

MINISTRY OF HEALTH OF UKRAINE

**I. HORBACHEVSKY TERNOPIL NATIONAL MEDICAL
UNIVERSITY OF THE MINISTRY OF HEALTH OF UKRAINE**

**Manuscript copyright
UDC: 616.98:578.831.1]-06 9**

Iryna Stefankiv

Master's Thesis

CORONAVIRUS (COVID-19) AS A GLOBAL PANDEMIA (OVERVIEW)

Master of Science in Nursing

**The Scientific Supervisor of the Thesis:
Iryna Iavorska, MD, PhD, MSN
I. Horbachevsky Ternopil National Medical University
of the Ministry of Health of Ukraine**

Ternopil – 2022

Abstract

Covid-19, also known as corona virus, was named because of its appearance, its outer layer covered with spike proteins that look like crown. There are many variants of corona virus, most famous are novel, delta and omicron. First cases of covid-19 were reported in China in 2019, that spread rapidly all over the world, leading to pandemic. The transmission of coronavirus happens through airborne, droplet and contact ways.

People can experience different kinds of symptoms, from mild to severe. Many people have mild symptoms, and some might even be asymptomatic. There are also times when disease causes severe symptoms such as difficulty breathing, requiring supplementation of oxygen and in some cases mechanical ventilation. Diagnosis of coronavirus is done using nasopharyngeal swab to do PCR test.

There is no available cure for coronavirus yet. Treatment of coronavirus depends mainly on the symptoms and severity of the disease. For mild symptoms symptomatic treatment and supportive care recommended. When disease causes more symptoms that require oxygen supplementation then hospitalization will be required. Antivirals such as remdesivir, baricitinib, or tocilizumab can also be administered along with corticosteroids.

The FDA (The U.S Food and Drug Administration) approved monoclonal antibody transfusion and convalescent plasma therapy for treatment of coronavirus. Vaccination is one of the safest and effective ways to help immune system to build protection against coronavirus. In the U.S three covid vaccines were approved by FDA. Those vaccines are: Pfizer, Moderna and Johnson and Johnson. Hand hygiene, wearing mask, social distancing, avoiding large crowds, and vaccination are important way to reduce spread of this virus.

Overview of Coronavirus (covid-19)

Coronavirus is a virus. Covid-19, also known as corona virus, was named because of its appearance. This virus outer layer is covered with spike protein that surround virus like a crown. Corona means crown. According to the article, An Overview of the World Current and Future Assessment of Novel COVID-19 Trajectory, Impact, and Potential Preventive Strategies at Healthcare Settings, “viruses are not from the plant or animal kingdom, and are neither bacteria, but are the typical parasites of the living kingdoms, they are not living organisms because they cannot live without a host cell (Al-Anzi, B., Alenizi, M., Dallal, J. A., Frage, L. A., & Ullah, A., 2020).

There are many different types of coronaviruses, not all the types of coronaviruses are causing disease in humans. The virus that caused pandemic 2019, called SARS-CoV-2, also known as covid-19 or coronavirus. According to the article, An Overview of the World Current and Future Assessment of Novel COVID-19 Trajectory, Impact, and Potential Preventive Strategies at Healthcare Settings “recently, the world has gone through an intermittent communicable disease outbreak that led to unprecedented epidemics, which have significantly impacted humanity claiming many innocent lives and the economy (Al-Anzi, B., Alenizi, M., Dallal, J. A., Frage, L. A., & Ullah, A., 2020).

First cases of covid-19 were reported in China in 2019. The strand of coronavirus, SARS-CoV-2 might be originated from an animal, bat, that mutated to cause disease in humans. According to the article, Comprehensive Overview on Multiple Strategies Fighting COVID-19, “coronaviruses (CoVs) are serious pathogens to humans and vertebrates affecting the hepatic, gastrointestinal, respiratory, and central nervous systems (Khalifa, S. A. M., Mohamed, B. S., Elashal, M. H., Du, M., Guo, Z., Zhao, C., Syed, G. M., Boskabady, M. H., El-Seedi, H., Efferth, T., & El-Seedi, H., 2020).

In severe cases coronavirus can cause death. According to article Early Lessons from Covid-19: An overview, “the SARS-COV-2 coronavirus now globally known as COVID-19 has generated a multi-faceted response since it was recognized by the World Health Organization as a pandemic in January 2020 (McNeely, J. A., & Mohan, M. 2021).

