WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 12, Issue 18, 178-194. Review Article ISSN 2277– 7105

A SURVEY ON CORONA VACCINATION PROGRAMME IN RURAL AREAS

Snehal Khare*[1], Rutika Waghchaure[1] and Prof. Chandrashekhar D. Patil[2]

[1]M. Pharmacy SSS's Divine Collage of Pharamcy, Satana.

[2]Divine Campus, Nampur Road, Satana, Nashik.

Article Received on
30 August 2023,

Revised on 20 Sept. 2023,
Accepted on 11 Oct. 2023

DOI: 10. 20959/wjpr202318-29838

***Corresponding Author**
Snehal Khare
M. Pharmacy SSS's Divine Collage of Pharamcy, Satana.

ABSTRACT

The emergence of the strain of coronavirus SARS-CoV-2 (severe acute respiratory syndrome coronavirus that causes corona virus disease 2019 (COVID-19) and its impact on in the world have made imperative progress to develop an effective and safe vaccine. Despite several measures undertaken, the spread of this virus isongoing. So far, more than 1,560,000 cases and 1000,000 deaths occurred in the world. Efforts have been made to develop vaccines against human coronavirus (CoV) infections such as MERS and SARS. However, currently, no approved vaccine exists for these coronavirus strains. Such Previous research efforts to develop a coronavirus vaccine in the years following the 2003 pandemic have opened the door for the scientist to design a new vaccine for the COVID-19. Both SARS-CoV and SARS-CoV-2 has a high degree of genetic similarity and bind to the same host cell ACE2 receptor. By using different vaccine development platforms including whole virus vaccines, recombinant protein subunit vaccines, and nucleic acid vaccines several candidates displayed efficacy in vitro studies but few progressed to clinical trials. This review provides a brief introduction of the general features of SARS-CoV-2 and discusses the current progress of ongoing advances in designing vaccine development efforts to counter COVID-19. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a novel coronavirus that appeared in Wuhan, China in January 2020 and caused a global pandemic drastically changing everyday life. Currently, there are vaccine candidates in clinical trials and development, so it is only a matter of time before one is authorised for human use.

INTRODUCTION

A year has passed since the first case of novel coronavirus infections was detected in China's Wuhan province. During the initial period of the disease, the efforts were concentrated on preventing and slowing down transmission Global analysis of herd immunity in COVID-19 has shown the urgent need for efficacious COVID-19 vaccines.[7] Currently, the vaccine development efforts have started to come tofruition as some of the leading vaccine candidates have shown positive results in the prevention of clinical disease. Although not mandatory, India with its estimatedpopulation of 1380 million (as of 2020) is planning to administer the vaccine to all its citizens who are willing to take it. Importation of vaccines might not be the best option for India due to its large population. According to the International Air Transport Association (IATA), it would require thousands of flights to transportthe vaccine from the production sites abroad to the distribution areas. A coronavirus gets its name from the way it looks under a microscope. The word corona means "crown," and when examined nearly, the round virus has a "crown" of proteins called peplomers jutting out from its center in every direction. These proteins help the virus identify whether it can infect its host. The condition known as severe acute respiratory syndrome (SARS) was also linked to a highly infectious coronavirus back in the early 2000s. The SARS virus has since been included and found to be successfully curable (WHO, 2020; NHB, 2020). The disease is caused by the virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV2), previously referred to as the 2019 novel coronavirus (2019-nCoV) (CDC, 2020). It is primarily spread between people via respiratory droplets from coughs and sneezes (Campbell, 2020; CDC, 2020). Lungs are the organs most affected by COVID-19 because the virus accesses host cells via the enzyme ACE2, which isthe most abundant in the type II alveolar cells of the lungs.[1]

