



## SIDE EFFECTS OF COVID – 19 VACCINES AMONG VACCINATED INDIVIDUALS OF INDIA

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**ABSTRACT** The COVID-19 pandemic is expected to continue to impose enormous burdens of morbidity and mortality while severely disrupting societies and economies worldwide. Government must be prepared to ensure large-scale, equitable access and distribution of a COVID-19 vaccine when a safe and effective one becomes available. This study aimed to look at the side effects that people have identified after receiving various COVID-19 vaccines in India, as well as their impressions. Females experienced more symptom of chills than males. The symptoms local pain at injection site (more in covishield, ), Diarrhea (more in covaxin), tiredness (more in covishield, ) and rigor (more in covishield). The association between covaxine and covishield was not found to be statistically significant.

**KEYWORDS :** Survey, COVID-19, Vaccine, Side effects, Peoples

### INTRODUCTION

The World Health Organization (WHO) declared COVID-19 outbreak caused by Severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) as a Public Health Emergency of International Concern (PHEIC) on 30<sup>th</sup> January 2020 and was officially labeled a pandemic on 11<sup>th</sup> March 2020.<sup>1,2</sup> Due to the disease being transmitted through close contact between humans, extreme social distancing measures have been used to prevent its further spread. Lengthy lockdowns have been imposed in many countries to reduce the exponential spread of the virus and to alleviate pressures on healthcare systems<sup>11</sup>

The global COVID-19 needs no extensive description. Various measures including countrywide lockdowns have been adapted globally to control and contain the disease. Albeit, the endeavors to devise appropriate diagnostic and therapeutic strategies against the pandemic have escalated multifold (Konwarh, 2020a, b; Konwarh, 2021), the daily rise in the total number of confirmed cases and deaths seems incessant (globally: 181,176,715 confirmed cases with 3,930,496 deaths, India: 30,316,897 confirmed cases with 397,637 deaths as on 29 June 2021) (WHO, 2021). Amongst others, the hunt for safe and effective vaccines continues across multiple nations while a few countries including India have successfully developed vaccines in less than a year's time frame, started their trial, approved and permitted the mass vaccination drive.

The COVID-19 vaccination program kick started on 16th January, 2021 in India. The first group of beneficiaries included healthcare and frontline workers. The second group, comprising people over 60 years of age (as of January 1st, 2022) and those in the age-bracket of (45–59) years with co morbid conditions started receiving vaccinations from March 1st, 2021 while vaccination for those above 45 years of age started from April 1st, 2021 (Ministry of Health and Family Welfare, Govt. of India, 2021). Covishield® (AstraZeneca's vaccine manufactured by Serum Institute of India) and Covaxin® (manufactured by Bharat Biotech Limited) are the two vaccines that have been granted emergency use authorization by the Central Drugs Standard Control Organization (CDSCO) in India. In the initial launching phase of the vaccination program, the beneficiaries were advised to receive two doses at a minimum time gap of 28 days. Although the second dose of Covaxin® can be taken four to six weeks after the first, however, the time gap between two doses of the Covishield vaccine has been extended from four-six weeks to four-eight weeks (Ministry of Health and Family Welfare, Govt. of India, 2021). The vaccine is free and participation in the vaccination drive is voluntary. One can register on the Co-WIN Portal and schedule his/her vaccination appointment or local government health workers at

Corona Vaccination Centers (CVCs) can help the beneficiaries with on-the-spot registration, appointment, verification, and vaccination on the same day in case the latter fail to get themselves registered online. Despite these efforts on the governmental end, the public response, particularly, in the early days of the first phase of vaccination was no less than dismal. The overall turnout was only 53 % on the first day, 44 % on the second day and 48 % on the third day post-registration. In the first three days, 6, 31,417 people (far below the expected figure) were vaccinated while 0.18% reported side-effects and nine people (0002%) were admitted to hospitals for observation and treatment (The Hindu, 2021). The drive is being decelerated by low turnout, attributable to a concert of factors including concerns about the safety of the vaccine, technical problems with the software used for the online registration, and rapid dissemination of misinformation among the mass (The Guardian, 2021). The overall national turnout had averaged around 64% while merely 22 % and 23 % of the target beneficiaries in Tamil Nadu and Punjab, respectively were vaccinated in the first two days of the vaccination drive (The Guardian, 2021). Surprisingly, only 4 % turned up for the second dose of the vaccine on February 13 (Hindustan Times, 2021).<sup>21</sup>

