

THREE WAVES OF COVID-19 PANDEMIC AND A COMPARISON OF COVISHIELD AND COVAXIN APPROVED BY DGCI TO FIGHT COVID-19 IN INDIA**Dr. Mohammed Mustafa G.*¹, Pharm D; Dr. Srirangam Anusha¹, Pharm D; Mr. Ravinandan A. P.¹, M Pharm, (Ph.d); Ms. S. Florence², Pharm D; Ms. Vanishree², Pharm D.**¹Asst. Prof. Dept. of Pharmacy Practice, Sree Siddaganga College of Pharmacy, Tumkur Karnataka, India.²Pharm D Students, Dept. of Pharmacy Practice, Sree Siddaganga College of Pharmacy, Tumkur, Karnataka, India.***Corresponding Author: Dr. Mohammed Mustafa G.**

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ABSTRACT

The COVID-19 pandemic exists in the form of three waves. As the first, second and third-order impacts of the virus manifest over different time frames, this pandemic will not necessarily be 'over' until we are through the impact of the 'third' wave of the COVID-19 pandemic. The pandemic declaration of COVID-19 infection by the world health organization (WHO) and ensuring boundless morbidities and mortalities in practically all nations of the world promoted the innovative work to discover an immunization against SARS-Co-V2 infection. Typically, any new vaccine takes 10 - 15 years of time. In pandemic circumstances, the whole cycle of vaccine development including clinical preliminaries gets shortened and optimized to 10-15 months i.e., the quest for a vaccine against COVID-19 is going on at high speed which came with the good news of two vaccines i.e., COVISHIELD and COVAXIN. This review article aims to highlight the difference between the three waves of COVID-19 and also the comparison of COVISHIELD and COVAXIN.

KEYWORDS: Covid-19, symptoms, Covaxin, Covishield.**INTRODUCTION**

Corona virus are important human and animal pathogen. At the end of 2019, a novel coronavirus was identified as the cause of a cluster of pneumonia cases in Wuhan, a city in the Hubei province of china .it rapidly spread, resulting in an epidemic.

Throughout China followed by an increasing number of cases in other countries throughout the world. in February 2020, the World Health Organization designated the disease COCOVID-19 which stands for Corona Virus disease-2019.

The virus that causes COVID-19 is designated as severe acute respiratory syndrome Coronavirus-2(SARS-CoV-2). Previously; it was referred to as 2019-n Co-V.^[1]

EPIDEMIOLOGY

Geographic distribution - Since the first reports of cases from Wuhan, a city in the Hubei province of china, at the end of 2019, more than 80,000 COVID-19 cases have been reported in china; these include all laboratory-confirmed cases as well as clinically diagnosed cases in the Hubei province. A joint World Health Organization (WHO)- China fact -Finding mission estimated that the epidemic in china peaked between late January and early February 2020. the majority of reports have been from Hubei and surrounding provinces, but numerous cases

have been reported in other provinces and municipalities thought china. An increasing number of cases have also been reported in other countries across all continents except Antarctica, and the rate of new cases outside of china has outpaced the rate in china. these cases initially occurred mainly among travelers from china and those who have had contact with travelers from china however, ongoing transmission has driven smaller outbreaks in some locations outside of china, including South Korea, Italy, Iran and Japan and infections elsewhere have been identified in travelers in those countries. In the united states, several clusters of COVID-19 with local transmission have been identified throughout the country.^[1]

DEFINITION

Coronavirus disease is an infectious disease caused by newly found corona virus. Most people infected with the COVID-19 virus will experience the symptoms like mild to moderate respiratory illness and some patient recover them self without special treatment. But patient who has underlying medical problems like cardiovascular diseases, diabetes, chronic respiratory diseases and cancer are more likely to develop serious illness.^[2]

SYMPTOMS**SYMPTOMS OF COVID-19****Most common symptoms**

- Fever
- Dry cough
- tiredness

Less common symptoms

- sore throat
- Diarrhea
- Conjunctivitis
- headache
- Loss of taste or smell

Serious symptoms

- Difficulty in breathing or shortness of breath
- Chest pain or pressure
- Loss of speech or movement

In common it takes 5-6 days from when someone is infected with the virus for symptoms to show, however it can also take upto 14 days.^[2]