Variants

There are different types of coronaviruses. Viruses are constantly mutating which results in many variants of the virus. Covid-19 is a virus, and as many viruses, it tends to mutate. Those mutations can make covid-19 to spread more

easily and faster. It also can cause more serious symptoms. New variants emerge and some older ones can disappear. According to article Early Lessons from Covid-19: An overview, “the pandemic continued to spread globally and by early February 2021, over 105 million people had been infected and over 2.25 million had died (McNeely, J. A., & Mohan, M., 2021)Health care organizations including CDC are monitoring variants of all covid viruses in the United States and all around the world. Some of the covid variants are more easily to spread, some are spread more quickly, some cause severe illness progression and some less severe symptoms. Even when disease has less severe symptoms but spreads easily it still causes many issues such as increased hospitalizations leading to overcrowding in the hospitals. According to article, Omicron, Delta, Alpha, and More: What To Know About the Coronavirus, “although new variants are an expected part of the evolution of viruses, monitoring each one that surfaces is essential in ensuring we—in the U.S. and globally—are prepared(Katella, 2022).

Variants of Concern

Covid-19 (SARS-CoV-2, novel coronavirus) was first identified in Wuhan City, China. According article, The novel coronavirus outbreak in Wuhan, China “the COVID-19 has then rapidly spread to all over China and the world”(Zhu, H., Wei, L. &Niu, P, 2020). Delta virus was first identified in India. This virus

spreads fast and causes more severe symptoms and disease. According to article, Omicron, Delta, Alpha, and More: What To Know About the Coronavirus “delta caused more severe disease than other variants in people who weren’t vaccinated” (Katella, 2022). Omicron is one of the variants of coronavirus. It was first identified in South Africa. It tends to spread more easily and quicker than other variants of coronavirus. It causes less severe progression of the disease and less symptoms. According to article, Omicron, Delta, Alpha, and More: What To Know About the Coronavirus “though Omicron has caused record numbers of cases, the variant appears to be less severe than previous variants (Katella, 2022).

Transmission

Covid-19 spreads through droplets of virus that is released by infected person during cough, sneezing, breathing, and talking. According article, The novel coronavirus outbreak in Wuhan, China “it is found that the COVID-19 can be transmitted through droplets, contact, aerosol, etc (Zhu, H., Wei, L. & Niu, P, 2020). Droplets of coronavirus can accumulate indoors. Physical distancing, wearing masks and hand hygiene are very important to reduce spread of the virus. Some people can be positive for covid-19 and have no symptoms, spreading to other people. Airborne transmission is transmission of the virus by small droplets that stay in the air. Contact transmission is transmission from touching surface contaminated with virus. When infected person touches eyes, nose or

mouth. According to the article, An Overview of the World Current and Future Assessment of Novel COVID-19 Trajectory, Impact, and Potential Preventive Strategies at Healthcare Settings “the contagious nature of this disease resulted in its spread to other 213 countries over few months (Al-Anzi, B., Alenizi, M., Dallal, J. A., Frage, L. A., & Ullah, A., 2020).

Symptoms

The incubation period for coronavirus is from two to fourteen days from exposure to infected person. Person can have symptoms of coronavirus from two to fourteen days post exposure. People can experience different kinds of symptoms, from mild to severe. Duration of the disease and symptoms also differs. Many people have mild symptoms, and some might even be asymptomatic. There are also times when disease causes severe symptoms such as difficulty breathing, requiring supplementation of oxygen and in some cases mechanical ventilation. Some people experience symptoms for only few days, and some might last weeks. Covid-19 produces many different symptoms such as, cough, sore throat, fever and chills, shortness of breath, body aches, loss of smell and taste, fatigue, vomiting or diarrhea. When person experience severe symptoms such as difficulty breathing, severe chest pain, pale/gray colored skin or lips, altered mental status, then it is time to seek emergency medical care.

Risk factors and complications

The risk factors for contracting coronavirus were identified such as being in close contact with infected person; being sneezed or coughed on by infected person. The age and certain medical conditions increase risk of having severe symptoms and severe progression of the disease. Medical conditions that can increase risk of serious disease from coronavirus are COPD, asthma, heart disease, diabetes, cancer, obesity, hypertension, smoking, kidney, and pregnancy. There are complications after coronavirus that were identified such as pneumonia, respiratory failure, blood clots, kidney injury and heart problems.

