



COVID 19 VACCINATION COVERAGE AND ITS ADVERSE EVENTS AMONG GENERAL POPULATION OF CENTRAL INDIA- A CROSS SECTIONAL STUDY

Community Medicine

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ABSTRACT

Background: The ongoing pandemic of Corona virus disease 2019(covid-19) is caused by Severe acute respiratory syndrome Corona virus 2(SAR-COV-2). The World Health Organization declared it as public health emergency of international concern on January 2020, and later declared as pandemic on 11 March 2020. Indian population are less aware of the pandemic and have less access to health care facilities. Vaccinating these populations can decrease disease burden and control the on-going pandemic. **Aim and Objectives:** To study AEFI pattern following COVID- 19 vaccination in populations of central India. To estimate the COVID 19 vaccination coverage in general populations of central India. To assess the factors responsible for COVID 19 vaccination coverage. **Material and Methods:** A community based cross sectional study will be conducted among 350 participants residing in the field practice area of Urban and Rural Health care Training Centre of tertiary medical college of Nagpur from January 2022 to February 2022. Data is collected using structured interview questionnaire after obtaining informed consent. Data is entered in Excel sheet and SPSS 20 for analysis. Analysis will be done using Chi square test and a p Value of <0.05 will be taken as significant. **Results:** In the present study, 84.31% (301 out of 357) of the study participants had taken COVID Vaccine, of which 217 (60.78%) were partially vaccinated and remaining 80 (23.52%) were fully Vaccinated. Most of the vaccinated study participants had taken Covishield vaccine 237 (78.73%) followed by Covaxin vaccine 62 (20.59%). And 16.52% were aware about AE reporting however those who aware of them 20% report Adverse events. The percentage of The AEFI experienced after 1st dose was 112 (51.61%) and 2nd dose was 30 (35.71%). Fever and general fatigue were the most common AEFI experienced. **Conclusion:** The COVID vaccine coverage was good in general population. Although adverse events due to vaccines were reported during the survey none of the events reported were severe or serious, which reiterates that the vaccines used in India are safe and the events will last without any kind of sequelae. Studies of this nature reinforce the need for vigilant monitoring and reporting of AEFIs.

KEYWORDS

COVID-19 , Adverse events , Vaccination coverage

INTRODUCTION

The ongoing pandemic of Corona virus disease 2019(covid-19) is caused by severe acute respiratory syndrome Corona virus 2(SAR-COV-2). The virus was first identified in December 2019 in Wuhan, China. The world health organization declared it as public health emergency of international concern on January 2020, and later declared as pandemic on 11 March 2020. As of 9 July 2021, more than 185 million cases have been confirmed, with more than 4.01 million confirmed deaths attributed to covid-19 making it one of the deadliest pandemic in the history¹.

At the beginning of new year January 2021 India's drug regulatory agency, Central Drugs Standard Control Organisation (CDSCO) decided to approve the newly developed COVID-19 vaccines, which were undergoing clinical trials. The regulatory agency issued a restricted emergency approval for covaxin, besides covishield (Made in India vaccine and developed by the Oxford– AstraZeneca)². On 16 Jan 2021, India began the world's largest vaccination program for COVID19, targeting an initial group of 300 million people and have successfully driven the world's biggest Covid-19 vaccination drive³.

To boost the confidence in public, the Govt. officials such as Ministers, CMs, PM, and healthcare workers took the vaccine jabs. During phase one and phase two vaccination drive many people were in a state of confusion and dilemma since there were 2 vaccines for COVID-19 in India so far.

Till now COVID – 19 Vaccination coverage has not been widely addressed in the India. Addressing this aspect of vaccination will help the policymakers to undertake appropriate measures to improve vaccine acceptance, coverage and reach desired national targets and to combat the COVID 19 pandemic. To estimate the COVID 19 vaccination coverage in general populations of central India. To study AEFI pattern following COVID- 19 vaccination in populations of central India. To assess the factors responsible for COVID 19 vaccination coverage.

MATERIALS AND METHOD

A cross-sectional study was carried out in month of January 2022 in Urban and Rural field practice area of IGGMC, Nagpur. The study

participants were all adults 18 years of age and above and those who were willing to give consent. Based on study conducted by DR SK et al, 2021. It was observed that 35.5 % had taken COVID Vaccine and after applying suitable formula for cross-sectional study, sample size derived was 352, however total 357 participants were included in the study.

