



Study of Currently Available Vaccines for COVID-19 in India

Vibhavari M. Chatur*, Sanjay G. Walode, Anup Nalawade, Rohit Nalawade, Hritik Patwa.

Rasiklal M. Dhariwal Institute of Pharmaceutical Education and Research, Chinchwad, Pune-19.

Abstract:

Nowadays COVID-19 spread all over the world and creates the pandemic situation and those widely spread all over the world. For controlling this pandemic situation and spreading of virus infection vaccination must be required. Because vaccination provides the long-lasting immunity and bust up the natural defense mechanism of body. It artificially develops the immunity which called as “immunization”. This defense mechanism slowly develops the antibodies which helpful for prevention of viral infection in body. Another benefit of vaccine is that, to avoid the spreading of viral infection from one person to another person. For the development of COVID-19 vaccines, approaches like inactivated, live-attenuated, subunit vaccine are used. Aim of review paper is to study about different type of COVID-19 vaccines used in Indian market. This review paper includes brief information about Covisheild and Covaxin which used for vaccination. This vaccination provides immunity against the COVID-19 infection within less period of time.

Keywords: Covisheild, Covaxin, Need of Vaccination, Dose Regimen, Side Effects.

Introduction:^[1]

Vaccine is a biological product which used to produce antibodies in human body and protect human from that particular disease condition. That produced antibodies can improve or bust up the human immune system artificially which leads to cause development of disease resistant immunity with in human body. Those artificially developed immunity called as “Immunization”. This biological preparation develops the active acquired immunity against infectious disease. This biological preparation mainly prepared from the disease-causing microorganism but those used organisms are virulence free. These organisms are act as an antigen which produce beneficial effect on body without causing any disease. During vaccine preparation micro-organism used in virus, live, killed, proteins or toxins state. One of these states are choose for the vaccine development and selection of organism’s state depend on their activity, effectivity and stability. Vaccination

are beneficial for every stage patients including infants also. Another beneficial point is that most of the vaccines having ability to provide lifelong immunity but, in some cases, bust of doses required.

Vaccination is an effective and simple method to improve immunity against infectious disease and provides must better effect over human body without any major side effect. Also worked as lifelong period. Vaccination not only improve body immunity but also stops the spreading of disease from one person to another person so, vaccination is proven as health developing, immune busting and life saving medication.

Vaccine:

Definition:^{[2][3]}

A product which accelerates a individual's immune system to generate immunity to a certain disease, defending the individual from that disease. A vaccine is an deactivated or attenuated pathogen or a element of a pathogen (protein, nucleic acid) which after administered to the host, accelerates a defensive reaction of the cells in the immune system or it is an immunobiological constituent created to generate exact protection in contrast to a certain disease.

Purpose:^[3]

- 1.To generate immunity against disease
- 2.To decrease the seriousness of the disease
- 3.Abolition of the disease
- 4.Decrease the problem of disease
- 5.Protect the society

Advantages:^[4]

- 1.Vaccines Help Prevent Risky Diseases.
- 2.Vaccines not only protect you; they guard persons nearby you, specially persons which are not fine adequate to be vaccinated.
3. Safe
4. Very Effective
5. Life Long Preventive

Corona virus: ^{[5][6][7][8]}

The corona virus also known as the COVID-19 Pandemic is an infectious disease caused by SARS-CoV-2 i.e., severe acute respiratory syndrome coronavirus 2. In December 2019, the first case of COVID-19 virus was detected in Wuhan, China. The World Health Organization announced a Public Health Emergency of International Concern about COVID-19 on 30 January 2020, and afterward announced a pandemic on 11 March 2020. As on 10 May 2021, above 158 million cases of COVID-19 have been confirmed, along with over 3.29 million deaths recognised to COVID-19. The Covid-19 is very comparable in symptomatology to another viral respiratory infections. Cases differ from minor kinds to difficult ones that can lead to dangerous medical situations or even death. A coronavirus is a class of common virus which produces an infection in nose, sinuses, or upper throat. Symptoms of COVID-19 are changeable, varying from minor symptoms to difficult illness. Common symptoms contain headache, loss of smell and taste, nasal congestion and runny nose, cough, muscle pain, sore throat, fever, diarrhoea and breathing difficulties. Symptoms are seen after 5-6 days of the infection in the individuals. The COVID-19 has now become a very serious disease in the world. Some of the vaccines have been developed for the COVID-19, which are proven to be useful in the prevention of the COVID-19.