Many people who had coronavirus recover in few days. Although some people who had more complicated severity of the disease can have long-term effects. Coronavirus can cause damage to multiple organs in the body, such as lungs, heart, brain, kidneys, blood vessels. This damage can have long term effects of person's health. It can affect older and younger population, people with medical problems as well as healthy individuals. Common long-term symptoms include: shortness of breath, fatigue, chest and joint pain, memory/sleep problems, palpitations, depression or anxiety. Progression of coronavirus can cause lung, heart, brain and kidney damage. Coronavirus can make blood cells to form a blood clot which can lead to heart attack or stroke.

Diagnosis:

When person has symptoms of coronavirus then testing need to be done and health care provider should be notified. Sample of mucus from nose or throat is used to diagnose coronavirus. It can be done using nasopharyngeal swab, in which health care provided inserts swab into a nose to collect mucus. Then sample is placed into media tube and sent to the lab for analysis. Rapid test is available to test for covid, in which result is available in less than an hour. PCR tests that are sent to the lab are usually available next day and are more accurate. There is also available over-the-counter antigen home covid tests. This test can be taken at home and result available in few minutes. Home antigen covid tests are not as reliable as PCR tests. Positive covid test means that person currently has coronavirus. Negative result means that there is no infection present. It is recommended to take PCR test along with rapid or home test to avoid false negative results.

Tests available to diagnose coronavirus:

RT-PCR Test is a diagnostic test for coronavirus that detects genetic material of the virus that uses RT-PCT (reverse transcription polymerase chain reaction). Antigen test is also a swab test, which detects proteins of coronavirus.

Result is available in few minutes. In some cases, RT-PCR test is used to confirm result. Flu SC2 Multiplex Assay: it's a RT-PCR test that tests for three viruses coronavirus, influenza A and influenza B.

Quarantine recommendations

Once person is tested positive for coronavirus then that person can spread virus to others. Person than requires to self-isolate. Quarantine is required for at least five days since symptoms began and twenty-four hours of being afebrile. All positive people are being contacted by Department of Health and asked to do contact tracing. Contact tracing is listing all person that infected person had contact with in order to prevent spread of the virus. Those people from the list might be contacted as well.

Treatment

There is no available cure for coronavirus yet. According to the article, The History, Efficacy, and Safety of Potential Therapeutics: A Narrative Overview of the Complex Life of COVID-19 “the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic posed a serious public health concern and started a race against time for researchers to discover an effective and safe therapy for coronavirus disease 2019 (COVID-19), the disease caused by SARS-CoV-2.

Coronavirus is a virus and antibiotics are not effective unless complicated by bacterial pneumonia. Treatment of coronavirus depends mainly on the symptoms and severity of the disease. For mild symptoms, isolation, resting and symptomatic treatment. Most people with coronavirus who has mild symptoms can be treated with supportive care. The goal of supportive care is to relieve symptoms that people might have. This supportive care includes fever and pain reliever, cough syrups, antihistamines, decongestants, plenty of rest and oral fluids.

When disease causes more symptoms that require oxygen supplementation then hospitalization will be required. Hospitalized patients who require supplemental oxygen or mechanical ventilation may benefit from administration of corticosteroids such as dexamethasone, prednisone, hydrocortisone or methylprednisolone. Also antivirals such as remdesivir, baricitinib, or tocilizumab can also be administered along with corticosteroid. Antiviral drug called remdesivir was approved by FDA (The U.S Food and Drug Administration) for treatment of coronavirus of adults and children of age twelve and older. Remdesivir is giving intravenously. Baricitinib is rheumatoid arthritis medication that reduces inflammation. Baricitinib was approved by FDA (The U.S Food and Drug Administration) for treatment of coronavirus. It is made in form of pill, given orally. Antiviral drug, Paxlovid is antiviral drug that blocks activity of enzyme to

prevent replication of coronavirus. This antiviral drug is used for adults and children of age twelve and older. This medication is available in oral route, taken as pill. According to the article, *The History, Efficacy, and Safety of Potential Therapeutics: A Narrative Overview of the Complex Life of COVID-19*, “remdesivir (GS-5734; Gilead Sciences Inc., Foster City, CA, USA) is a prodrug of a nucleotide analog, specifically an adenosine triphosphate (ATP) analog, that inhibits the function of viral RNA-dependent RNA polymerase (RdRp), and therefore, impedes the viral replication of a variety of RNA viruses” (Basel, 2021). Hydroxychloroquine is medication used to treat malaria. In 2019, hydroxychloroquine was used to treat covid-19. It was chosen as one of the drug to fight coronavirus due to its anti-inflammatory activity. According to the article, *The History, Efficacy, and Safety of Potential Therapeutics: A Narrative Overview of the Complex Life of COVID-19*, “in vitro studies exhibited the potent antiviral activity of hydroxychloroquine against SARS-CoV-2” (Basel, 2021).

