



An Overview of Covid-19 vaccine

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Abstract Late in December 2019, an earlier unidentified coronavirus—now known as the 2019 novel coronavirus emerged from Wuhan, China. It caused a severe outbreak in numerous Chinese cities. It spread worldwide, including our nation and Thailand, the Republic of Korea, Japan, the United States, the Philippines, and Vietnam (as of 2/6/2020, at least 25 countries). The World

Health Organization formally designated the illness Coronavirus Disease-2019 (COVID-19) on 11 February, 2020 [1]. The disease takes two to fourteen days to incubate and is spread through inhalation or contact with contaminated droplets. Fever, cough, sore throat, dyspnea, exhaustion, and malaise are typical symptoms. Most persons with the condition have moderate symptoms. Still, in some (typically the elderly and those with comorbidities), the illness can worsen and cause multiorgan failure, pneumonia, and acute respiratory distress syndrome (ARDS). A lot of folks have no symptoms. The case fatality rate is believed to fall between 2 and 3% [2]. The two primary COVID-19 vaccines presently being researched or made accessible in the United States are the Vector and Messenger RNA (mRNA). The Janssen/Johnson & Johnson COVID19 vaccine is a vector vaccine. Both the Pfizer-BioNTech and the Moderna COVID-19 vaccines use mRNA. The present review will discuss the three vaccines: Moderna, Pfizer, and Johnson & Johnson.

Keywords covid-19, vaccines, effectiveness, sars-coV-2, pharmacist role

1. Introduction

SARS-CoV-2 is the virus responsible for COVID-19, commonly called coronavirus illness 2019. It has a rapid spread and a significant potential for infection. In the United States, the COVID-19 pandemic has tragically resulted in the loss of more than one million lives. This virus belongs to the coronavirus family. Coronaviruses, a group of viruses, are responsible for causing various illnesses, including the common cold, Middle East respiratory syndrome (MERS), and severe acute respiratory syndrome (SARS). The COVID-19 virus can be easily transmitted between individuals. Studies have shown that the transmission of the COVID-19 virus is most common among individuals close to each other. The transmission of the virus occurs through respiratory droplets released when an infected individual coughs, sneezes, breathes, sings, or speaks. Someone nearby could potentially inhale these droplets, or they could land in their mouth, nose, or eyes. Many COVID-19 patients typically experience mild to moderate symptoms and can recover without professional intervention.

Nevertheless, COVID-19 has the potential to result in severe illness and fatalities among specific individuals. Elderly individuals are particularly susceptible to various risks that increase as they age. People with preexisting medical conditions are at a higher risk of experiencing severe illness. Getting vaccinated against COVID-19



significantly lowers the chances of experiencing severe illness, requiring medical attention, or succumbing to the virus.