The virus uses a special surface glycoprotein, called "spike", to connect to ACE2 and intrude the hosting cell (Letko et al., 2020). The density of ACE2 in each tissue correlates with the severity of the disease in that tissue and it has been suggested that decreasing ACE2 activity might be protective (Zhang et al., 2020; Zheng et al., 2020) though another view is that increasing ACE2 using Angiotensin II receptor blocker drugs could be protective and that these hypotheses need to be tested by determining the clinical patient records (Jin et al., 2020; WHO, 2020). Asthe alveolar disease progresses respiratory failure might develop and death might ensue. ACE2 might also be the path for the virus to assault the heart causing acute cardiac injury. People with existing cardiovascular conditions have the worst prognosis. The virus is thought to have an animal origin. It was first transmitted to humans in Wuhan, China,

in November or December 2019, and the primary source of infection became human-to-human transmission by early January 2020. An acute respiratory illness in humans caused bya coronavirus, capable of producing severe symptoms and in some cases death, especially in older people and those with underlying health conditions. It was originally identified in China in 2019 andbecame pandemic in 2020.[3]

COVID-19 Symptoms Usually Show Up in This OrderMild COVID-19

Most people with COVID-19 will only have a mild case. According to the NationalInstitutes of Health's COVID-19 treatment guidelines, people are characterized as having a mild case if them:

- Have any of the typical symptoms of COVID-19 (such as cough, fatigue, orloss of taste or smell)
- Do not have shortness of breath or abnormal chest imaging

Mild cases can still have long-lasting effects. People who experience symptoms months after first contracting the virus — and after the virus is no longer detectable in their body — are referred to as long haulers.

According to a February 2021 research letter in JAMA Network Open, approximately one-third Trusted Source of people with COVID-19 had persistent symptoms as long as 9 months after infection.

A December 2020 literature review estimated that 17 percent of people with COVID-19 are actually asymptomatic. This means they have no symptoms at all.

Twenty percent of people who have COVID-19 and require any sort of older adult care services are asymptomatic. The authors evaluated data from 13 studies to come up with their estimates.

A January 2021 literature review looked at 61 studies and reports about COVID-19.

The researchers concluded that[6]

- At least one-third of all cases are asymptomatic.
- Almost 75 percent of people who are asymptomatic when they receive a positive polymerase chain reaction (PCR) test result will remain asymptomatic. PCR tests include nasal swab tests.

- **Severe COVID-19**
- Call emergency medical services if you have or someone you care for has any of the following symptoms:
- Trouble breathing
- Blue lips or a blue face
- Persistent pain or pressure in the chest
- Confusion
- Excessive drowsiness

The Centers for Disease Control and Prevention (CDC) Trusted Source is still investigating the full range of symptoms.

How are coronavirus infections diagnosed?

COVID-19 can be diagnosed similarly to other conditions caused by viral infections: using a blood, saliva, or tissue sample. However, most tests use a cotton swab to retrieve a sample from the inside of your nostrils.[8]

Locations that conduct tests include

- The CDC
- Some state health departments
- Commercial companies
- Certain pharmacies
- Clinics and hospitals
- Emergency rooms