The FDA (The U.S Food and Drug Administration) approved monoclonal antibody transfusion for treatment of coronavirus. Monoclonal antibody transfusion is used to treat mild to moderate coronavirus disease for people who are in high-risk group of developing severe symptoms and complications. This treatment is given intravenously, one time dose as outpatient visit. These

medications include bebtelovimab, sotrovimab and combination of both medications. For new variant of corona virus, omicron, some monoclonal antibody infusions are not effective. In case of omicron virus, monoclonal antibody transfusion, sotrovimab and bebtelovimab can be effective.

Another treatment approved by FDA (The U.S Food and Drug Administration) is convalescent plasma therapy. Convalescent plasma therapy is a convalescent plasma taken from blood donated by people who had coronavirus. This therapy with high levels of antibodies is used to treat hospitalized patients with coronavirus in the beginning of the disease or those patients who are immunocompromised. According to the article, *The History, Efficacy, and Safety of Potential Therapeutics: A Narrative Overview of the Complex Life of COVID-19*, “recent published clinical studies showed positive outcomes in terms of clinical symptoms, radiologic changes, and viral clearance, thus emphasizing the adjunctive role of convalescent plasma in alleviating COVID-19”(Basel, 2021).

During coronavirus pandemic, convalescent plasma was and still is effective in two ways. First way is “some studies presented data on the ability of the immune system to mount an immune response to SARS-CoV-2 by detecting neutralizing immunoglobulin M (IgM) and immunoglobulin G (IgG) levels” (Basel, 2021). Second way is “SARS-CoV-2 was not shown to spread through the

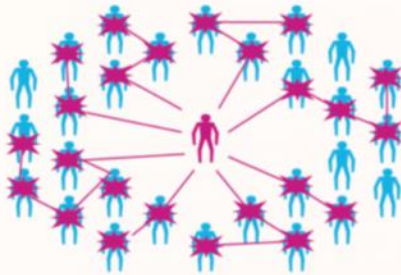
bloodborne route, making the risk of transmission via the convalescent plasma of recovered donors negligible”(Basel, 2021).

Prevention

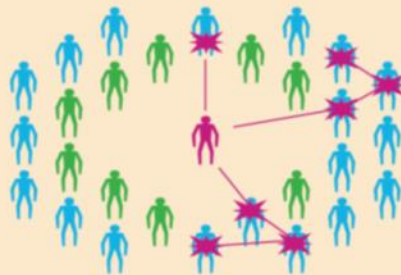
According to the article, Comprehensive Overview on Multiple Strategies Fighting COVID-19, “the entire world established coordinative relations in research projects regarding drug and vaccine development on the external range, whereas on the internal range, all countries declared it an emergency case through imposing different restrictions related to their border control, large gatherings, school attendance, and most social activities” (Khalifa, S. A. M., Mohamed, B. S., Elashal, M. H., Du, M., Guo, Z., Zhao, C., Syed, G. M., Boskabady, M. H., El-Seedi, H., Efferth, T., & El-Seedi, H., 2020). Person can have coronavirus more than once. Vaccination is one of the safest and effective ways to help immune system to build protection against coronavirus. Coronavirus vaccine reduces risk of experiencing severe symptoms of disease, lower work of hospitalization even might prevent death. Vaccination of the population also helps with herd immunity that eventually will significantly reduce spread disease in the community, country and worldwide. Herd immunity happens when large part of population is immune to disease. As more people around the world receiving

vaccines there are great chances for this pandemic to end. According to article, Omicron, Delta, Alpha, and More: What To Know About the Coronavirus, in addition to staying up-to-date with their vaccines, people were advised to practice such strategies as washing hands, wearing masks, and maintaining a physical distance from one another, especially when indoors in places where there was substantial or high transmission” (Katella, 2022).

The way herd immunity works



When no one has immunity, contagion has many opportunities to spread quickly.



The more immunity we have in the system, the less often contagion comes into contact with the susceptible.



Spread of contagious disease is contained.