Vaccines and their importance

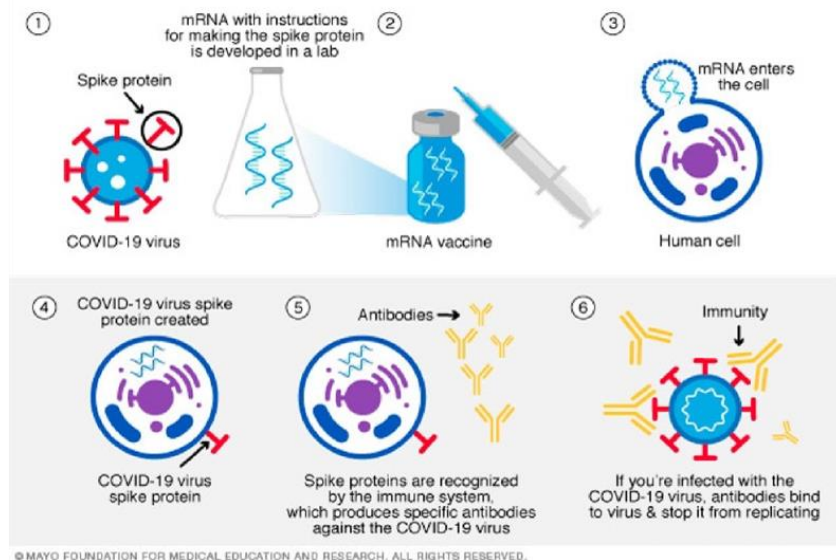
The COVID-19 vaccine is recommending the CDC for those aged 12 and up. One way to lessen the chances of COVID-19 causing severe illness or death is to get the vaccine. Your danger and the risk of infecting others around you are both reduced. A person can be protected from COVID19 safely, efficiently, and effectively by vaccination. Despite the wide range of investigations since the virus was initially identified, many questions about COVID-19 still need to be answered. Specific individuals, such as pregnant women, breastfeeding folks, those with autoimmune disorders and weakened immune systems, diabetic patients, and individuals with lung and cardiac illness, necessitate additional attention when it comes to COVID-19 vaccination.² Social distancing tactics aid in infection control and transmission prevention however vaccination is necessary for the general public to develop immunity to COVID-19. The COVID-19 vaccine has become available at an unprecedented rate in the history of vaccinations [3].

vaccines approved for Emergency Use Authorization

- 1) Pfizer-BioNTech COVID-19 Vaccine
- 2) Moderna COVID-19 vaccine
- 3) Janssen/Johnson & Johnson COVID-19 vaccine

1) Pfizer covid 19 vaccines

Based on safety and efficacy information from a randomized, controlled, blinded, and ongoing clinical trial involving thousands of participants, the first EUA for the Pfizer-BioNTech COVID19 Vaccine for people 16 years of age and older was released on December 11 [4]. COVID-19 vaccines utilize genetically modified messenger RNA (mRNA). Coronaviruses possess a spikelike feature known as an S protein on their surface. COVID-19 mRNA vaccines provide your cells with instructions for producing a non-harmful segment of an S protein. Following immunization, your muscle cells initiate the production of S protein fragments and present them on their cell membranes. The immune system identifies the protein and initiates an immunological response by producing antibodies. Upon identification of the S proteins by your immune system, this vaccination triggers the production of antibodies and protective white blood cells. If you are infected with the COVID-19 virus at a later time, your antibodies will combat the infection. [5]. The nucleoside-modified mRNA (modRNA), which encodes a mutant version of the full-length spike protein present on the surface of the SARS-CoV-2 virus and stimulates an immune response against infection, is the basis of the BioNTech technology for the BNT162b2 vaccine [6] [7].



The Pfizer BioNTech COVID-19 Vaccine is given in two doses spaced three weeks apart [8]. SAGE advises two doses (30 µg, 0.3 ml each), given intramuscularly into the deltoid muscle, 4–8 weeks apart, for all individuals 12 years and older. For kids 5 to 11 years old, the Pfizer-BioNTech COVID-19 vaccine is given in a two-dose main series (10 µg, 0.2 ml each) intramuscularly into the deltoid muscle three weeks apart. [9]. The most often reported side effects were injection site pain, fatigue, headaches, chills, joint pain, and fever. These effects usually persisted for several days. Vaccination providers and receivers must anticipate that there may be some adverse effects after either dosage, but more so after the second dose. Notably, more people had these side effects following the second dose than following the first.

