included and analysed 306 individuals who reported AEFI to the ADR monitoring centre. Out of the total, 169 individuals (55%) were female, while 137 individuals (45%) were male. The AEFI described in this study pertains to individuals aged 18 to 80 years. The current study documented Adverse Events Following Immunization (AEFIs) associated with COVID-19 vaccination (Covishield, Covaxin), encompassing individuals who have received either the first dose, second dose, or both. Most of the negative incidents occurred among those aged 28-37 years, with a total of 200 adverse events. A minimal number of Adverse Events Following Immunization (AEFIs) were documented within the older population with no specific comorbidities.

Table no: 1 Demographic details of reported AEFI

Age/Gender	Total no of recipients who reported AEFI	Total no of AEFI reported
18-27	**71**	**139**
Female	33	65
Male	38	74
28-37	**104**	**200**
Female	53	104
Male	51	96
38-47	**59**	**111**
Female	39	72
Male	20	39
48-57	**51**	**86**
Female	35	56
Male	16	30
58-67	**16**	**31**
Female	7	15
Male	9	16
68-77	**4**	**5**
Female	1	1
Male	3	4
78-87	**1**	**3**
Female	1	3
Grand Total	306	575

Out of the 306 individuals who received the COVID-19 vaccine, 279 of them experienced more than one negative event. A total of 502 adverse events following immunization (AEFI) were recorded after

the first administration of Covishield vaccination, accounting for 87.3% of the cases. Additionally, 23 cases (4%) were reported after the second administration of Covishield vaccination. Similarly, 37 cases (6.4%) were reported after the first dose of Covaxin, and 13 cases (2.3%) were reported after the second dose of Covaxin vaccination.

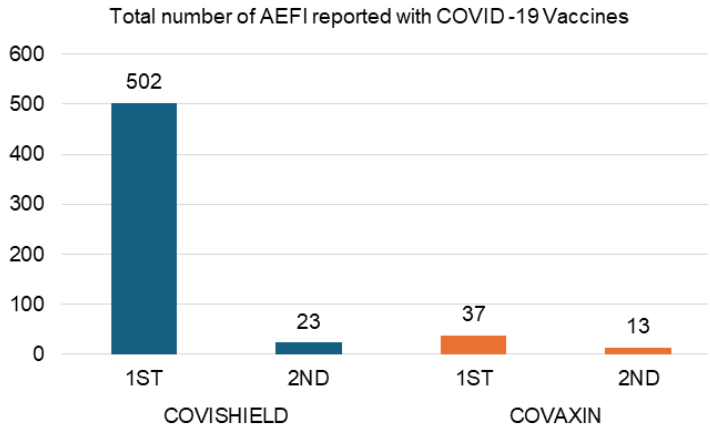

Figure no 1: Total number ofAEFI reported in both doses of COVID-19 vaccines

The most frequently reported systemic adverse events following immunization (AEFI) were fever (21.9%), headache (20.9%), nausea and vomiting (4.3%), rashes (2.1%), palpitations (1.6%), chest pain (1.4%), diarrhoea (1.6%), generalized weakness (1.6%), and other non-specific events (including dry mouth (0.2%), back pain (0.9%), sweating, and one episode of hypoglycaemia (0.2%) where Random Blood sugars (RBS) was 40mg/ml was noted). Following the first dosage of Covishield, 7.5% (43 patients) reported local injection-site symptoms, including pain and discomfort. Our study did not experience the warning symptoms of sleepiness, drowsiness, or fainting, which were like the adverse effects of the Covishield vaccine listed in their monograph[22].

Table no 2: Reported AEFI with 1st and 2nd doses of COVID-19 Vaccines

Symptoms	COVISHIELD		COVAXIN	
	1ST	2ND	1ST	2ND
Local reactions	43			
Head ache	104	4	7	5
Fever	117	10	6	5
Myalgia	95	7	6	2
generalized weakness	9			
Fatigue/tiredness	12			
Chills	8	1	3	
Rash	11			1
facial oedema	1			
Itching	2			
Nausea	5			
Vomiting	19		2	
Diarrhoea	9			
abdominal pain	2		1	
Constipation	1			
Palpitations	8		1	

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chest pain	6		2	
SOB	14			
Tachycardia	1			
weakness of limbs	3			
Vertigo	1			
dizziness/giddiness	7		7	
tingling/paraesthesia	2			
Drowsiness	1		1	
Fainting			1	
slurred speech	1			
deviation of mouth	1			
Cough	4	1		
dry mouth	1			
Sweating	1			
hypoglycaemia	1			
low back pain	5			
throat ulcers/throat pain	3			
burning micturition	1			
Dysphagia	1			