Challenges and Opportunities of COVID-19 Vaccination

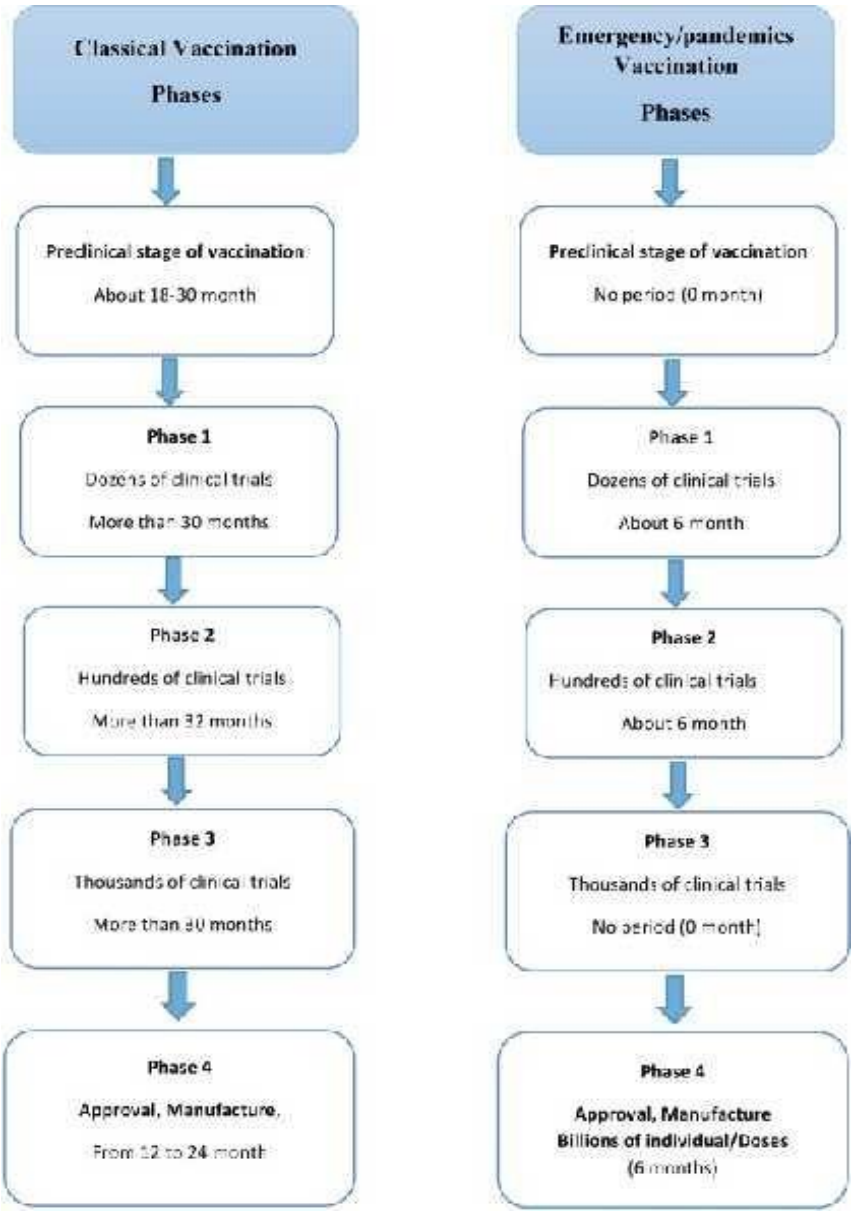
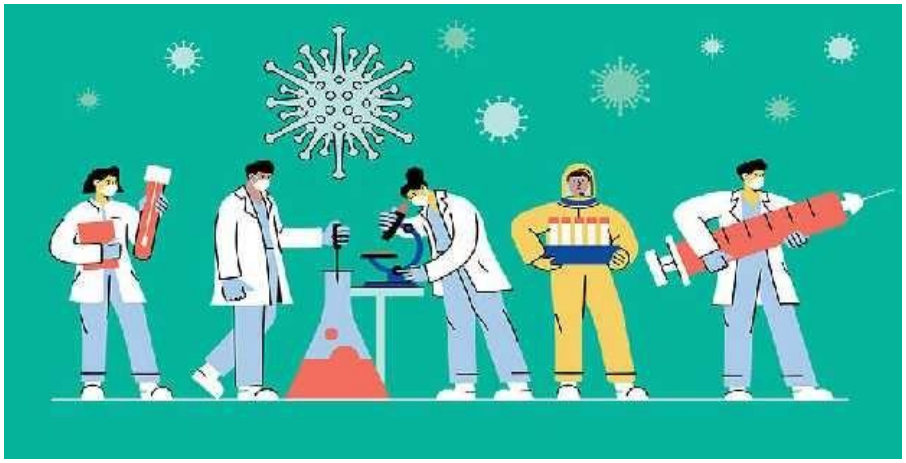


Fig. Vaccine phases.