Need for vaccination against COVID-19: ^{[9][10][11][12]}

The COVID-19 vaccination is necessary for following reasons:

1. It Will Support to Save You From Receiving The Virus.
2. A Main Tool to Support To Stop The Pandemic.
3. A Secure Means to Aid Develop Protection.
4. Receiving Immunized Is Safer Than Gaining Infected Protection in Contrast to Infection and Spreading Later on Vaccination.
5. By Providing Us Immunity, Vaccines Defend Us from Disease.

Covisheild: ^[13]

It is a COVID-19 vaccine which used to treat against corona virus and prevent human body from their infection. Vaccine bust up the natural defense mechanism of body and provide protection against COVID-19 virus. Indian government give permission for emergency use to fight against COVID-19 pandemic situation for 18-year age person and older. This Covisheild vaccine developed by the Oxford university scientist with the help of pharmaceutical company AstraZeneca. This developed under the codename AZD1222. This Covisheild manufactured by the Indian pharmaceutical company "Serum institute" under the chairmanship of Aadar Poonawalla. Covisheild is an Adenovirus type of vaccine. This adenovirus vector obtained from the chimpanzee.

Covisheild contains ingredients such as L-Histidine hydrochloride monohydrate, L-Histidine, Magnesium chloride hexahydrate, Ethanol, Polysorbate 80, Sodium chloride, Sucrose, Disodium edetate dihydrate (EDTA), Water for injection.

Dose Regimen: ^[14]

Covisheild vaccine have two separate dose course which taken after particular time period after the first dose of vaccine. Both doses are 0.5 ml and administered via Intramuscular route on (at the top of upper arm)deltoid muscle. Second dose of Covisheild should be taken between 12 to 16 weeks after the first dose. These 12 to 16 weeks gap between two doses should be necessary because body required some time for development of antibodies. In case any person misses their second dose that time first consult with your health care provider and take vaccine after his advice. Covisheild provide up to 70% efficacy after both doses and improves immunity up to 90% and fight against COVID-19 infection.

Needs for vaccination: ^[14]

Person's health information must require because that information talks about person's health condition, their medical history, allergic condition etc. in case of women required information about their pregnancy and breast-feeding condition so, health care provider can easily decision about vaccination of that person. Checking of health condition necessary so, it helpful to avoid further allergic reaction, adverse effects.

Side effects: ^[15]

Those side effects vary from person to person. It shows minor symptoms for short period of time which not seen after the second dose of Covisheild. Developed side effects after vaccine administration are very common and simple which seen in 1 of 10 people so, nothing to worry about these side effects.

These side effects are...

- Tenderness, pain, itching
- Rashes, warmth, redness, swelling
- Felling unwell or uncomfortable
- Fatigue
- Headache
- Nausea
- Lump at injection site
- Fever
- Vomiting etc.

But, in some cases shows uncommon side effects. These uncommon side effect mainly formed due to their genetics, past medical history, allergic condition and lack of compliances. This type of side effects seen in 1 of 100 persons

These side effects are...

- Dizziness
- Loss of appetite
- Abdominal pain
- Lymph node enlargement
- Excess of sweating, rashes and itching etc.

If any person seen these uncommon side effects, those patients should consult with health care provider and take next treatment under his guidance.

Covaxin: ^[16]

It is India's first indigenous (local) vaccine give permission by Indian government for emergency use of vaccine for 12-year age or older persons. Covaxin developed by the Bharat Biotech International Ltd. with the association of National Institute of Virology (NIV) and Indian Council of Medical Research (ICMR). Here NIV provides the isolated strains of corona virus for manufacturing of vaccine. This Covaxin manufactured by Indian pharmaceutical company Bharat Biotic International Ltd. which based on in-house Vero cell derived technology. Now Indian government also give permission to Haffkine institute for manufacturing of Covaxin via technology transfer. It developed under codename BBV152. Covaxin developed by inactivated viruses i.e. killed viruses-based vaccine. Covaxin works via provoking the immune response which causes the improvement of defense mechanism of body. Also blocks or kills the virus invasions and prevents from future infection of COVID-19 virus. Covaxin have efficacy upto 81% but it still unclear about how long vaccine protect us. In phase 1 and phase 2 clinical trials of Covaxin demonstrated that, it has ability to produce the antibodies which effectively fight against COVID-19 virus infection. Still Covaxin studied under the phase 3 clinical trial.