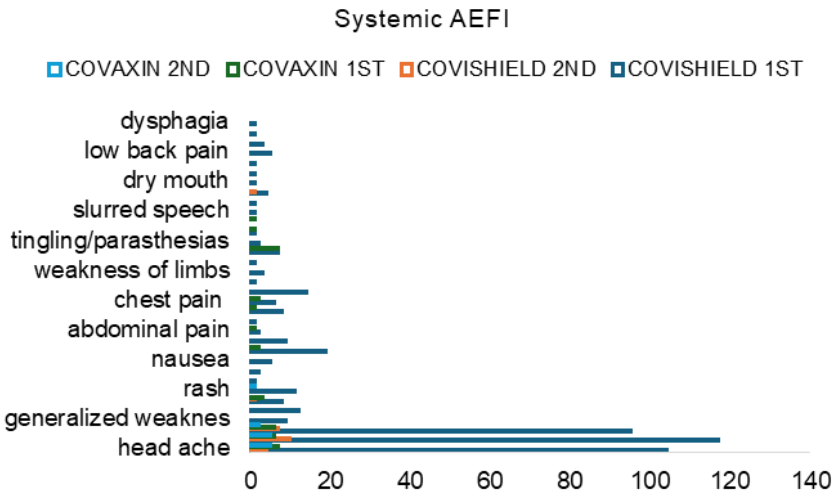

Figure no 2: Systemic AEFI following COVID–19 Vaccines

The large number of Adverse Events Following Immunization (AEFI)reported occurred within 0 to 4 days following vaccination and resolved spontaneously, which was depicted in Figure 3. The symptoms were classified as mild, moderate, severe, and serious. One serious life-threatening adverse event (death) was reported following the initial dose of the Covishield vaccine, and one serious adverse event (unconsciousness) which led to hospitalization was also reported. The remaining AEFI (573) were mild to moderate which resolved with or without symptomatic treatment.

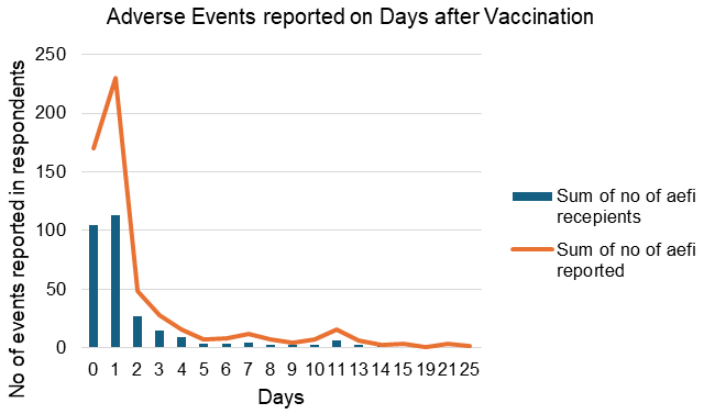

Figure no 3: Adverse Events reported on Days after Vaccination

Following COVID-19 vaccinations, the adverse event patterns were primarily widespread and included headache, myalgia, fever, and gastrointestinal symptoms such as constipation, diarrhoea, nausea, and vomiting. The documented neurological effects include weakness in the upper and lower limbs, dizziness or vertigo, and one instance of slurred speech after the administration of the first dose of Covishield.

Discussion

As of currently, a total of 10,080,000,000 individuals worldwide have received the COVID-19 vaccine. Out of this, 406 crores (52.1%) of the population have been fully vaccinated with both doses. Approximately half of the population in India has received complete vaccination. [3]

502 (87.3%) AEFI were reported following the initial dose of Covishield vaccination, 23 (4%) following dose of Covishield vaccination, 37 (6.4%) following 1st dose of Covaxin, and 13 (2.3%) following subsequent dose of Covaxin vaccination. 502 Adverse Events Following Immunization (AEFI) were reported. Among them, two adverse events were observed: one resulting in death and one causing unconsciousness. the incidents occurred after the administration of the first dose of the Covishield vaccine.