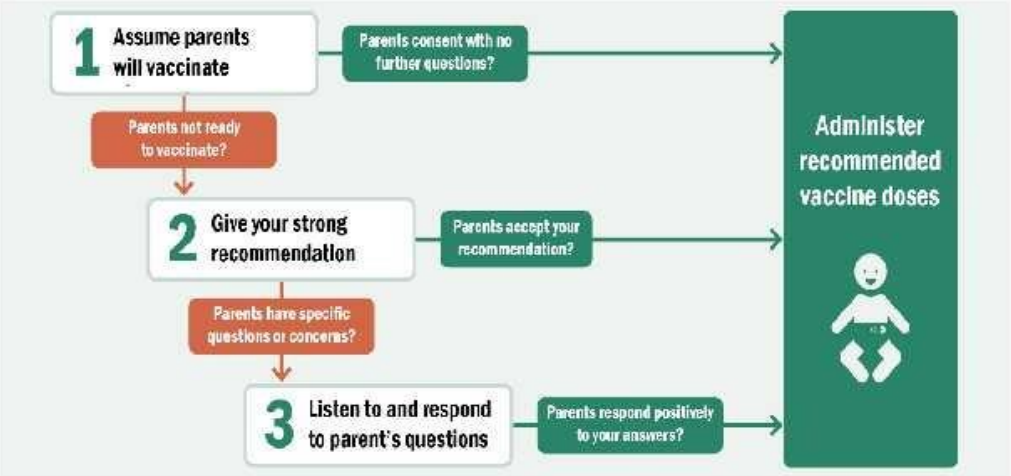
Vaccination Process

- **Help People Find a COVID-19 Vaccine**
- Share these vaccine tools to help members of your community find a vaccine:
- Visit **vaccines.gov** (English) or **vacunas.gov** (Spanish) to search and find a vaccine nearby.
- Text GETVAX (438829) for English or VACUNA (822862) for Spanish to receive 3 vaccine sites.
- National COVID-19 Vaccination Assistance Hotline 1-800-232-0233. (TTY line 1-888-720-7489.)[4]



COVID-19 Vaccination Eligibility Guidance

The Centers for Disease Control and Prevention (CDC) has determined that vaccination is an important tool to help stop the COVID-19 pandemic and up until now the ACIP recommendations for phased allocation have provided guidance for federal, state, and local jurisdictions while vaccine supply was limited. However, given substantial increases in the supply of vaccines, it is appropriate to transition beyond priority groups and allow broad eligibility for receipt of COVID-19 vaccines consistent with applicable Emergency Use Authorizations. The following information provides eligibility guidance for federal, state, and local jurisdictionsas well as those enrolled in the federal pharmacy program.[5]



Vaccination in Rural Areas

Vaccination Strategies

State, tribal, local, and territorial health departments should consider employing multiple strategies to offer and administer COVID-19 vaccines to all rural and remote workers.

- Offer workplace vaccination clinics for work sites that bring large numbers of workers

together at the same time. For example, a factory or meat processing plant in a rural area with a hundred or more employees may be a good candidate for a workplace vaccination clinic. These vaccination clinics could also potentially be opened to others in the community, such as workers' family members.