THREE WAVES OF COVID-19

FIRST WAVE OF COVID-19

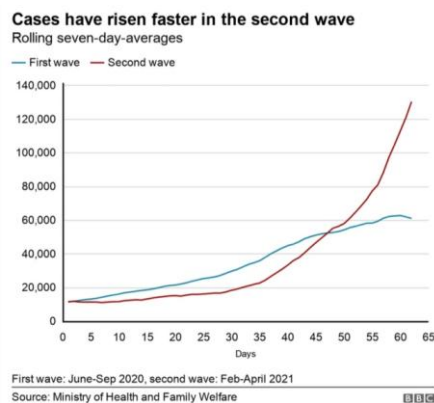
Many countries around the world saw the pattern of the coronavirus disease in 2019. The first wave of COVID-19 emerged in the spring that substantially subsided during the summer. The considerable number of seroprevalence studies done in different countries has suggested that not all the age groups are being infected

during the spread of virus in the first wave. In several countries like e.g. Singapore, Australia [or] Iceland etc. Evidence suggest that elderly people were less likely to be infected and were not contributing many fatalities were as the opposite pattern was seen in other countries that had high rate of death, where nursing home were massively infected during the 1st wave. The proportion of COVID-19 deaths is <50 years among all COVID-19 deaths in the first wave did not surpass 1.5% in any high-income country except for the USA (2.8% for a cut-off <45 years) and it was much higher in Ukraine (12.7%).

Where as in India nearly 6 months after the peak of 1st wave in September 2020 Corona virus in India once again began to raise from the first week of March signaling the arrival of the second wave of the pandemic in the count Second wave.^[3]

SECOND WAVE OF COVID-19

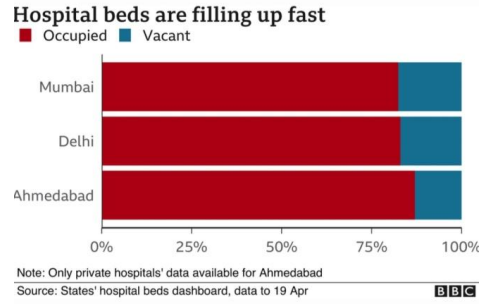
In India second wave of corona virus is catastrophic. The rise in case number has been enormous in second wave. On 18th June last year i.e. 2020, India has recorded about 11,000 cases and in next 60 days, it added 35,000 new cases on average every day. On 10th February 2021, at the start of second wave, India had confirmed about 11,000 cases and in next 50 days, the daily average was around 22,000 cases. But in past 10 days, cases rose sharply with the daily average 89800 case.



In second wave of COVID-19 the infection is spreading much faster across the country and also shortage of beds in hospital due to the rapid spread of infection among the population and also people are dying without timely treatment, India has been incessantly reporting more than

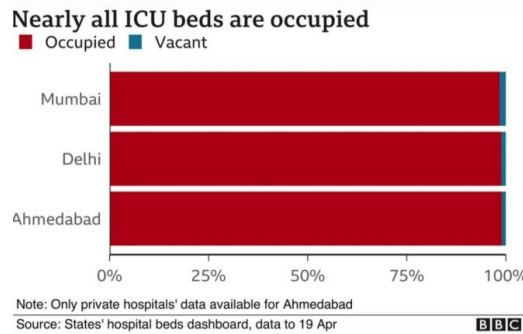
150,000 cases from the starting of April 2021. the most badly affected cities like.

Delhi, Mumbai and Ahmadabad have almost run out of hospital beds.



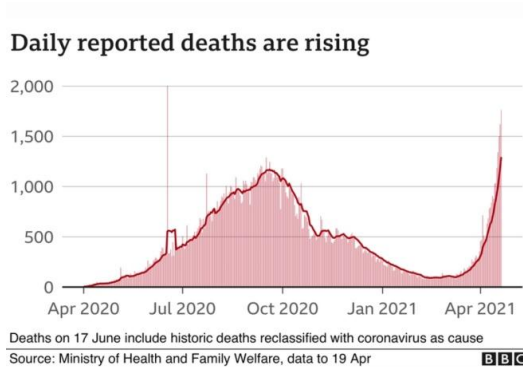
In India situation is much more disastrous when it comes to ICU beds. Several cities have left with limited number

of ICU beds and they are trying to build extra capacity in hotels and stadiums.