Covaxin contains 6 microgram whole inactivated virion of SARS-COV 2 antigen, 250 microgram Aluminum hydroxide, 15 microgram imidazoquinolinone as a TLR 7/8 agonist, 2.5 microgram 2-phenoxyethanol and phosphate buffer upto 0.5 ml.

Dose regimen: ^[17]

Covaxin also have 2 dose regimen of 0.3 ml each. It given on upper arm of deltoid muscle via intramuscular route. The time gap between two doses should be 4 weeks. This time gap helps to develop disease preventive antibodies in humans to treat against corona infection. If you miss second dose of Covaxin then consult with vaccinator and take vaccine after his advice.

Need for vaccination: ^[17]

Before vaccination vaccinator should check detailed information about person's past medication history, genetic condition, past disease condition and allergic condition. Then decides about vaccination of that particular patient.

Side effects :^[18]

This Covaxin still studied under the phase 3 clinical trial so, it shows some more unwanted side effects. Most of persons seen allergic reaction after dose administration so, after vaccination vaccinator ask to stay for 30 minutes to check weather allergic symptoms seen or not.

Common side effects are...

- Swelling at injection site
- Stiffness in upper arm
- Redness at injection site
- Itching at injection site
- Body ache
- Weakness In injected arm
- Malaise
- Nausea
- Vomiting
- Fever etc.

Unwanted side effects...

- Difficult to breath
- Swelling of throat and mouth
- Increase heart beat
- Rashes seen on all over body
- Dizziness and weakness in body

If unwanted side effects seen then consult immediately with doctors or health care provider and take treatment according to their advice.

Comparative table: ^[19] ^[20]

Sr. no.	Parameters	Covisheild	Covaxin
1.	Developers	Oxford university	Bharat Biotech International Ltd.
2.	Collaborator	AstraZeneca	ICMR and NIV
3.	Codename of vaccine	AZD1222	BBV152
4.	Manufacturer	Serum Institute of India	Bharat Biotech International Ltd.
5.	Type of vaccine	Chimpanzee Adenovirus (ChAdOx1) vaccine	Whole virion inactivated vaccine
6.	Development Technology	Cell Vero technology	Viral vector technology
7.	Dose	0.5 ml	0.3 ml
8.	Route of administration	Via IM route on deltoid muscle	Via IM route on deltoid muscle
9.	Time gap between two doses	12 to 16 weeks	Upto four weeks
10.	Storage condition	2-8 °C	2-8 °C
11.	Efficacy	90%	81%
12.	Price	Free in govt. hospital and Rs 600 in private hospitals.	Free in govt. hospital and Rs 1200 in private hospitals.
13.	Age beneficiary	Approved for 18-year age person or older	Approved for 12-year age person or older

Conclusion:

This review paper provides beneficial information about vaccines which used in Indian market. It also includes their efficacy, action, benefits and side effects of vaccines. This Covisheild and Covaxin both are used as emergency medication and majorly used in Indian market which shows good effective over the COVID-19 infection. Both vaccine provides the recovery rate up to 80 to 90% from COVID-19 infection with in less time period. Vaccination person can't donate blood up to 6 months because disease resistant antibodies present in their body. Now a day Indian government also give permission for the Sputnik-V and Sputnik light vaccine which are Russian vaccine much effective in COVID-19 infection with less side effects. And Sputnik light vaccine only one dose is much sufficient for prevention of COVID-19 infection. In a few days these vaccines will be available in Indian market.