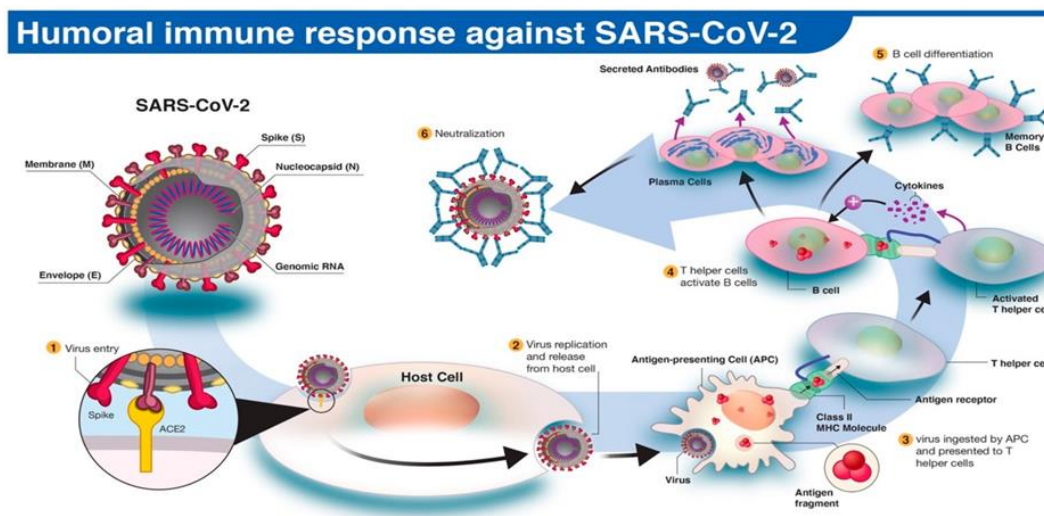
2) COVID-19 vaccine, mRNA-Moderna

The Moderna vaccine is an mRNA vaccine, just like the Pfizer-BioNTech vaccine. Although these two mRNA vaccines are the first to be approved for use in people, researchers have been working on this technology for a long time. An mRNA vaccine gives the organism the genetic information it needs to make bacterial or viral proteins—in this example, the spike protein on the surface of SARS-CoV-2. When the body comes into contact with the pathogen again, these proteins initiate an immune response and manufacture particular antibodies, priming the body to fight infection [10]. The Food and Drug Administration (FDA) Trusted Source issued emergency use authorization (EUA) for the vaccine in December 2020 [11]. The vaccination will be given by medical personnel in two doses. The vaccination will be injected into the upper arm, and the second dose will be given 28 days after the first [12]. The Moderna COVID-19 vaccine's most frequent adverse effects are headache, fatigue, chills, and injection site responses such as pain, flushed skin, and swelling. After getting the vaccination, these symptoms could appear one or two days later and linger for a few days. After the second dosage, side effects are more likely to occur [13].

3) Johnson & Johnson COVID-19 Vaccine

Under an Emergency Use Authorization (EUA), the Janssen COVID-19 vaccine may be administered to people 18 years of age and older to prevent coronavirus illness 2019 (COVID-19), which is brought on by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

In contrast to Moderna and Pfizer's mRNA technology, Johnson & Johnson's vaccination relies on a traditional virus-based approach. Rather than using messenger RNA (mRNA), the Johnson & Johnson vaccination depends on a defective adenovirus to convey the instructions. It is an entirely separate virus. While it can communicate information on removing the coronavirus, it will not infect you with a virus. It is unable to multiply in your body [13].



A modified adenovirus that can enter cells but not increase or cause disease was employed by the Johnson & Johnson team. Following injection into the arm, the adenoviruses collide with cells and adhere to surface proteins. The virus is drawn inside by the cell, which encloses it in a bubble. The adenovirus enters the nucleus, which is the area where the cell's DNA is kept, and proceeds there after escaping the bubble. The adenovirus's DNA penetrates the nucleus. Although the adenovirus is genetically modified to prevent self-replication, the coronavirus spike protein gene may be read by the cell and replicated into messenger RNA, or mRNA. By turning on the warning systems in the cell, the adenovirus also agitates the immune system. To activate neighboring immune cells, the cell emits warning signals. The Johnson & Johnson vaccination heightens this alert, which makes the immune system respond more forcefully to the spike proteins [14].