For data collection, simple random sampling method was used and house to house survey was done. Eligible respondent was selected from each of the households and face to face interview was conducted after obtaining written Informed consent from the study participants. The data was collected using a pre-tested, semi-structured identification sheet questionnaire. The data included age, gender, number of volunteers, vaccine administered (By Brand name), Adverse event experienced after 1st dose, Adverse event experienced after 2nd dose, Aware of AE reporting, and Any Adverse event reported through COWIN or another platform. During this survey, informed verbal consent was taken from the survey volunteers. Assurance was given that the confidentiality regarding their information will be maintained strictly.

After collecting the data, entry was done in MS EXCEL Version 2020. IBM Statistical Package for Social Sciences version 20 (SPSS V.20.0) software was used for analysis. Socio demographic data was organized and presented by applying principles of descriptive statistics. Chi-square is applied to find the association between the vaccine coverage and sociodemographic factors with adverse events following immunization.

RESULTS

Table 1 : Sociodemographic Characteristics Of Study Participants

Variables	No. of participants	
	N = 357	%
Age groups	18 – 44	251 70.30
	45 – 60	58 16.24
	>60	48 13.44
Gender	Male	213 59.66
	Female	144 40.33
Religion	Hindu	261 73.10

Religion	Muslim	38	10.64
	Buddhist	42	11.76
	Christian	6	1.68
	Jain	8	2.24
	Sikh	2	0.56
Locality	Urban	122	34.17
	Rural	235	65.82
Education	Post graduate	16	4.48
	Graduation	64	17.92
	Higher secondary or Diploma	71	19.88
	Secondary	46	12.88
	Middle	60	16.80
	Primary	52	14.56
	Illiterate	48	13.44
Occupation	Professional	36	10.08
	Farm, shop owner, clerk	8	2.24
	Skilled	96	26.89
	Semiskilled	123	34.45
	Unskilled	50	14.0
	Homemaker	6	1.68
	Unemployed	20	5.60
Students	Students	18	5.04
SEC	Class I	68	19.04
	Class II	100	28.01
	Class III	112	31.37
	Class IV	61	17.08
	Class V	16	4.48

Table 1 shows that out of 357 participant's majority were male 59.66% and 40.33% were female. Mean age of male were 34.06±12.71 years with a range of 18-61 years and mean age of female were 39.27±15.48 years with a range of 23-68 years. Majority of participants belongs to 73.10% Hindus religion and residing at rural 65.82% locality. Maximum number of participants were higher secondary or diploma 71 (19.88%) while 16 (4.44%) postgraduate and most were semiskilled workers 123 (34.45%). Socioeconomic status classification by using modified B. G. Prasad scale [CPI= 123 Sept 2021; base year 2016 = 100], maximum number of participants belongs to socioeconomic class III (lower middle) 31.37%. Participants were not aware about AE reporting 83.47% while 16.52% were aware about AE reporting however those who ware of them 20% report Adverse events.

Out of 357 study participants, 301 (84.31%) were had taken COVID vaccine. Partially vaccinated 217 (60.78%) and fully vaccinated 84 (23.52%) [fig 1]. Most of the vaccinated study participants had taken Covishield vaccine 237 (78.73%) followed by Covaxin vaccine 62 (20.59%) and other vaccine 2 (0.6%) had taken which is Sputnik vaccine. Reasons reported for unwillingness to vaccinate are fear to side effect, fear of COVID infection, fear of long-term complication, infertility, assumption of not being at risk of getting COVID infection.

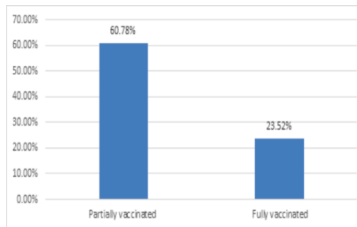


Fig 1: COVID-19 Vaccination Coverage

Table 2: Factors Associated With Vaccination Coverage Among Vaccinated And Non-vaccinated Study Participants

Variables	Total	Vaccination	Non vaccination	X2 df	p value
Age groups	18 – 44	251	217	34	4.124
	45 – 60	58	48	10	2
	>60	48	36	12	0.127*
Gender	Male	213	187	26	4.834
	Female	144	114	30	1
					0.028**

