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ASSESSMENT OF SEVERITY OF COVID 19 AMONG VACCINATED AND NON-VACCINATED PATIENTS USING CT-SCORES

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ABSRACT

The development of vaccines that provide protection from SARS-CoV-2 infection is a global matter of life and death. An unrivalled effort is currently moving rapidly develop effective COVID-19 vaccines. Vaccines to prevent SARS-CoV-2 infection are considered the most promising approach for curbing the COVID-19 pandemic. Several COVID-19 vaccines are available globally COVID-19 vaccines have exemplify to bring forth a sufficient countervail response that protects against COVID-19. The site of vaccine delivery may impact the character of the immune response, Chest CT is a key for fast imaging tool inorder to diagnosis of COVID-19-infected patients especially in developing countries. In addition, chest CT can predict the disease severity by showing the percentage of lung involvement and hence give an idea about the prognosis of the disease. COVAXIN single dose vaccinated was 48 and with two doses was 48, and COVISHIELD single dose vaccinated was 130 and with two doses was 81 with 95% confidence interval (CI), 20% relative width of 95% CI, Severity of COVID 19 among vaccinated and non-vaccinated patients was compared. The severity of disease was less prevalent in double dose vaccinated patients when compared to single dosed, non-vaccinated patients.

INTRODUCTION

The World Health Organisation (WHO) has declared the coronavirus disease 2019 (COVID-19) a pandemic.[1]

The routes of transmission of COVID-19 remains unclear at present, but from other viruses and respiratory diseases indicates that the disease may rapidly spread through the large respiratory droplets with direct or indirect contact of infected secretions.[2]

Intensive research efforts to develop novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccines to protect against the global coronavirus disease 2019 (COVID-19) pandemic have resulted in many different vaccines but only a few available and also approved for use. Most are based on the spike (S) protein sequence of the original wild-type SARS-CoV-2 virus isolated in Wuhan, China, or inactivated whole virus.[3]

The development of vaccines that provide protection from SARS-CoV-2 infection is a global matter of life and death. An unrivalled effort is currently moving rapidly develop effective COVID-19 vaccines.[4]

Vaccines to prevent SARS-CoV-2 infection are considered the most promising approach for curbing the COVID-19 pandemic. Several COVID-19 vaccines are available globally.[5]

COVID-19 vaccines have exemplify to bring forth a sufficient countervail response that protects against COVID-19. The site of vaccine delivery may impact the character of the immune response.[6]

Chest X-rays are not especially sensitive for COVID-19, but chest CT gives a much more detailed view appears to have good sensitivity in initial stages of the disease.[7]

Chest CT is a key for fast imaging tool inorder to diagnosis of COVID-19-infected patients especially in developing countries. In addition, chest CT can predict the disease severity by showing the percentage of lung involvement and hence give an idea about the prognosis of the disease.[8,9]

The Clinical trial phase 3 conducted among 23 848 participants. The overall vaccine efficacy was computed as 70.4% of 5807 patients. The antibody last for 6 months upon vaccination. The vaccine was approved by Institutional Biosafety Committee (IBC). The major side effects included fatigue and headache. Covishield has been prepared using the viral vector platform which is a totally different technology.[10]

The accelerated development of vaccines has put forward a strength to fight against the COVID-19 pandemic. The Indian vaccination programme has primarily waged two vaccines, they are COVISHIELD (ChAdOx nCoV-19) and COVAXIN (BBV152). In an interim analysis of four randomised controlled trials, the efficacy of two doses of the ChAdOx nCoV-19 vaccine for preventing symptomatic COVID-19 was 70.4%.[11]

As universal vaccination campaigns against coronavirus disease 2019 (Covid-19) started throughout the world, vaccine effectiveness needs to be estimated the outcomes across diverse populations in a noncontrolled setting. Our study aimed to comparing the disease severity in population who has taken the vaccines which is approved by the government of India that is covaxin and covisheild. The countries started the vaccine trial, all of the documented cases with sequence data available were VOCs. But it was not possible to estimate efficacy to the original strain neither it is compared to the efficacy against the original strain of approved vaccines. However, there is a unavailability of studies comparing outcomes between COVISHIELD and COVAXIN recipients after single and double doses. Thus, we carry out a retrospective analysis to compare COVID-related severity between COVISHIELD and COVAXIN recipients.