The COVID-19 pandemic is expected to continue to impose enormous burdens of morbidity and mortality while severely disrupting societies and economies worldwide. Governments must be prepared to ensure large-scale, equitable access and distribution of a COVID-19 vaccine when a safe and effective one becomes available. This will require sufficient health system capacity, as well as strategies to enhance trust in and acceptance of the vaccine and those who deliver it.<sup>13</sup>

The rapid development of COVID-19 vaccines, due to the urgency of the pandemic, in addition to technological advances and existing vaccine candidates has contributed to the emergence of many rumors. Vaccine rumors are well-persistent during the post vaccination period. Rumors that COVID-19 vaccines are linked to various post-vaccination adverse effects (such as infertility) continue to circulate and be debated on various social media sites. Indians' ability to participate in a COVID-19 vaccination has been investigated in previous studies. This may be a major impediment to the pandemic's good management. Vaccine hesitancy was linked to a dependence on social media as the primary source of knowledge about COVID-19 vaccines. Therefore, since different vaccines are being used in vaccination campaign, there is a significant need to assess side effects and perceptions after vaccination in order to tackle vaccine hesitancy and rumors. This study aimed to look at the side effects that people have identified after receiving various COVID-19 vaccines in India, as well as their impressions. To accomplish that, an online survey was developed and the recorded data was statistically analyzed. Tools were

utilized to build predictive models that involve the implementation of statistical means for learning and predicting outputs like the severity of post-vaccination side effects based on other participants' responses, demographic and medical data.<sup>[4]</sup>

**MATERIALS AND METHODS**

**Survey plan and Participants**

A cross-sectional study was performed from 1<sup>st</sup> April to 15<sup>th</sup> April among peoples who received COVID-19 vaccines, regardless of their ethnicities, occupations, and places of residence. Peoples (above 18 years and older) were asked to take part in a self-administered online survey (created with Google Forms) that was circulated via social media platforms (i.e., Facebook, Instagram, and WhatsApp). Potential participants were directed to a page that included a thorough description of the study's purpose before being asked to agree to a mandatory electronic informed consent form that included statements about voluntary participation and anonymity,

**The Online Survey Tool**

The study's survey tool (Supplementary Material) was developed after an extensive literature search that included Medline/PubMed, Google Scholar, and other databases.

As a result, a wide spectrum of potential post-vaccination side effects was identified and covered in this survey. Several questions were also added to record participants demographic data and to assess their general health status after COVID-19 vaccines.

The survey tool was written in English, and it was validated by a panel of experts who provided feedback on the different items of the survey, which were then updated based on their suggestions.

**Statistical Analysis**

Descriptive Statistics were used to assess the baseline characteristics of the data. All quantitative variables are presented as mean and standard deviation, and all qualitative variables in frequency and percentages. For the comparison of categorical variables, either chi square All the data were entered in Microsoft excel and analyzed using SPSS version 23.00.

**Results**

A total of 1008 participants attempted the survey questionnaire over a two-week period from 1<sup>st</sup> April to 15<sup>th</sup> April.

**Table-1 Frequency and percentage distribution of variables**

Variables	(n-1008) f	%
<b>Gender</b>		
Female	480	47.6
Male	528	52.8
<b>Area / State</b>		
Andhra Pradesh	1	.1
Bihar	1	.1
Chandigarh	5	.5
Delhi	88	8.7
Gujarat	161	16.0
Haryana	1	0.1
Himachal Pradesh	1	.1
Jammu Kashmir	1	.1
Karnataka	5	.5
Kerala	7	.7
Madhya Pradesh	77	7.6
Maharashtra	14	1.4
Manipur	9	.9
Puducherry	2	.2
Punjab	5	.5
Rajasthan	170	16.9
Tamil Nadu	3	.3
Telangana	1	.1
Uttar Pradesh	362	35.9
Uttarakhand	92	9.1
West Bengal	2	.2
<b>Age</b>		
18 - 28 years	428	42.5
29 - 39 years	368	36.5
40 - 50 years	149	14.8