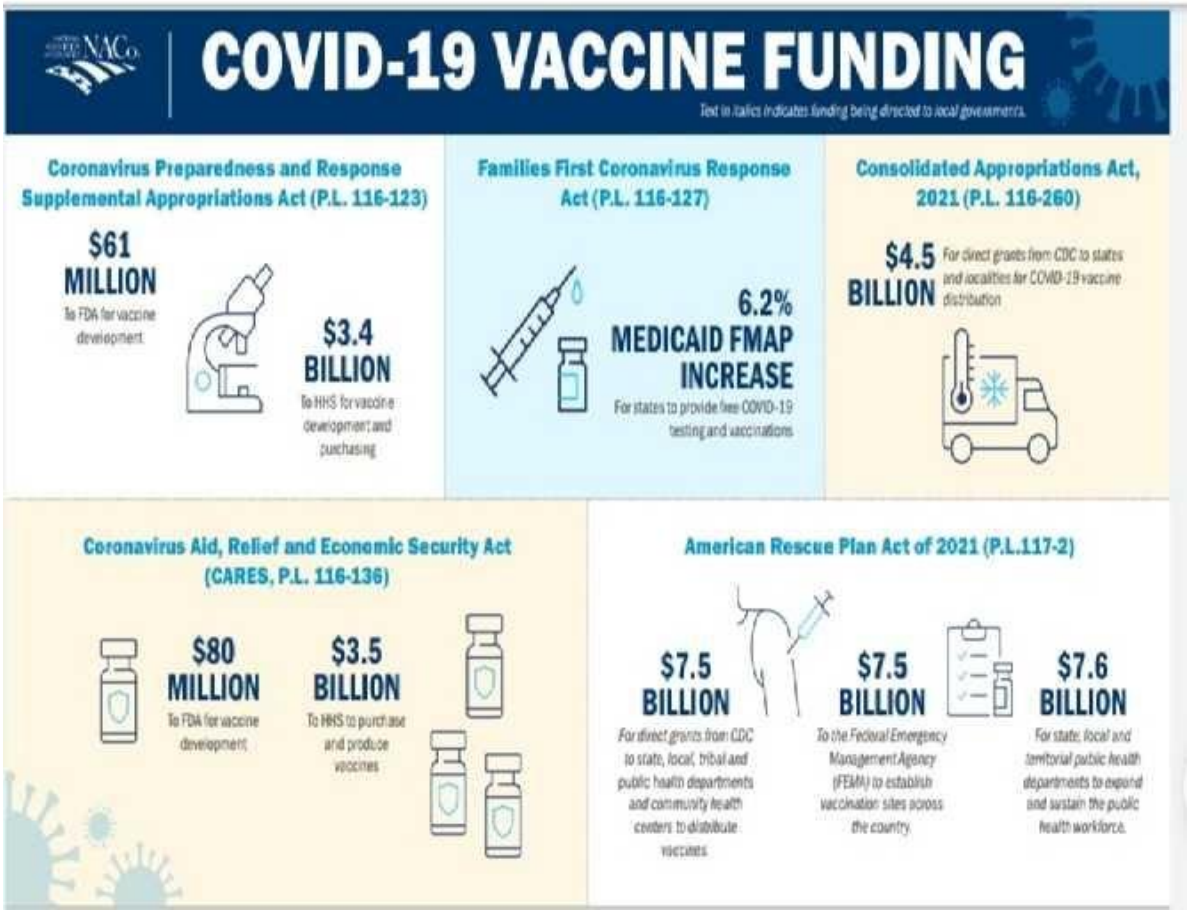
- Offer mobile vaccination clinics for smaller work sites with fewer workers who work alone or in a small group. This approach may allow for short stopsat several work sites in a remote area.
- Partner with local pharmacies, through either the Federal Retail Pharmacy Program or agreements with independently owned pharmacies. Ensure vaccination sites are open during a variety of hours, including evenings and weekends, to accommodate different work schedules and shifts.
- Partner with local field offices for assistance with reaching agricultural operations and planning vaccination for their workers.
- Encourage employers of remote workers to provide transportation vouchers or allow workers to use company vehicles to drive to their vaccinationappointment.[6]
- Encourage employers to allow employees to get vaccinated during work hours or take paid leave to get vaccinated at a community site. This may require educating employers that the cost of a long commute for vaccinating a group of workers may be worth it in the long term to help keep the business operational.

Communication Strategies

Often the best way for health departments to reach rural and remote workers is through trusted sources where they routinely go for information in their home community or area where they work, rather than trying to make direct contact. Thisis especially true for workers who travel long distances and cross through multiple counties or states. Trusted sources vary among worker populations, but may include:

- Physicians, nurses, nurse practitioners, physician assistants, and pharmacists
- Community and faith leaders
- Employers
- Unions for represented workforces
- Cooperative Extension System field agents for agricultural employers andworkers
- Health insurance providers
- Some people may have concerns about COVID-19 vaccines and may take a "wait and see" approach.
- Messages that may resonate include some of the following benefits ofvaccination:
- Returning to normal daily life and helping to end the pandemic
- Keeping family members safe and healthy
- Improving the worker's ability to stay healthy at work, or return to work

In addition, encouragement and positive examples from coworkers and other people they know who have been vaccinated (including peer leaders and supervisors) can be important in building vaccine confidence. For more communication strategies and resources for vaccinating workers.[7]



APPROVED BY WORLD HEALTH ORGANIZATION (WHO)

System	Vaccines Name	Trials
Protein Subunit	Serum Institute Of India COVOVAX (Novavax Formulation).	Approved in 2 countries2 trials in 1 country
RNA	Moderna mRNA- 1273	Approved in 81 countries 35 trials in 9 countries