Religion	Hindu	261	223	38	6.832
	Muslim	38	28	10	3
	Buddhist	42	34	8	0.77*
	Christian	6	6	0	
	Jain	8	8	0	
	Sikh	2	2	0	
Locality	Urban	122	100	22	0.590
	Rural	235	200	35	1
Education	Post graduate	16	16	0	37.134
	Graduation	64	64	0	1
	Higher secondary or Diploma	71	68	3	0.000**
	Secondary	46	41	5	
	Middle	60	40	20	
	Primary	52	46	6	
	Illiterate	48	26	22	
Occupation	Professional	36	36	0	11.190
	Farm, shop owner, clerk	8	8	0	2
	Skilled	96	82	14	0.004**
	Semiskilled	123	105	18	
	Unskilled	50	36	14	
	Homemaker	6	2	4	
	Unemployed	20	14	6	
Students	Students	18	18	0	
SEC	Class I	68	65	3	40.175
	Class II	100	93	7	2
	Class III	112	95	17	0.000**
	Class IV	61	47	14	
	Class V	16	1	15	

X2-chi square; *-non significant; **- significant

Table 2 shows that vaccination coverage was found to be significantly associated with gender (p = 0.028), education (p = 0.000), occupation (p = 0.004) and socioeconomic status (p = 0.000) however no association was found between age, religion and locality.

Table 3: Distribution Of Vaccinated Study Participants As Per Adverse Events

Adverse events	Study Participants	
	n= 301	%
After 1st dose (n= 217)		
Yes	112	51.61
No	105	48.38
After 2nd dose (n= 84)		
Yes	30	35.71
No	54	64.28

Table 3 shows overall vaccinated study participants experienced adverse events 142 (47.17%). after 1st dose was 112 (51.61%) and 2nd dose was 30 (35.71%). Fever (91.07%), General fatigue (91.07%), Headache (85.71%), Pain at injection site (17.85%), Myalgia (14.28%), Arthralgia (7.14%), Flu like symptoms (71.42%), Dizziness (3.57%) and Nausea (7.14%) were most prevalent symptoms experienced by study participants after 1st dose. However Fever (73.33%), General fatigue (13.33%), Headache (26.66%), Pain at injection site (80%), Myalgia (6.66%), Arthralgia (6.66%) were most prevalent symptoms experienced by study participants after 2nd dose [fig 2].

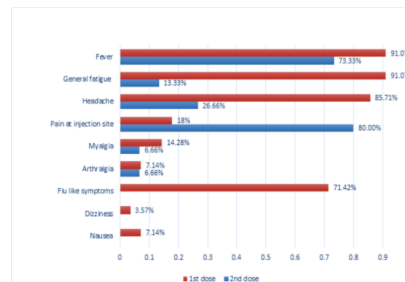


Fig 2: Comparison Of Adverse Events Experienced After 1st And 2nd Dose

Comparison between adverse events in 1st and 2nd dose observe that study participants were experienced adverse events less in 2nd dose as compare with 1st dose. Except for Pain at injection site were experienced more in 2nd dose as compare with 1st dose.

DISCUSSION

In the present study, 84.31% (301 out of 357) of the study participants had taken COVID Vaccine of which 217(60.78%) were partially vaccinated and remaining 84 (23.52%) were fully vaccinated. In a study done by DR SK et al, 35.5% (583 out of 1638) of the study participants had taken COVID Vaccine of which 533(91.42%) were partially vaccinated and remaining 50(8.5%) were fully vaccinated.

In the present study, vaccination coverage was high among males (87.79%), graduates and postgraduates (100%), professional and clerical (100%) followed by skilled workers (85.41%), Upper socioeconomic class (95.58%). This difference was statistically significant. In a study done by DR SK et al, vaccination coverage was high among 18 – 45 years age group (37.75%), males (64.86%), Christians (47.05%) followed by Hindus (43.56%), graduates (95.67%), clerical and skilled workers (70.75%), Upper middle socioeconomic class (72.41%). This difference was statistically significant. This differs from the vaccine acceptance rate among the older population of the US and Saudi-Arabia, who found a higher prevalence of acceptance in this group.^{18,19}