In line with our research, a study done by Deep Kamal et.al. revealed that most of the adverse events recorded after administering the ChAdOx1 nCoV-19 vaccine (Covishield) were non-serious. In all, 57% of individuals experienced a non-severe adverse event following their initial immunization dose, while the reported rate of major adverse events was only 0.2%. The overall incidence of non-serious adverse events was around 14.1% following the administration of the subsequent dose of the vaccine. There were no significant adverse effects reported following the administration of the subsequent dose of the vaccine. [8]

The current investigation observed that the majority of negative occurrences occurred within the initial week (0 to 4 days) after immunization and were resolved without intervention. A minimal number of negative incidents were recorded following the administration of the first dose of Covishield on the 15th, 21st, and 25th days, the second dose of Covishield on the 11th day, and the second dose of Covaxin on the 9th day. This finding aligns with a study conducted by Deep Kamal et.al., which observed that the majority of negative incidents occurred within the initial 48 hours following the administration of both the first and second vaccine doses. The investigation saw a reduction in the occurrence of negative events after 48 hours of vaccination, and no adverse events were reported after two weeks (post-day 15) of vaccination. [8]

The study found that the most frequently reported adverse events following COVID-19 vaccination were fever, headache, malaise, and tenderness or discomfort at the injection site. The majority of Adverse Events Following Immunization (AEFI) were of mild to moderate severity. The incidence and intensity of Adverse Events Following Immunization (AEFI) were lower in the senior population (aged > 60 years). One patient experienced a change in mental state and subsequently died after receiving the first

dose of Covishield, resulting in hospitalization. This incident was classified as a serious adverse event. The residual Adverse Event Following Immunization (AEFI) was resolved promptly within a few days.

The most commonly reported side effects, according to an interim review of four clinical studies on the ChAdOx1 nCoV-19 vaccine, were injection site discomfort (63.7%), injection site pain (54.2%), headache (52.6%), and weariness (53.1%). Most adverse responses were a mild-to-moderate intensity and disappeared a few days after the immunization. The findings of our investigation were comparable to these results. [17]

A majority of the reported adverse reactions were generic. There were reports of local adverse events following immunization (AEFI) after the first dose of Covishield. Additional unfavourable occurrences observed after receiving COVID-19 vaccines included angina, irregular heartbeats, xerostomia, impaired speech, diminished strength in both the upper and lower extremities, paresthesia, and dizziness (Covishield). [13]

In the current study, the occurrence of adverse effects after the first and second administration of Covaxin was less frequent compared to Covishield. The reported adverse effects are as follows: headache (7 cases, 1.2%), fever (6 cases, 1%), myalgia (6 cases, 1%), chills (3 cases, 0.5%), vomiting (2 cases, 0.3%), dizziness (8 cases, 1.4%), sleepiness (1 case, 0.2%), palpitations (2 cases, 0.3%), and chest discomfort (8 cases, 1.4%). In a separate research conducted by Raches Ella, et.al., the Covaxin (BBV152) group experienced several adverse events. These included injection site pain (17 [5%] out of 375 participants), headache (13 [3%]), fatigue (11 [3%]), fever (9 [2%]), and nausea or vomiting (7 [2%]). The requested adverse events reported were predominantly mild (69%) or severe (31%) in severity, with a higher frequency observed after the initial dose. [7]

Limitations:

Our study has a few limitations,

1. The investigation was conducted in a singular facility, limiting the generalizability of the data.
2. The possibility of bias due to unobserved variables cannot be excluded.
3. Only adverse events reported to our centre are taken into consideration.
4. The study does not take comorbidities into account.

Conclusion

This study aimed to investigate and identify the clinical patterns and degree of adverse events that occurred after receiving either of the doses of the COVID-19 vaccines Covishield or Covaxin. The documented Adverse Events Following Immunization (AEFI) primarily include mild adverse events such as headache, muscle pain, fever, and chills. A higher incidence of adverse events was seen following administration of the first dosage of the vaccine as compared to the second dose. The incidence of adverse events following administration of Covaxin was lower in comparison to Covishield. In this study, the average duration of symptoms ranged from 0 to 4 days.

To create an innovative approach to vaccinating against new infectious illnesses, it is crucial to have access to precise and ample data regarding the effectiveness of vaccine pharmacovigilance. Comprehensive investigations are necessary to evaluate the delayed (long-term sequelae) symptoms of immunization on a large scale. A crucial component of vaccination regulation is vaccine pharmacovigilance, which should be implemented properly for the benefit of the public.

No fundin.g sources are present.

Ethical Clearance/Statement of Ethics-Institutional Ethics Committee Guntur Medical College, & Government General Hospital, Guntur application no: GMC/IEC/132/2021, date-08-10-2021

No conflicts of interest

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