51 - 60 years	58	5.8
61 year and above	5	.5
<b>Religion</b>		
Hindu	730	72.4
Muslim	156	15.5
Sikh	63	6.3
Christian	56	5.6
Others	3	.3
<b>Education</b>		
High School	46	4.6
Intermediate	103	10.2
Diploma	227	22.5
Bachelor's Degree	517	51.3
Post Graduate	115	11.4
<b>Employment</b>		
Student	53	5.3
Govt Employee	309	30.7
Pvt Employee	334	33.1
Business	89	8.8
Professional	1	.1
Paramedic/Nurse	18	1.8
Unemployed	204	20.2
<b>Past history of Illness</b>		
No illness	472	46.8
Covid 19	371	36.8
Cardio vascular	48	4.8
Endocrine	75	7.4
Gastro intestinal	20	2.0
Nervousness	22	2.2
<b>Vaccine</b>		
Covaxin	319	31.6
Covi shield	689	68.4
<b>Experience of any Symptoms</b>		
No	88	8.7
Yes	920	91.3
<b>If yes then post vaccination Symptoms</b>		
Body ache	519	51.5
Fever	612	60.7
Headache	562	55.8
Local pain at injection site	587	58.2
Joint pain	216	21.4
Chills	150	14.9
Diarrhea	91	9.0
Insomnia	96	9.5
Sore throat	43	4.3
Vomiting	67	6.6
Nausea	118	11.7
Syncope	23	2.3
Tiredness	384	38.1
Constipation	2	.2
Allergic rash	69	6.8
Giddiness	14	1.4
Weakness	1	.1
Cough/Sneezing	1	.1
Rigor	48	4.8
<b>Inconvenience to work</b>		
Yes	732	72.6
No	276	27.4
<b>Paracetamol Intake</b>		
Yes	669	66.4
No	339	33.6
<b>After vaccination following Covid 19 guideline</b>		
Yes	955	94.7
No	45	5.3

**Table 2-Association of Gender with Symptom Experienced**

Experience any Symptoms	Gender				x <sup>2</sup>	p-value
	Female (n=480)		Male (N=528)			
	f	%	f	%		
No	32	6.7%	56	10.6%	4.90	<b>0.027</b>
Yes	448	93.3%	472	89.4%		

Table 2 shows that the association between gender and symptom experience was found to be statistically significant (p=0.027). Females experienced more symptoms than males.

Weakness	0	0.0%	1	.2%	0.91	0.340
Cough/Sneezing	0	0.0%	1	.2%	0.91	0.340
Rigor	28	5.8%	20	3.8%	2.32	0.128

**Table 3-Association of Gender with Side Effects of covid 19 vaccine**

Side Effect/Symptom	Gender				x <sup>2</sup>	p- value
	Female (n=480)		Male (n=528)			
	f	%	f	%		
Bodyache	261	54.4%	258	48.9%	3.06	0.080
Fever	304	63.3%	308	58.3%	2.64	0.105
Headache	276	57.5%	286	54.2%	1.13	0.287
Local pain at injection site	285	59.4%	302	57.2%	0.49	0.484
Joint pain	99	20.6%	117	22.2%	0.35	0.553
Chills	91	19.0%	59	11.2%	12.03	<b>0.001</b>
Diarrhea	36	7.5%	55	10.4%	2.60	0.107
Insomnia	52	10.8%	44	8.3%	1.82	0.177
Sore throat	17	3.5%	26	4.9%	1.18	0.278
Vomiting	36	7.5%	31	5.9%	1.08	0.300
Nausea	66	13.8%	52	9.8%	3.70	0.054
Syncope	8	1.7%	15	2.8%	1.56	0.212
Tiredness	188	39.2%	196	37.1%	0.45	0.504
Constipation	2	.4%	0	0.0%	2.20	0.138
Allergic rash	35	7.3%	34	6.4%	0.29	0.593
Giddiness	6	1.3%	8	1.5%	0.13	0.719

Table 3 shows that the association between gender and the side effects symptom chills was found to be statistically significant (p=0.001). females experienced more symptom of chills than males.