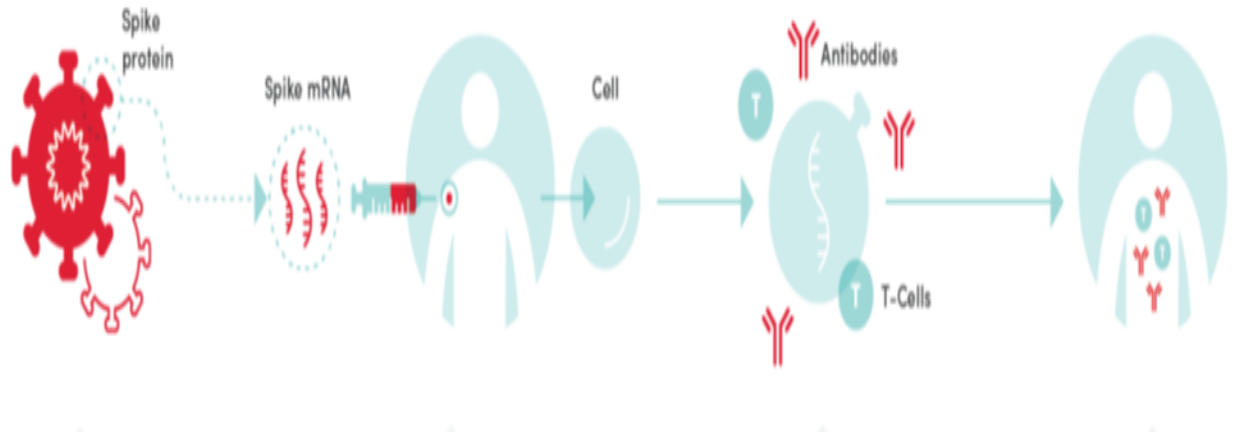
In the U.S three covid vaccines were approved by FDA. Those vaccines are : Pfizer, Moderna and Johnson and Johnson. Vaccines are effective in prevention of contracting coronavirus, severity of disease and prevent hospitalization. Pfizer and Moderna also have boosters.

