ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 09 | September - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A COMPENDIOUS REVIEW ARTICLE ON COVID-19 VACCINATION

Nursing

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ABSTRACT

A COVID-19 vaccine is a vaccine intended to provide acquired immunity aim to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes coronavirus disease 2019 (COVID-19). In Phase III trials, several COVID-19 vaccines have demonstrated effectiveness as high as 95% in preventing symptomatic COVID-19 infections. Almost twenty vaccines have been approved by at least one national regulatory authority for public use: nine conventional inactivated vaccines, two RNA vaccines, five viral vector vaccines, and four protein subunit vaccines. At least nine different technology platforms are doing continuous research and development to create an effective as well as active vaccine against the deadlier infective disease COVID-19. Our immune system uses numerous tools to defend any kind of infection. Blood contains red blood cells, carries oxygen to tissues and organs, and white blood cells or immune cells helps to fight to defend infection. Different varieties of white blood cells defend infections in various ways. COVID-19 vaccines give assistance to our bodies to develop immunity against the coronavirus which causes COVID-19 without getting illness. It naturally takes few weeks to months after vaccination for the body to produce T-lymphocytes as well as B-lymphocytes. Sometimes after vaccination also the process of building immunity can cause symptoms like fever, runny nose etc. These symptoms are usual indicating that the body is building immunity. After COVID vaccination the chances of getting a Corona infection will be only 10%. Through all available information, it is known that taking COVID vaccine is very essential.

KEYWORDS

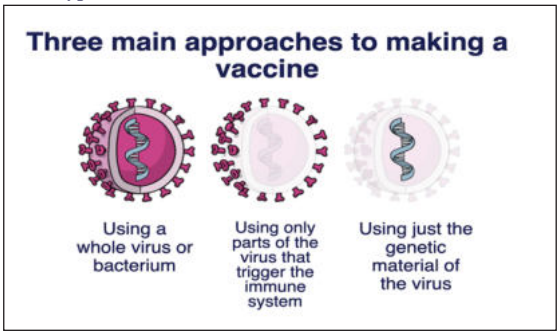
COVID-19 vaccine, SARS-CoV-2 spike protein & FDA.

Introduction:

Preceding to COVID-19, a vaccine for an infectious disease had never been produced in less than numerous years – and no vaccine existed in order to prevent a coronavirus infection in humans.[1] A COVID-19 vaccine is a vaccine intended to provide acquired immunity aim to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes coronavirus disease 2019 (COVID-19).[2] The initial focus of SARS-CoV-2 vaccines was on preventing symptomatic problems, often severe illness.[3] The COVID-19 vaccines are widely accredited for their role in declining the severity, spread, & death caused by COVID-19.[4] Vergano, Dan (5 June 2021) had told that COVID-19 vaccines have worked far better that they had expected earlier BuzzFeed News.[5]

In Phase III trials, several COVID-19 vaccines have demonstrated effectiveness as high as 95% in preventing symptomatic COVID-19 infections. Almost twenty vaccines have been approved by at least one national regulatory authority for public use: nine conventional inactivated vaccines (BBIBP-CorV, Chinese Academy of Medical Sciences, Covaxin, Minhai-Kangtai, CoviVac, COVIran Barakat ,CoronaVac, QazVac, and WIBP-CorV), two RNA vaccines (Moderna and Pfizer–BioNTech), five viral vector vaccines (Sputnik V, Sputnik Light ,Convidicea, and Janssen, Oxford–AstraZeneca), and four protein subunit vaccines (EpiVacCorona, , Abdala, ZF2001,Soberana 02, and MVC-COV1901).[6,7]

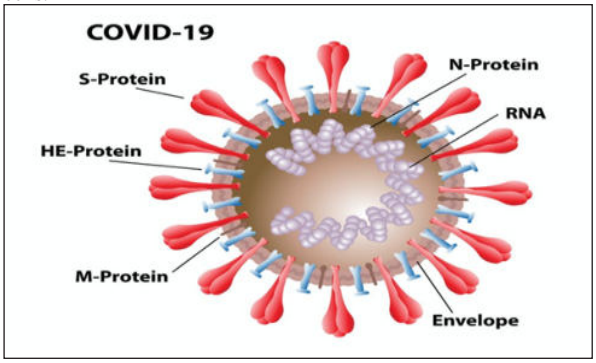
Vaccine types:



- At least nine different technology platforms are doing continuous research and development to create an effective as well as active vaccine against the deadlier infective disease COVID-19. Most of the platforms of vaccine candidates in clinical trials are focused on the coronavirus spike protein and its variants as the primary antigen of COVID-19 infection. Platforms being developed in 2020 involved nucleic acid technologies (nucleoside-modified messenger RNA and DNA), non-replicating viral vectors, peptides, recombinant proteins, live attenuated viruses, and inactivated viruses. Many vaccine technologies being established for COVID-19 are not like vaccines already in use to prevent influenza, but rather are using "next-generation" strategies for precise pointing of COVID-19 infection mechanisms.[8,9]

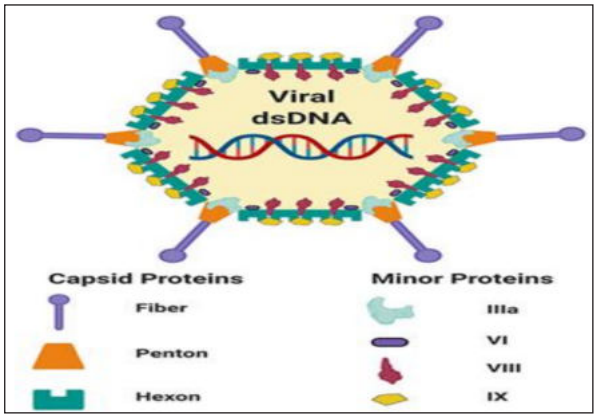
- **RNA vaccines:**

Several COVID-19 vaccines, including the Pfizer–BioNTech and Moderna vaccines, have been developed to stimulate an immune response by using RNA. When these vaccines are introduced into human tissue, the RNA contained in the vaccine acts as messenger RNA (mRNA) to cause cells to build and take shape as the SARS-CoV-2 spike protein. This helps body how to recognize and destroy the corresponding pathogen. RNA vaccines frequently, but not always, use nucleoside-modified messenger RNA. The delivery of mRNA is achieved by a coformulation of the molecule into lipid nanoparticles which protect the RNA strands and help their absorption into the cells.[10,11,12,13]



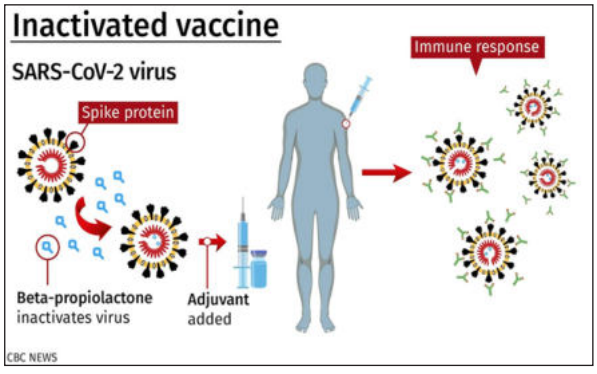
- **Adenovirus vector vaccines:**

These vaccines are some types of non-replicating viral vector vaccines, using an adenovirus shell containing DNA which encodes a SARS-CoV-2 protein. The viral vector-based vaccines against COVID-19 are non-replicating means that they do not make new virus particles, but rather produce only the antigen which provokes a systemic immune response.[14]



- **Inactivated virus vaccines:**

Inactivated vaccines contain virus elements that have been grown in culture and then are killed using a method such as heat or formaldehyde to destroy the disease producing capacity, while still stimulating an immune response.[15]



The Immune System—the Body's Défense in opposition to Infection

To know how COVID-19 vaccines work, it helps to first look at how the bodies defend against illness. When germs, such as the virus causes COVID-19, attack our bodies, they spell and multiply by reproducing themselves. This invasion, called an infection, is what reasons illness. Our immune system uses numerous tools to defend any kind of infection. Blood contains red blood cells, carries oxygen to tissues and organs, and white blood cells or immune cells helps to fight to defend infection. Different varieties of white blood cells defend infections in various ways:

- **Macrophages** are white blood cells that engulf and digest germs and dead or dying cells. The macrophages leave behind parts of the occupying germs, called "antigens". The body recognizes antigens as harmful and stimulates antibodies to defend them.
- **B-lymphocytes** are defensive kind of white blood cells. These cells produce antibodies which attack the pieces of the virus left by the macrophages.
- **T-lymphocytes** are another type of defensive white blood cell. These white blood cells attack cells in the body which have already been infected.

First time when a person got infected with COVID-19 can take some days or weeks for their body to make and use all the germ-fighting tools desired to get over the infection with more severity. But once body got second time COVID-19 infection, the person's immune system remembers what it learned about how to protect the body against that disease.

The body preserves a few T-lymphocytes, named "memory cells," that go into action quickly if the body encounters the same virus attack once again. When the familiar antigens are detected, B-lymphocytes activates the antibodies to attack them. Experts are still identifying the duration of protected by memory cells a person can get against the virus that causes COVID-19.