**Table 4- Association of Gender with Post Vaccination Status**

Post Vaccination	Gender				x <sup>2</sup>	p- value
	Female (n=480)		Male (n=528)			
	f	%	f	%		
Inconvenience to work	345	71.9%	387	73.3%	0.26	0.613
Paracetamol Intake	320	67.8%	349	67.0%	0.07	0.786
After vaccination following Covid 19 guideline	455	94.8%	500	94.7%	0.01	0.946

Table 4 shows that the gender was not found to be significantly associated with inconvenience to work (p=0.613), paracetamol intake (p=0.786) and covid19 guideline following (p=0.946).

**Table 5-Association of Age with Type of Symptom Experienced**

Side Effect/Symptom	Age Group										x <sup>2</sup>	p-value
	18 - 28 years (n=428)		29 - 39 years (n=368)		40 - 50 years (n=149)		51 - 60 years (n=58)		61 year and above (n=5)			
	f	%	f	%	f	%	f	%	f	%		
Bodyache	222	51.9%	168	45.7%	84	56.4%	44	75.9%	1	20.0%	22.25	<0.001
Fever	270	63.1%	210	57.1%	95	63.8%	36	62.1%	1	20.0%	7.16	0.128
Headache	211	49.3%	212	57.6%	100	67.1%	36	62.1%	3	60.0%	16.51	<b>0.002</b>
Local pain at injection site	190	44.4%	244	66.3%	109	73.2%	42	72.4%	2	40.0%	62.69	<0.001
Jointpain	70	16.4%	90	24.5%	44	29.5%	11	19.0%	1	20.0%	14.57	<b>0.006</b>
Chills	64	15.0%	29	7.9%	37	24.8%	19	32.8%	1	20.0%	40.63	<0.001
Diarrhea	19	4.4%	44	12.0%	24	16.1%	4	6.9%	0	0.0%	24.73	<0.001
Insomnia	24	5.6%	24	6.5%	28	18.8%	20	34.5%	0	0.0%	68.78	<0.001
Sore throat	13	3.0%	13	3.5%	11	7.4%	6	10.3%	0	0.0%	11.08	<b>0.026</b>
Vomiting	23	5.4%	19	5.2%	15	10.1%	10	17.2%	0	0.0%	16.08	<b>0.003</b>
Nausea	45	10.5%	50	13.6%	20	13.4%	3	5.2%	0	0.0%	5.33	0.255
Syncope	5	1.2%	14	3.8%	4	2.7%	0	0.0%	0	0.0%	7.79	0.100
Tiredness	192	44.9%	126	34.2%	47	31.5%	18	31.0%	1	20.0%	15.26	<b>0.004</b>
Constipation	1	.2%	0	0.0%	1	.7%	0	0.0%	0	0.0%	2.57	0.633
Allergic rash	7	1.6%	16	4.3%	31	20.8%	13	22.4%	2	40.0%	98.02	<0.001
Giddiness	5	1.2%	3	.8%	2	1.3%	4	6.9%	0	0.0%	13.96	<b>0.007</b>
Weakness	1	.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1.36	0.852
Cough/Sneezing	1	.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1.36	0.852
Rigor	27	6.3%	6	1.6%	10	6.7%	5	8.6%	0	0.0%	13.62	<b>0.009</b>

Table 5 shows that the age was found to be significantly associated with the symptoms Bodyache (maximum in 51 - 60 years, p<0.001), Headache (more in 40 to 50 years, p=0.002), local pain at injection site (more in 40 to 50 years, p<0.001), Joint pain (more in 40 to 50 years, p=0.006), chills (more in 61 to 60 years, p<0.001), Diarrhea (more in 40 to 50 years, p<0.001), Insomnia (more in 51 to 60 years, p<0.001), sore throat (more in 51 to 60 years, p=0.026), vomiting (more in 51 to 60 years, p=0.003), tiredness (more in 18 to 28 years, p=0.004), allergic rash (more in 61 years and above age, p<0.001), giddiness (more in 51 to 60 years, p=0.007) and rigor (more in 51 to 60 years, p=0.009).