RNA	Pfizer/BioNTech BNT162b2	Approved in 118 countries 49 trials in 23 countries
Non Replicating Viral Vector	Janssen (Johnson & Johnson). Ad26.COV2.S	Approved in 91 countries 16 trials in 18 countries
Non Replicating Viral Vector	Oxford / AstraZeneca AZD1222	Approved in 133 countries 52 trials in 23 countries
Non Replicating Viral Vector	Serum Institute of India Covishield Oxford/AstraZeneca formulation).	Approved in 47 countries2 trials in 1 country
Inactivated	Bharat Biotech Covaxin	Approved in 12 countries 7 trials in 1 country
Inactivated	Sinopharm (Beijing). BBIBP-CorV (Vero Cells).	Approved in 77 countries 19 trials in 10 countries
Inactivated	Sinovac CoronaVac	Approved in 48 countries 27 trials in 8 countries

Advantages and Disadvantages

Advantages	**Disadvantages**
Attenuated vaccines :	Attenuated vaccines :
Immunity from this vaccine lasts for the longest period, which is especially important in the case of COVID-19, Because coronavirus infections do not always induce long-term immunity(antibody) response.	Due to the mutation of SARS-CoV-2, the process of creating a "live" vaccine is largely unpredictable. There is always a risk that the weakened virus "regains its strength" and "learns" to cause the disease.

How does Corona Vaccine work?

As you all know that we have to take two doses of corona vaccine, in which the second dose has to be taken after 4 weeks i.e. 28 days. When we take the first dose of corona vaccine, it produces some antibodies in our body. Which increases the immunity system of our body. So that our body is able to fight against coronavirus. It is essential to take both doses of the vaccine to get the full benefit of the vaccine.

NOTE:- Even after taking both the doses of corona vaccine, it is important to wear a mask, wash hands often and keep distance from crowded areas. Because only the immunity inside your body has been increased to fight the corona virus.[12]

Benefits of corona vaccine

The full benefit of the corona vaccine can be availed only when we take both the doses of the vaccine at the correct time interval. When we take the corona vaccine, we will have the following benefits- By taking the vaccine, antibodies are produced in our body, which enables us to fight the corona virus. By taking the vaccine, a person is protected from

getting seriously ill. And it is very beneficialfor those who take the vaccine. The Covid-19 vaccine not only keeps you safe from the corona virus, but also protects the people around you from getting serious diseases like corona virus.[13]

Herd Immunity in COVID-19

Herd immunity occurs when **a large portion of a community (the herd) becomes immune to a disease, making the spread of disease from personto person unlikely**. As a result, the whole community becomes protected —not just those who are immune.

Why is herd immunity important?

Often, a percentage of the population must be capable of getting a disease in order for it to spread. This is called a threshold proportion. If the proportion of the population that is immune to the disease is greater than this threshold, the spread of the disease will decline. This is known as the herd immunity threshold.

What percentage of a community needs to be immune in order to achieve herd immunity? It varies from disease to disease. The more contagious a disease is, the greater the proportion of the population that needs to be immune to the disease to stop its spread. For example, the measles is a highly contagious illness. It's estimated that 94% of the population must be immune to interrupt the chain of transmission.[15]

How is herd immunity achieved?

There are two main paths to herd immunity for COVID-19 — infection and vaccines.

Natural infection

Herd immunity can be reached when enough people in the population have recovered from a

disease and have developed protective antibodies against future infection.

However, there are some major problems with relying on community infection to create herd immunity to the virus that causes COVID-19:

Reinfection

It's not clear how long you are protected from getting sick again after recovering from COVID-19. Even if you have antibodies, you could get COVID-19 again.