Administering a vaccine with a 95% efficacy against the disease can significantly decrease the occurrence of the disease, hospital admissions, and deaths in the future, even if only adults are immunized. The ongoing distribution of vaccines implies that non-pharmaceutical measures still hold considerable importance in responding to epidemics [15].

Pharmacist Role in covid COVID-19 Vaccines

Pharmacists are uniquely positioned to recognize patients who would gain immunizations. Additionally, by assisting patients and caregivers in making the most educated decision, they can ease worries by offering information, screening, and documentation.

Pharmacists are often the most approachable medical professionals, especially in rural areas. Community pharmacies can be found in almost every town in the US; in fact, more than 90% of people live within 5 miles of one [16]. In addition, people see their neighborhood pharmacist 12 times more often than their primary care provider. [17]. Community pharmacists are uniquely positioned to boost vaccine accessibility and broaden their use. In the United States, the COVID19 pandemic significantly increased the duties of pharmacists. The federal government partnered with forty thousand community pharmacy businesses to increase vaccination availability. [18]. Pharmacists said health officials communicated revisions to a patient's vaccination eligibility with little prior notice. The same channels of communication (news articles, official websites) utilized to enlighten the public were frequently employed to obtain information. Pharmacists found it challenging to meet public demand because of a lack of resources; during the pandemic, the prescription volume has varied, drive-through usage has gone up, COVID-19 testing has been introduced, and vaccination protocols have been modified [19] add this to personnel shortages, corporate office refusals that prevented them from hiring more staff, and unpredictable vaccine supplies.

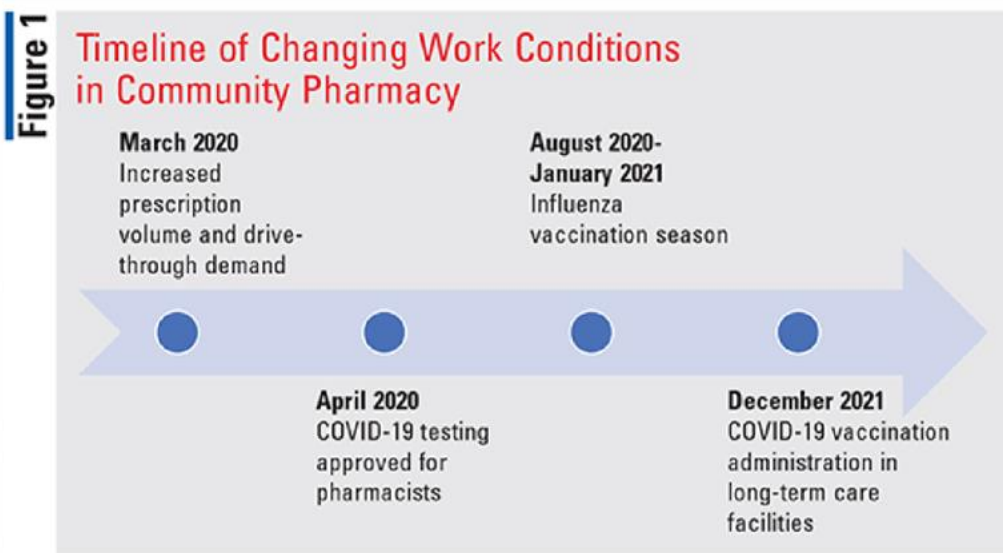


Figure 1: Timeline of changing work conditions in community pharmacy [19]



Conclusion

Every year, vaccines save millions of lives; the COVID-19 vaccine may be able to save yours. Strong protection against severe illness and death is offered by the COVID-19 vaccination, which is safe and effective. Even if you have previously contracted COVID-19, it is crucial to get vaccinated as soon as it is your turn. It is safer to have a COVID-19 vaccination than to become ill to build immunity. Although the COVID-19 vaccinations are successful, no vaccine offers complete protection. In conclusion, the COVID-19 vaccine protects against severe illness and death; getting vaccinated as soon as possible is crucial.

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