**Table 6-Association of Past History with Symptom Experienced**

Experience Symptoms	Past history										x <sup>2</sup>	p-value		
	No illness (n=472)		Covid 19 (n=371)		Cardio vascula r (n=48)		Endoc rine (n=75)		Gastro intestin al(n=20)				Nervo usness (n=22)	
	f	%	f	%	f	%	f	%	f	%			f	%
No	66	14.0%	17	4.6%	2	4.2%	3	4.0%	0	0.0%	0	0.0%	31.73	<0.001
Yes	406	86.0%	354	95.4%	46	95.8%	72	96.0%	20	100.0%	22	100.0%		

Table 6 shows that the association between past history and symptom experience was found to be statistically significant (p<0.001). Respondent with past history experienced more symptoms.

**Table 7- Association of Past History with Post Vaccination Status**

Post Vaccination	past history												x <sup>2</sup>	p-value
	No illness (n=472)		Covid 19 (n=371)		Cardio vascular (n=48)		Endocrine (n=75)		Gastro intestinal (n=20)		Nervousness (n=22)			
	f	%	f	%	f	%	f	%	f	%	f	%		
Inconvenience to work	269	57.0%	319	86.0%	41	85.4%	66	88.0%	18	90.0%	19	86.4%	109.36	<0.001
Paracetamol Intake	255	55.6%	279	75.6%	35	72.9%	66	88.0%	16	80.0%	18	81.8%	59.28	<0.001
After vaccination following Covid 19 guideline	454	96.2%	353	95.1%	46	95.8%	68	90.7%	19	95.0%	15	68.2%	35.87	<0.001

Table 7 shows that the past history was found to be significantly associated with inconvenience to work (p<0.001), paracetamol intake (p<0.001) and covid guideline follow (p<0.001). All these proportion were more in case if past history was present.

**Table 8-Association of the type of vaccine with Symptom Experienced**

Experience any Symptoms	vaccine				x <sup>2</sup>	p-value
	Covaxin (n=319)		Covi shield (n=689)			
	f	%	f	%		
No	32	10.0%	56	8.1%	0.99	0.319
Yes	287	90.0%	633	91.9%		

Table 8 shows that the association between vaccine type and symptom experience was not found to be statistically significant (p=0.319).

**Table 9- Association of the Vaccine Type with Type of Symptom Experienced**

Side Effect/Symptom	vaccine				x <sup>2</sup>	p-value
	Covaxin (n=319)		Covi shield (n=689)			
	f	%	f	%		
Bodyache	163	51.1%	356	51.7%	0.03	0.866
Fever	192	60.2%	420	61.0%	0.05	0.816
Headache	168	52.7%	394	57.2%	1.81	0.179
Local pain at injection site	171	53.6%	416	60.4%	4.11	<b>0.043</b>
Jointpain	66	20.7%	150	21.8%	0.15	0.697
Chills	45	14.1%	105	15.2%	0.22	0.638
Diarrhea	39	12.2%	52	7.5%	5.81	<b>0.016</b>
Insomnia	37	11.6%	59	8.6%	2.33	0.127
Sore throat	14	4.4%	29	4.2%	0.02	0.896
Vomiting	26	8.2%	41	6.0%	1.70	0.192
Nausea	35	11.0%	83	12.0%	0.24	0.622
Syncope	7	2.2%	16	2.3%	0.02	0.899
Tiredness	106	33.2%	278	40.3%	4.69	<b>0.030</b>
Constipation	1	.3%	1	.1%	0.31	0.576
Allergic rash	26	8.2%	43	6.2%	1.25	0.264
Giddiness	3	.9%	11	1.6%	0.69	0.408
Weakness	0	0.0%	1	.1%	0.46	0.496
Cough/Sneezing	1	.3%	0	0.0%	2.16	0.141
Rigor	7	2.2%	41	6.0%	6.78	<b>0.009</b>

Table 9 shows that the vaccine type was found to be significantly associated with the symptoms local pain at injection site (more in covishield, p=0.043), Diarrhea (more in covaxin, p=0.016), tiredness (more in covishield, p=0.030) and rigor (more in covishield, p=0.009).