Health impact

Experts estimate that in the U.S., 70% of the population — more than 200 million people — would have to recover from COVID-19 to halt the pandemic. This number of infections could lead to serious complications and millions of deaths, especially among older people and those who have existing health conditions. The health care system could quickly become overwhelmed.[14]

Vaccines

Herd immunity also can be reached when enough people have been vaccinated against a disease and have developed protective antibodies against future infection. Unlike the natural infection method, vaccines create immunity without causing illness or resulting complications. Using the concept of herd immunity, vaccines have successfully controlled contagious diseases such as smallpox, polio, diphtheria, rubella and many others. Herd immunity makes it possible to protect the population from a disease, including those who can't be vaccinated, such as newborns or those who have compromised immune systems. The U.S. Food and Drug Administration has approved one COVID-19 vaccine and given emergency use authorization to a handful of COVID-19 vaccines.

Vaccine hesitancy

Some people may object to getting a COVID-19 vaccine because of religious objections, fears about the possible risks or skepticism about the benefits. If the proportion of vaccinated people in a community is below the herd immunity threshold, a contagious disease could continue to spread.

Protection questions

It's not clear how long the COVID-19 vaccines will protect you from COVID-19. Further research is needed to see how much the COVID-19 vaccines reduce transmission of the

COVID-19 virus. Also, research suggests that COVID- 19 vaccines may have lower efficacy against some of the variants of the COVID- 19 virus. New variants, which could be more resistant to vaccines, are regularly emerging.

Uneven vaccine roll-out

The distribution of COVID-19 vaccines has greatly varied among and within countries. If one community achieves a high COVID-19 vaccination rate and surrounding areas don't, outbreaks can occur if the populations mix.

How it works

When a large percentage of the population becomes immune to a disease, the spread of that disease slows down or stops. Many viral and bacterial infections spread from person to person. This chain is broken when most people don't get or transmit the infection. This helps protect people who aren't vaccinated or who havelow functioning immune systems and may develop an infection more easily, such as:

1. Older adults
2. Babies
3. Young children
4. Pregnant women
5. People with weakened immune systems
6. People with certain health condition

COVID-19 and herd immunity

Social distancing and frequent hand washing are currently the only ways to help prevent you and those around you from contracting and potentially spreadingSARS-CoV-2, the virus that causes COVID-19.

There are several reasons why herd immunity isn't the answer to stopping the spread of the new coronavirus:

1. There isn't yet a vaccine for SARS-CoV-2. Vaccinations are the safest way to practice herd immunity in a population.
2. The research for antivirals and other medications to treat COVID-19 isongoing.
3. Scientists don't know if you can contract SARS-CoV-2 and develop COVID-19 more than once.
4. People who contract SARS-CoV-2 and develop COVID-19 can experience serious side

effects. Severe cases can lead to death.

5. Doctors don't yet know exactly why some people who contract SARS-CoV- 2 develop severe COVID-19, while others do not.
6. Vulnerable members of society, such as older adults and people with some chronic health conditions, could get very sick if they're exposed to this virus.
7. Otherwise healthy and younger people may become very ill with COVID- 19.
8. Hospitals and healthcare systems may be overburdened if many peopledevelop COVID-19 at the same time.[13]

Herd immunity for COVID-19 in the future

Scientists are currently working on a vaccine for SARS-CoV-2. If we have avaccine, we may be able to develop herd immunity against this virus in the future.

This would mean getting the SARS-CoV-2 in specific doses and making sure the majority of the world's population is vaccinated.

Almost all healthy adults, teens, and older children would need to be vaccinated to provide herd immunity for people who can't get the vaccine or who are too ill to become naturally immune to it.

If you're vaccinated and build immunity against SARS-CoV-2, you most likely wouldn't contract the virus or transmit it.[15]

Side Effects of COVID-19 Vaccination

- Fever
- Fatigue
- Headache
- Muscle pain
- Chills
- Diarrhoea
- Pain at the injection site

Future Prospect

- Increase investment in basic research in infectious diseases
- Vaccines development technologies.