COVID-19 Vaccines: Mechanism of Action

COVID-19 vaccines give assistance to our bodies to develop immunity against the coronavirus which causes COVID-19 without getting illness. Different varieties of vaccines work in dissimilar ways to offer defence against infection. But with all types of vaccines, the body is left with a supply of "memory" T-lymphocytes along with B-lymphocytes that will reminisce how to fight that virus in the future once it comes back.

It naturally takes few weeks to months after vaccination for the body to produce T-lymphocytes as well as B-lymphocytes. Consequently, it is also likely that a person could be infected with the virus that origins COVID-19 infection just earlier or just after the vaccination and then get affected because the vaccine did not have enough time to provide protection against this viral infection. Sometimes after vaccination also the process of building immunity can cause symptoms like fever, runny nose etc. These symptoms are usual indicating that the body is building immunity. After COVID vaccination the chances of getting a Corona infection will be only 10%. So far millions of people have lost their lives due to Covid 19 and sars-cov-2 in the globe.[16]

Potential Adverse Effects at Post-vaccinated Period

COVID-19 vaccination will help defend us from getting COVID-19. Occurrence of some common side effects indicating the body is building protection. These adverse effects may disturb the body's ability to do daily activities, but should go away in a few days. Some people have no side effects too.

Serious adverse effects that could cause a long-term health problem are tremendously unlikely following any vaccination, including COVID-19 vaccination. Vaccine monitoring has historically screened those adverse effects generally comes out with the signs and symptoms within 45 days after taking a vaccine dose. Due to this reason, the FDA has made compulsory each of the approved COVID-19 vaccines to be premeditated for at least two months (eight weeks) after the final dose.

On the arm where generally, we got the shot: Pain, Redness & Swelling.

Throughout body while resting: Tiredness, Muscle pain, Headache, Chills, Fever, & Nausea.

Supportive Tips to Relieve Side Effects

In case while getting pain and discomfort after vaccinated, before taking any over-the-counter medicine like ibuprofen, acetaminophen, aspirin, or antihistamines should consult with the physician. Generally, these medications to relieve post-vaccination adverse effects can be taken if there are no other medical reasons like hypersensitivity reactions preventing us from taking these medications normally.

To reduce pain and discomfort: Apply a clean and cool wet wash cloth over the area getting pain, use or exercise the arm.

To reduce discomfort causing from fever: Drink plenty of fluids & Dress lightly.[17]

Efficacy rate: Covaxin vs Covishield.

In the following information will be given full details about the efficiency rate of both these vaccines. Should follow & read carefully and vaccination should be taken as soon as possible. Covaxin is available at personal vaccine centres, by registration through online. All information about the injection of Covishield is given below. In the next table comparative points have been explained clearly about both the vaccines:

Subject	Covaxin	Covishield
Effectiveness	If this vaccine is applied in a phase 3 trial with Covaxin, it will be effective of 78% – 100%.	If this vaccine is injected the effect is 70% -90%.
Age group	These injections are applied only to people above 18 years of age.	Covishield can only be applied to people over 12 years of age.

Doctor's involvement	Doctor's supervision is required	Must and should administer only under the doctor's guidance
Second dose gaping	The second dose can be taken 4-6 weeks after first dose	Has been extended from 4-6 weeks to 4-8 weeks.[18]

Covaxin Possible Side Effects:
Covaxin can be painful at the injection site, presence of swelling & redness at the place of injection. Dizziness and weakness, rashes all over the body are the indications of increased heartbeat. Chances of getting swelling on the throat and difficulty in breathing, allergic reaction, vomiting, nausea, malaise, fever, headache, body ache, pain in the arm on which the injection has been done, may also occur. Stiffness in the upper arm also may occur. But no strong information has been acknowledged about it yet.

Covishield Possible Side Effects:
After injecting Covishield, pain at the injection site is common, chances of getting headaches and joint pain, may feel like feverish, general feeling unwell, itching may also at the injection site, Swelling may occur with warmth and tenderness. There is no clear information about the above-mentioned side effects; it has been said on the basis of an assumption that this can happen after the injection, but so far, no clear effects of its bad effects have been revealed.19

Conclusion
Through all this information mentioned above, it is known that taking COVID vaccine is very essential. Covaxin or Covishield can be used either of the two vaccines, both are the valid vaccines with their action, either one person can get any vaccine. Cordially requesting everyone that all should get vaccinated as soon as possible to avoid this disease.

Ethical clearance- This article is a purely a narrative review article hence it's not required an ethical clearance.
Source of funding- Self (review article), No financial support was provided relevant to this article.
Conflict of Interest – Have no conflict of interest relevant to this article.

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