In the present study, it was observed that out of 301 vaccinated study participants 112 (51.61%) have experienced adverse events after the first dose of the COVID-19 vaccine whereas 30 (35.71%) have experienced adverse event after their second dose of COVID-19 vaccine. In a study done by Rajpurohit et al. 2021, it was observed that out of 75 subjects 67 (89.33 %) of subjects have experienced adverse events after the first dose of the COVID-19 vaccine whereas 66 (88 %) subjects have experienced at least a single adverse event after their second dose of COVID-19 vaccine. Also, in a study done by Remlabeevi A et al, proportion of respondents having reported at least one post vaccination symptoms is 63.3% and 24.3% after first and second doses of Covishield vaccination respectively. And in study done by R Jayadevan et al among healthcare workers in India after first dose of vaccination, the incidence of adverse events was reported to be 65.9%, but it was not exclusive to Covishield vaccination, included other vaccine candidates like Pfizer.

In the present study participants were not aware about AE reporting 83.47% while 16.52% were aware about AE reporting however those who aware of them 20% report Adverse events. In a study done by Rajpurohit et al., 2021 among 75 subjects the 56 (74.66 %) subjects were not aware of adverse event reporting. 20 % of subjects have experienced adverse events with the COVID-19 vaccine, also they were aware of the AE reporting but still didn't reported any adverse events.

In the present study, Fever was a most common adverse event, which was experienced by 91.07% of participants after the 1st dose but it has reduced to 73.33% in the 2nd dose of the COVID-19 vaccine. General fatigue which was experienced by 91.07% of participants after the 1st dose and 13.33% after the second dose COVID-19 vaccine. Almost 85.71% of subjects have experienced Headache during 1st dose and 26.66% after the second dose. We can see in the Fig 2, that the data of adverse events experienced during the 2nd dose was less compared to the 1st dose of the COVID-19 vaccine. In a study done by Rajpurohit et al., 2021, Fever was a most common adverse event, which was experienced by 76 % of subjects after the 1st dose but it has reduced to 30.66 % in the 2nd dose of the COVID-19 vaccine. Weakness and body ache was the second commonest adverse event, which was experienced by 65 % of subjects after the 1st dose and 30.66 % after the second dose COVID-19 vaccine. Almost 50.66 % of subjects have experienced Swelling and pain at the site of injection during 1st dose and 36 % after the second dose. We can see in the Table 3, that the data of adverse events experienced during the 2nd dose was less compared to the 1st dose of the COVID-19 vaccine. Some of the subjects have also experienced headache (21.33 %) and nausea (8 %) at a first dose and a second dose headache (25.33 %) and nausea (12 %). Also, in a study done by Jayadevan R et al, Tiredness was the most common symptom (45%), followed by myalgia (44%), fever (34%) and headache (28%). Local pain at the injection site was reported by 27% of the respondents.

LIMITATIONS

The study has few limitations. Although this study comprehensively

explored the socio demographic determinants of vaccine Coverage, the influence of essential factors like misinformation on vaccine safety and effectiveness on the intention to vaccinate was not explored in this study. Both the vaccines (Covishield and Covaxin) described in the study were introduced in two different timelines, which led to the large difference in the number of beneficiaries receiving each of these vaccines.

CONCLUSION

The COVID vaccine coverage was good in general population. Although adverse events due to vaccines were reported during the survey, none of the events reported were severe or serious, which reiterates that the vaccines used in India are safe and the events will last without any kind of sequelae. Studies of this nature reinforce the need for vigilant monitoring and reporting of AEFIs especially for newly introduced vaccines, as to identify potential signals.

Recommendations

Vaccine coverage may be increased once additional information about vaccine safety and efficacy is available in the public domain, preferably by a trusted, centralized source of information. In addition, all efforts must be made to curb the spread of misinformation about the vaccine. Interventional educational campaigns especially targeting the populations at a higher risk of vaccine hesitancy are therefore essential to avoid low inoculation rates.

Effective implementation of national surveillance programme of adverse events following immunisation is of prime importance for building evidence about vaccine safety and assuring the public that continuous monitoring is in place to help assessing any suspicion of safety issue. This will help the public health policy makers to formulate more definitive, efficient strategies that can help to implement the COVID-19 vaccination program successfully in India.

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