Unreported deaths- Number of daily deaths has been rising sharply in the second wave of COVID19. this

graph indicates actual number of deaths could be much higher.^[10]



India globally ranks second in total infection i.e., 21,077,410, on 3rd Jan 2020 to May 2021 and fourth in total mortality 230,168 according to WHO 2021. In second wave of COVID19 compared to older ones the pediatric and younger individuals are getting infected. Large numbers of Covid patients are between the age of 18 and 45 years and are suffering serious symptoms of COVID-19.^[10]

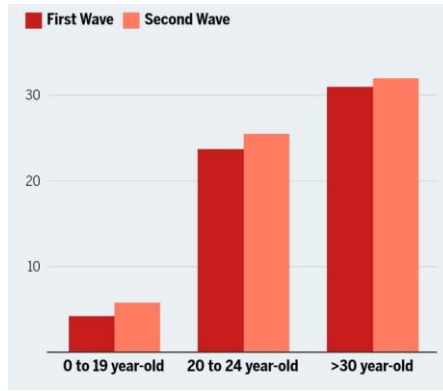
After doing an analysis of the first and second wave of COVID-19 the hit in India in 2020 and 2021 respectively the Indian Council of Medical Research suggested that there is no major shift in the different age groups have been affected by COVID-19 in two waves.^[4]

1. Whether younger people are getting infected in second wave of COVID-19?

NO. The older population continues to be more vulnerable to the infection only limited proportion of patients in younger age group more than 70% of patients are under 40 in both the waves.

2. Age wise break up of younger Covid-19: -First V/S second wave?

The older population continues to be more vulnerable to Covid-19 in 2nd wave while the marginal increase is recorded in the number of young people testing positive for the virus.



Source: - Indian Council of Medical Research.

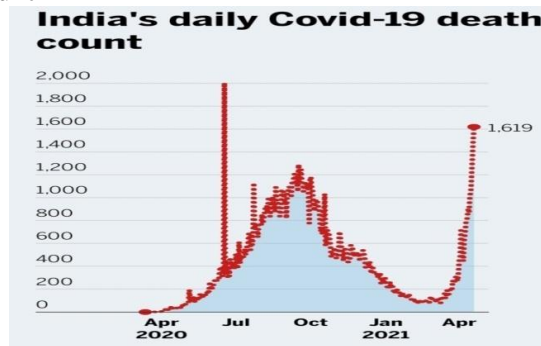
- Based on the analysis of ICMR, in 2nd wave a high proportion of Asymptomatic have been recorded.

the symptoms of breathlessness in the second wave where as in first wave patients showed symptoms like sore throat and dry cough. There is no much difference in deaths between the 1st and 2nd wave among the hospitalized patient.

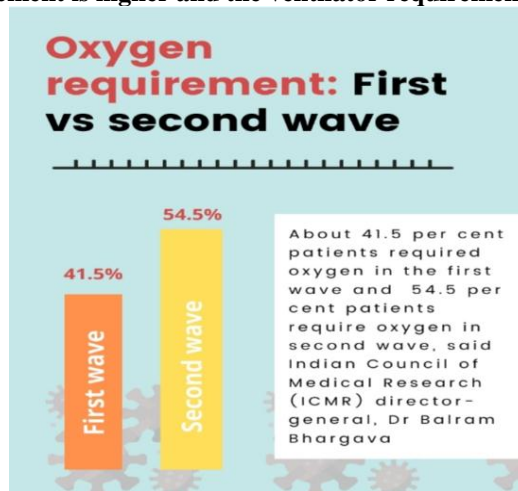
3. The symptoms of Covid-19: - first V/S second wave?

Higher portion asymptomatic patient got admitted in the 2nd wave. Higher portion of admitted patience showed

India’s daily Covid-19 death count



In a 2nd wave the oxygen requirement is higher and the ventilator requirement is not high



THIRD WAVE OF COVID-19

In the third wave of COVID19 the experts says that novel corona virus is affected in children. As many as 150 children below age of 10 and below age of 15 have been tested positive in the last two months. the second wave of pandemic COVID-19 will decline by July 2021.

while third wave is expected to hit the country in about late July (i.e., in above 6-8 months). The phase three of pandemic will be localized and it won’t affect the many people’s due to their immunity from the vaccination.^[4]

How to prevent the spread of corona virus-2019?