METHOD

Study Design

A cross sectional survey was carried out for a period of 3 months from May 2021 to July 2021. The questionnaires were sent electronically to the patients who met the eligibility criteria through social media with **Inclusion criteria of** Patients with age ≥18 years old**,** Patients who had CT scores and RTPCR tests, We defined cases as severe COVID-19 [positive based on rRT-PCR test at admission or documented within 14 days prior to hospitalization]. We excluded individuals with rRT-PCR negative report but highly suggestive of COVID-19 on CT scan, unwilling to participate or known contraindication to COVID-19 vaccine, symptoms appearing 14 days before 1st dose**,** symptoms appearing 21 days before 2nd dose Inaccurate data and patients who are not willing to participate.

SAMPLE SIZE

A total of 756 patients (*n* =756) who met the inclusion criteria were recruited in the study COVAXIN single dose vaccinated was 48 and with two doses was 48, and COVISHIELD single dose vaccinated was 130 and with two doses was 81with 95% confidence interval (CI), 20% relative width of 95% CI.

RESULTS

Mild, Moderate and Severe Categorization Based on Ct Scores of Vaccinated and Non-Vaccinated

	COVAXIN		COVISHEILD		NON- VACCINATED
	SINGLE	DOUBLE	SINGLE	DOUBLE	N=449
TOTAL VACCINATED	48	48	129	64	-
TOTAL AFFECTED	28	15	65	18	220
MILD	09(18.75%)	08(16.66%)	19(14.72%)	7(10.93%)	31(6.9%)
MODERATE	10(20.83%)	06(12.5%)	34(26.35%)	08(12.5%)	86(19.1%)
SEVERE	09(18.75%)	01(2.08%)	13(10%)	3(4.68%)	103(22.93%)

The above table represents the categorization of vaccinated and non-vaccinated into mild, moderate and severe based on CT scores.

COVAXIN

Out of a total of 48 patients who were administered with single dose covaxin, a total of 28 people had disease of which 9(18.75%) had mild disease, 10(20.83%) had moderate disease and 9(18.75%) had severe disease. Similarly, out of a total of 48 patients who were administered with double dose covaxin, a total of 15 people had disease of which 8(16.66%) had mild disease, 06(12.5%) had moderate disease and 1(2.08%) had severe disease.

COVISHIELD

Out of a total of 129 patients who were administered with single dose covishield a total of 65 people had disease of which 19(14.72%) had mild disease, 34(26.35%) had moderate disease and 13(10%) had severe disease. Similarly, out of a total of 64 patients who were administered with double dose covishield, a total of 18 people had disease of which 7(10.93%) had mild disease, 08(12.5%) had moderate disease and 3(4.68%) had severe disease.

NON-VACCINATED

Out of a total of 449 patients who were non-vaccinated 220 were effected with disease. The number of people who had mild disease were found to be 31(6.9%), moderate was 86(19.1%) and severe was 103(22.93%)

Mean Ct Scores of People with Disease Who Are Vaccinated and Non-Vaccinated

CT SCORE	COVAXIN		COVISHEILD		NON- VACCINATED
	SINGLE (28)	DOUBLE (15)	SINGLE (65)	DOUBLE (18)	(220)
CT MEAN	10.35(4.71)	6.18(4.58)	9.6(4.63)	10.10(4.6)	12.22(4.45)

Significance Between The Mean Ct Scores of Vaccinated and Non- Vaccinated

	MEAN	SD	SEM	N	
VACCINATED	9.050	4.6300	0.4125	126	**P=0.0001**
NON-VACCINATED	12.2200	4.4500	0.3000	220	Std error of difference=0.505
					T value-=6.2826

The unpaired t-test is used to compare the mean between two independent groups. The unpaired t test is done to find out the significance between the mean CT scores of vaccinated and non-vaccinated persons and it is proved to be statistically significant (p=0.0001).

DISCUSSION

We try to saw the seed of the effectiveness of COVID-19 vaccines used in India through this study.

Ella R, Reddy S et al conducted a randomised double blinded control trail and stated that BBV152 was highly efficacious against laboratory-confirmed symptomatic COVID-19 disease in adults.[12] which was also in line with our observations. severity of disease was very less in covaxin compared to covisheild. Absolute differences in vaccine effectiveness were more marked after the receipt of the first dose. This finding would support efforts to maximize vaccine uptake with two doses among vulnerable populations.[13] which was also in line with our observations.

CONCLUSION

Severity of COVID 19 among vaccinated and non-vaccinated patients was compared. The severity of disease was less prevalent in double dose vaccinated patients when compared to single dosed, non-vaccinated patients. When comparing with covaxin and covishield our study shows that the number of people who had disease was more with covaxin than covishield but the severity of disease was very less in covaxin when compared to covishield.

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