**Table 10-Association of Vaccine Type with Post Vaccination Status**

Post Vaccination	vaccine				x <sup>2</sup>	p-value
	Covaxin (n=319)		Covi shield (n=689)			
	f	%	f	%		
Inconvenience to work	237	74.3%	495	71.8%	0.66	0.417
Paracetamol Intake	200	63.9%	469	69.0%	2.51	0.113
After vaccination following Covid 19 guideline	295	92.5%	660	95.8%	4.81	<b>0.028</b>

Table 10 shows that the type of vaccine was not found to be significantly associated with inconvenience to work (p=0.417) and paracetamol intake (p=0.113).

**Limitations:**

This study had a number of limitations. The survey was conducted based on the respective online network of the authors and relied on the circulation of the survey link on different social media platforms for a certain period in time. Any study is bound to be taken by those with an interest in the topic. For instance, a survey on side effects of a vaccine is more likely to be answered by someone who had a problem with that vaccine. Those who developed symptoms following vaccination could likewise show greater interest in the survey. There is a possibility of bias as underprivileged populations may not have been able to participate in the survey. Greater awareness and anticipation of potential adverse effects among healthcare workers as a group, could also get reflected in the reporting rate. Hence, the reported 91% incidence of post-vaccination symptoms could be an overestimation. Survey questions were in English, which might have posed some difficulty among those with limited proficiency in that language. As the survey was done soon after initiation of vaccination, there was no scope for reporting delayed symptoms. The survey was done on trust; it was not possible to verify the I.D or information provided by each respondent. Moreover, when compared to the current population in India, the survey-sample was over representative for participants below the age of 50, students, and educated (more than a degree). The findings may not be a true representation from the perspective of the entire nation. The relatively small number of respondents who took the Covaxin and covishield vaccines makes it difficult to do a head to head comparison. A more systematic, community-based, inclusive sampling method (preferably conducted in local/ official language of different area) is recommended to improve the representativeness and generalizability of the finding. Despite these limitations, our finding are expected to provide valuable information about the side effects of COVID-19 vaccine among Indian peoples.

**Conclusions:**

This community based online survey on side effects of COVID-19 vaccine among peoples in India revealed that the majority of the participants reported more side effects/ symptoms of COVID -19 vaccine. The symptom experienced in maximum proportion were Bodyache, Fever come Headache local pain at injection site Other remarkable symptoms were joint pain, chills, Nausea, tiredness. In this females experienced more symptom of chills than males. The symptoms local pain at injection site (more in covishield), Diarrhea (more in covaxin), tiredness (more in covishield,) and rigor (more in covishield). The association between covaxine and covishield was not found to be statistically significant (p=0.319).

**Declaration of Competing Interest**

The authors declare that they have no known competing financial interests or personal relationships which have, or could be perceived to have, influenced the work reported in this article.

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**REFERENCES**

- [1] R.K. Singh et al.COVID-19 pandemic and its average recovery time in Indian states, clinical epidemiology and global health 11(2021) 100747 0
- [2] Suresh A, Konwarh R, Singh A.P, Tiwari A.K, "Public awareness and acceptance of COVID-19 vaccine: An online cross-sectional survey, conducted in the rst phase of vaccination drive in India", Research Square,1-19. <https://doi.org/10.21203/rs.3.rs-324238/v1>
- [3] Lazarus, J.V., Ratzan, S.C., Palayew, A. et al. A global survey of potential acceptance of a COVID-19 vaccine. Nat Med 27, 225–228 (2021). <https://doi.org/10.1038/s41591-020-1124-9>.

- [4] Hatmal, M.M.; Al-Hatamleh, M.A.I.; Olaimat, A.N.; Hatmal, M.; Alhaj-Qasem, D.M.; Olaimat, T.M.; Mohamud, R. Side Effects and Perceptions Following COVID-19 Vaccination in Jordan: A Randomized, Cross-Sectional Study Implementing Machine Learning for Predicting Severity of Side Effects. *Vaccines* 2021, 9, 556