To prevent the infection and to slow transmission of COVID-19, do the following:

1. Wash your hands regularly with soap and water, or clean them with alcohol-based hand rub.
2. Maintain at least 1 meter distance between you and people coughing or sneezing.
3. Avoid touching your face
4. Cover your mouth and nose when coughing and sneezing
5. Stay home if you feel unwell
6. Refrain from smoking and other activities that weaken the lungs
7. Practice physical distancing by avoiding unnecessary travel and staying away from large group of people.^[2]

A COMPARISON OF COVISHIELD AND COVAXIN VACCINES APPROVED BY THE DRUG CONTROLLER GENERAL OF INDIA (DGCI)

1. INTRODUCTION

DEFINITION: - A Vaccine is any preparation intended to produce immunity to a disease by stimulating the production of antibodies. Vaccines include, for EX: suspensions of killed (or) attenuated microorganisms, (or) products (or) derivatives of microorganisms. The most common method of administering vaccines is by injection, but some are given by mouth (or) Nasal spray.

FOLLOWING PROTOCOLS SHOULD BE TAKEN INTO CONSIDERATION DURING VACCINATION

1) What should you mention to your vaccination provider before you get vaccination i.e., both COVISHIELD AND COVAXIN?

- Tell the vaccinator/Officer supervising your vaccination about all your medical conditions, including if you: -
 - Are on regular medication for any illness, for how long and for which condition. It is advisable not to take vaccine in any of these condition
 - Have any allergies
 - have fever
 - Have a bleeding disorder(or) are on a blood thinner
 - Are immunocompromised (or) are on medication that affect your immune system
 - Are pregnant
 - Are breastfeeding
 - Have received another COVID-19 vaccine.^[6,7]

Individuals should consult the health care professionals before deciding to take the vaccine.

2) Who should get the vaccine?

- Both COVISHIELD and COVAXIN vaccine has been approved for restricted use in emergency condition in individuals 18 years of age and older.

3) Who should not get vaccine?

- Individuals should not get vaccinated if they have any serious allergic reaction to any ingredients of any vaccine
- If they have any allergic reaction after a previous dose of the vaccine that may be either covishield or covaxin.
- If the individual is currently suffering from any acute infection or fever.^[6,7]

4) How the vaccine is given?

- The COVISHIELD or COVAXIN will be given to an individual through an intramuscular route (IM injection) only, preferably in the deltoid muscle.

2. BACKGROUND

Two vaccine are currently being administered in India in order to prevent the spread of Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-Co-V2) The assessment of humoral immune response is carried out after the administration of first dose of both the vaccine i.e., ChAdOx1-nCOV (COVISHIELD) and BBV-152(COVAXIN) in Indian population.

3. METHODS

In India, cross-Sectional study has been conducted on Corona virus vaccine-induced antibody among the population with or without past history of SARS-Co-V2 infection in order to assess the antibody response, SARS-Co-V2 antis pike binding antibody is being assessed quantitatively at four time points between 21 days or more after the first dose to six months after the second dose.

The second phase of COVID-19 vaccination drive has already begun in India and many people are still oblivious of the two vaccine i.e., COVISHIELD or COVAXIN are different from each other.

4. COMPARITION OF COVAXIN V/S COVISHIELD -which one better?

a) DEVELOPER

- Covaxin has been developed by the Bharat Biotech international Ltd in association with the Indian Council of Medical Research (ICMR) and The National Institute of Virology (NIV). This vaccine is approved for emergency use that may prevent COVID-19.^[8,6]
- Covishield has been developed by Oxford-Astra-Zeneca and is being manufactured by Serum institute of India (SII).^[7]

b) TYPE OF VACCINE

- Covaxin is an inactivated vaccine, which has been tested platform of dead virus. This vaccine is developed with whole -virion inactivated Vero cells-derived technology. This vaccine contains inactivated viruses, which cannot infect a person but still can instruct the immune system to prepare the defense mechanism against the active virus. This conventional vaccine has been used for decades.

There are vaccines for some other disease as well which are made using the same technology. These diseases are Rabies, polio, pertussis and Japanese encephalitis. The SARS-Co-V2 virus strain was isolated from an asymptomatic COVID-19 patient at India's National Institute of Virology. The TLR7/8 adjuvant formulation specifically induced significant Th1 biased antibody response and increased SARS-CoV-2 lymphocyte responses. The virus strain is soaked in beta -propiolactone, and organic compound that deactivates then by binding to their genes. Covaxin was found to be effective against corona virus strains found in India and United Kingdom. These findings are from a study conducted in collaboration with the Indian Council of Medical Research.^[6,9]