- Improve alignment between regulators and vaccine developers.
- Increase transparency in vaccine development strategies
- Increase measures for fair vaccine accessibility and affordability.
- Diversify types of vaccines

CONCLUSION

In this large community-based study on COVID-19 vaccine hesitancy in the U.S, itwas found that almost a fifth (22%) of the respondents were hesitant to take these vaccines if they are available. Differences in vaccine hesitancy were based on sociodemographic characteristics such as sex, race, ethnicity, education, income, employment status, and place of residence. Also, political affiliation and perceived COVID-19 threat were strong predictors of COVID-19 vaccine hesitancy. Various factors may be contributing to this vaccine hesitancy such as preexisting indecisiveness, historical mistrust with health care especially among minorities, cost-related concerns, and lower levels of awareness. Along with vaccine deployment and distribution efforts, additional research is needed to understand the complex interplay of a variety of individual and social characteristics that influence vaccine hesitancy to ensure broader coverage with COVID-19 vaccines. Educational and policy-level interventions that are evidence-based must be implemented to address these issues and promote COVID-19 immunization programs. The rates of willingness to be vaccinated might change now given the availability of the vaccines, but frequent and untoward effects of vaccines may reduce those rates. Along with factors identified in this study, the long-term effects of the vaccines will influence the uptake of COVID-19 vaccines.

REFERENCE

1. Bharadwaj, Kaushik Kumar, "Computational intelligence in vaccine design against COVID-19." Computational Intelligence Methods in COVID-19 Surveillance, Prevention, Prediction and Diagnosis, 2021; 311-329.
2. Khubchandani, Jagdish, “Journal of Community Health Covid 19 Vaccination, 2021; 46.2: 270–277s.
3. Silvestris, Nicola, “Frontiers In Oncology” Cancer Patients Vaccination Priority Strategies, 2021; 11: 168.
4. Kricorian, Katherine, Rachel Civen, and Ozlem Equils. "COVID-19 vaccine hesitancy: misinformation and perceptions of vaccine safety." *Human Vaccines & Immunotherapeutics*, 2021; 1-8.

5. Sun, Yue, and Shannon M. Monnat. "Rural-urban and within-rural differences in COVID-19 vaccination rates." *The Journal of Rural Health*, 2021.
6. Shekhar, Rahul, Abu Baker Sheikh, Shubhra Upadhyay, Mriganka Singh, Saket Kottewar, Hamza Mir, Eileen Barrett, and Suman Pal. "COVID-19 vaccine acceptance among health care workers in the United States." *Vaccines*, 2021; 9(2): 119.
7. Alinia-Ahandani, Ebrahim, and Milad Sheydaei. "Overview of the introduction to the new coronavirus (Covid19): A Review." *J Med Biol Sci Res.*, 2020; 6(2): 14-20.
8. Corona, Giovanni, Mauro Gacci, Elisabetta Baldi, Rosa Mancina, Gianni Forti, and Mario Maggi. "Androgen deprivation therapy in prostate cancer: focusing on sexual side effects." *The journal of sexual medicine*, 2012; 9(3): 887-902.
9. Randolph, Haley E., and Luis B. Barreiro. "Herd immunity: understandingCOVID-19." *Immunity*, **2020; 52**(5): 737-741.
10. Kadkhoda, Kamran. "Herd Immunity to COVID-19: Alluring and Elusive." *American Journal of Clinical Pathology*, 2021; 155(4): 471-472.
11. Bulchandani, Vir Bannerjee, Saumya Shivam, Sanjay Moudgalya, and Shivaji L. Sondhi. "Digital herd immunity and COVID-19." *Physical Biology*, 2021.
12. Tregonings, John S., Emily S. Brown, Hannah M. Cheeseman, Katie E. Flight, Sophie L. Higham, N-M. Lemm, Benjamin F. Pierce, David C. Stirling, Ziying Wang, and Katrina M. Pollock. "Vaccines forCOVID-19." *Clinical & Experimental Immunology*, 2020; 202(2): 162-192.
13. Koirala, Archana, Ye Jin Joo, Ameneh Khatami, Clayton Chiu, and Philip N. Britton. "Vaccines for COVID-19: The current state of play." *Paediatric respiratory reviews*, 2020; 35: 43-49.
14. Hotez, Peter J., David B. Corry, Ulrich Strych, and Maria Elena Bottazzi. "COVID-19 vaccines: neutralizing antibodies and the alum advantage." *Nature Reviews Immunology*, 2020; 20(7): 399-400.
15. Caddy, Sarah. "Developing a vaccine for covid-19." *Bmj*, 2020; 369.