References:

1. Czocho Jennifer, Turchick Audrey. Introduction Vaccines. Yale Journal of Biology and Medicine 2014; 87(4):401–402.
2. Immunization: The Basics. (2018, May 16). Retrieved from <https://www.cdc.gov/vaccines/vac-gen/imz-basics.htm>
3. Lahariya Chandrakant. Vaccine epidemiology: A review. Journal of Family Care and Primary Care 2016; 5(1):7–15.
4. Sampson s. Everything You Need to Know About Vaccinations. (2019, November 27). Retrieved from <https://www.healthline.com/health/vaccinations>
5. Coronavirus and COVID-19: What You Should Know. (2021, April 19). Retrieved from <https://www.webmd.com/lung/coronavirus>
6. Islam Asiful Md, Kundu Shoumik, Alam Sayeda Sadia, Hossan Tareq, Kamal Mohammad Amjad, Hassan Rosline. Prevalence and characteristics of fever in adult and paediatric patients with coronavirus disease 2019 (COVID-19): A systematic review and meta-analysis of 17515 patients. PLoS One 2021; 16(4):1-21.
7. Unhale Shrikrushna Subhash, Ansar Quazi Bilal, Sanap Shubham, Thakhre Suraj, Wadatkar Shreya, Bairagi Rohit, Prof. Sagrule Suraj, Prof. Dr. K. R. Biyani. A Review on Corona Virus (COVID-19). World Journal of Pharmaceutical and Life Science 2020; 6(4):109-115.
8. Singhal Tanu. A Review of Coronavirus Disease-2019 (COVID-19). The Indian Journal of Pediatrics 2020; 87:281-286.
9. Why it is safe and important to get the COVID-19 vaccine. (2021, January 15). Retrieved from <https://www.uab.edu/news/youcanuse/item/11797-why-it-s-safe-and-important-to-get-the-covid-19-vaccine>
10. Benefits of Getting a COVID-19 Vaccine. (2021, April 12). Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/vaccine-benefits.html>
11. Getting the COVID-19 Vaccine. (2021, March 31). Retrieved from <https://www.who.int/news-room/feature-stories/detail/getting-the-covid-19-vaccine>
12. Why do we need a vaccine for COVID-19? (2020, May 04). Retrieved from <https://covid.joinzoe.com/post/covid-coronavirus-vaccines>
13. Covid-19: An FAQ factsheet for Covishield vaccine by Serum Institute. (2021, January 13). Retrieved from https://www.livemint.com/science/health/covid19-an-faq-factsheet-for_covishield-vaccine-by-serum-institute-11610496726579.html
14. Coronavirus Vaccine Covisheild: Side effects, Benefits of Serum Institute-AstraZeneca vaccination. (2021 January 06). Retrieved from <https://www.msn.com/en-in/millennials/other/coronavirus-vaccine-covishield-side-effects-benefits-of-serum-institute-astrazeneca-vaccination/ar-BB1cvPL8>

15. AstraZeneca COVID-19 vaccine: What you should know. (2021, April 14). Retrieved from <https://www.canada.ca/en/health-canada/services/drugs-health-products/covid19-industry/drugs-vaccines-treatments/vaccines/astrazeneca.html>
16. Covaxin Vaccine. (2021, May 04). Retrieved from <https://www.1mg.com/drugs/covaxin-vaccine-645593>
17. Explained: What is Covaxin, India's Covid-19 vaccine candidate; how long before approval? (2020, May 30). Retrieved from <https://www.msn.com/en-in/news/other/explained-what-is-covaxin-india-e2-80-99s-covid-19-vaccine-candidate-how-long-before-approval/ar-BB169iZX>
18. FACT SHEET FOR VACCINE RECIPIENT APPROVED FOR RESTRICTED USE IN EMERGENCY SITUATION OF ChAdOx1 nCoV- 19 CORONA VIRUS VACCINE (RECOMBINANT) COVISHIELD™ IN PREVENTION OF COVID-19 DISEASE IN INDIVIDUALS 18 YEARS OF AGE AND OLDER. (2021, January 01). Retrieved from https://cdsco.gov.in/opencms/export/sites/CDSCO_WEB/en/Factsheetof-ChAdSerum.pdf
19. Understanding the Difference Between Covishield and Covaxin. (2021, April 28). Retrieved from <https://www.msn.com/en-in/money/technology/understanding-the-difference-between-covishield-and-covaxin/ar-BB1g8p2R>
20. Covaxin vs Covishield: Difference between Indian Coronavirus vaccines, benefits, side-effects, price difference decoded. (2021, May 06). Retrieved from <https://timesofindia.indiatimes.com/life-style/health-fitness/health-news/covaxin-vs-covishield-coronavirus-vaccine-difference-between-indian-coronavirus-vaccines-benefits-side-effects-price-difference-decoded/photostory/82307510.cms>