- Covishield has been prepared using the virus vector platform which is totally different technology. A chimpanzee adenovirus - ChAdOx1 has been modified to enable it to carry the COVID-19 spike protein into the cells of humans. this cold virus is basically incapable of infecting the receiver but can very well instruct the immune system to prepare a mechanism against such viruses.^[8]

c) DOSES

- COVAXIN vaccination series is two doses given four weeks apart.
- The COVISHIELD vaccination course is consist of two separate doses of 0.5ml each. If an individual receives one dose of the COVISHEILD vaccine, then second dose should be administered between 4 to 6 weeks after the first dose. however, there is data available for administration of the second dose up to 12 weeks after the first dose from the overseas studies.^[6,7]

D) STORAGE GUIDELINES

Both COVAXIN and COVISHIELD can be stored at 2 to 8 degrees centigrade, which is a household temperature. this make both the vaccine to adopt the Indian condition as most of the vaccine are kept at the same temperature range. This type of storage guidelines makes the transportation and storage of both the vaccine easier.^[8]

E) EFFICACY

- Both the vaccine has shown more satisfactory result. Bharath Biotech announced phase 3 interim analysis which shows 81% of effectiveness against the COVID-19. the second interim analysis result in a point estimate of vaccine efficacy of 78% (95% CI: 61-88) against mild, moderate and severe COVID-19 diseases and 100% (95%-CI: 60-100), impacting

in reduction of hospitalization. the efficacy against asymptomatic COVID-19 infection was 70% suggesting decreased transmission in Covaxin recipients.^[9,8]

- The effectiveness of covishield vaccine nearly 90% as per the global reports.^[8]

F) SIDE EFFECTS

Sid effect that has been reported with the Bharath Biotech COVID-19(COVAXIN) include -pain at the site of injection or swelling or itching, headache, fever malaise, nausea, vomiting or rashes.^[6]

Side Effect that has been reported with COVISHIELD include

- Very common (may affect more than 1 in 10people) tenderness, pain, warmth, redness, itching, swelling or bruising where the injection is given.
- generally feeling unwell, feeling tired, chills, feverish, headache, nausea, joint pain or muscle ache
- Common (may affect up to 1 in 10 people)-a lump at the site of injection may occur fever, vomiting, flu like symptoms such as high temperature, sore throat, running nose, cough and chills.
- Uncommon ((may affect up to 1 in 100 people)-felling dizziness, decrease appetite, abdominal pain, enlarged lymph nodes, excessive sweating, itchy skin or rashes. These are the possible Sid effects of COVISHIELD vaccine. Serious and unexpected Sid effects may occur. COVISHIELD vaccine is still being studied in clinical trials.^[7]

G) APPROVALS

Covaxin has been granted a restricted use authorization in clinical trial mode, while Covishield has been allowed for restricted use in emergency situation which prevent corona virus infection in people aged 18 years and above. However, the Drug Controller General of India (DGCI) has not given a market use authorization clearance to any of the vaccine till now.^[8]

H) PRICE OF VACCINES

COVAXIN is More expensive is being sold at INR 400(government) and INR 1200(Private facilities) where as COVISHIELD is less expensive. Serum Institute of India (SII) is selling the vaccine at INR 300[government] and INR 600 (Private centers).^[8]

I) AGE OF BENEFICIARIES

Both COVAXIN and COVISHIELD has been approved for people aged 18 years and above. but however, isn't any assurance if the vaccine can be given to children and pregnant woman.^[6,7,8]

SUMMARIZING THE DIFFERENCE BETWEEN COVAXIN AND COVISHIELD

Covishield	Covaxin
The interval between 1st and 2nd doses is 12-16 weeks	The interval between the 2 doses is 4-6 weeks
Efficacy after the second dose can vary from 70-90%	This vaccine can be 78-100% effective after the second dose
People above 18 years of age can opt for this vaccine	This vaccine can be injected into younger people as well (12 years and above)
Covishield is less expensive. SII is selling this vaccine at INR 300 (government) and INR 600 (private centres)	Covaxin is more expensive and is being sold at INR 400 (government) and INR 1200 (private facilities)
Covishield is more easily available	Fewer hospitals and healthcare centres are stocking Covaxin

CONCLUSION

While both the vaccine has obtained immune response, seropositivity rate to antibody where significantly higher in COVISHIELD recipient when compared to COVAXIN recipient after the administration of first dose of both the vaccine. Ongoing COVAT study will further enlighten the immune response between two vaccine after the second dose.

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