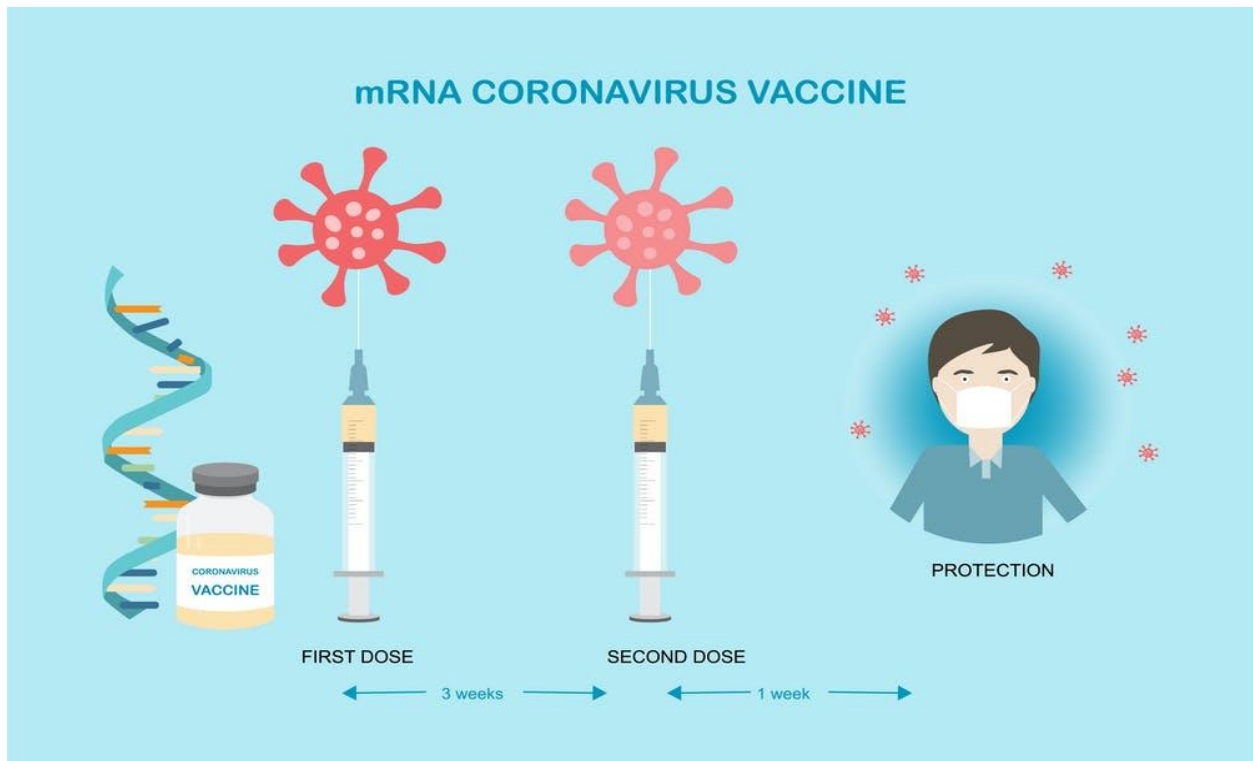
How vaccines work

When bacteria and viruses enter human body they invade, attack and multiply. This process makes humans ill. In response to invasion human immune system start to form antibodies and immune cells to fight infection. Vaccines are effective against diseases by helping our immune system to create those antibodies and immune cells. After receiving vaccine, our immune system creates memory cells and antibodies that in case of invasion will recognize and will know how to fight bacteria and viruses. In order to build protection against bacteria and viruses some vaccines require more than one dose to be effective. Two vaccines, Pfizer and Moderna, are messenger RNA (mRNA) vaccines. This type of vaccine stimulates our cells to make on surface of coronavirus a piece of spike protein.

This piece of spike protein makes our immune system to produce antibodies against coronavirus.

How mRNA vaccine work





Pfizer is a vaccine to prevent covid-19 in persons ages five through fifteen; sixteen and older. Two doses are recommended. An additional dose of the vaccine, called booster is recommended to decrease risk of being infected with corona virus, avoid severe illness and being hospitalized. Booster dose is recommended for persons of age twelve and older. Person should receive booster dose at least five months after receiving second dose of the vaccine. Preferably it should be the same vaccine for a booster dose as the previous one. There is also available single dose of the corona vaccine, called Johnson and Johnson. Pregnant women are also

encouraging to receive covid vaccine as pregnancy is one of the risk factors of contracting covid and having more severe progression of disease.

Ways to reduce risk of contracting covid-19 and spreading to others:

There are many ways to reduce risk of contracting coronavirus. One of the important ways are to wear mask indoors and public places. According to article, The enforcement of statewide mask wearing mandates to prevent COVID-19 in the US: an overview, “face masks have become the bulwark of COVID-19 prevention in the US” (Jacobs, P., & Ohinmaa, A. P., 2020). Social distancing and avoiding close contact with others will also lower risk of contracting disease. Hand hygiene, covering mouth when sneezing or coughing are very helpful too. Once testing positive staying home will help prevent spread of the virus to others. Self-testing prior to gathering indoors with others even when asymptomatic to prevent spread of the disease to others.

Coping and support during pandemic

Many people feel scared and anxious during coronavirus pandemic. They fear of contacting virus, having severe symptoms, hospitalization and even death. Also, there is a fear of getting their loved ones sick. Not being able to take care for

themselves or other infected family members can increase anxiety. Ways to reduce stress and anxiety are to have enough rest and sleep, eat healthy, have regular physical activity, get vaccinated, wear mask and social distancing, ask for help if needed.

Researchers from all over the world are learning about covid-19 and its effects on people. Many of these effects are still not known yet. According to the article, *Immune Responses in Patients with COVID-19: An Overview*. *Pediatric Annals*, “although many aspects of COVID-19 are still not understood, new information about its clinical manifestations emerge daily(Kamat, D., Kamat, A., & Mathur, A. 2021). That is why it is very important to reduce spread of coronavirus. Hand hygiene, wearing mask, social distancing, avoiding large crowds, and vaccination are important way to reduce spread of this virus.

Pandemic of coronavirus effected people’s lives globally, women, men, children, people from different countries, background, race, and cultural beliefs. According to the article, *An Overview of the World Current and Future Assessment of Novel COVID-19 Trajectory, Impact, and Potential Preventive Strategies at Healthcare Settings*“no one can overlook what the world is going through these days as a result of the COVID-19 pandemic that has already spread through the 213 countries affecting 13,000,000 people and, unfortunately, killing

around 600,000 people over a short timeframe (5–7 months), still with an accelerated pace and notable upward trend, affected the world economy, the humans' life, and has spread panic all around (Al-Anzi, B., Alenizi, M., Dallal, J. A., Frage, L. A., & Ullah, A., 2020).

This virus changed our lives in many ways. We were mandated to wear masks, maintain social distance, work, and study from home, being afraid of one another to contract the virus. We are mandated to vaccinate, people who refuse can lose their jobs, will not be able to attend school in person, eat indoors, etc. Many people died and lost their loved ones. Living through covid as an emergency department nurse was extremely challenging. Taking care of patients with covid, I was afraid to contact it and even more to infect my family members. Witnessing my patients of different ages, cultures, backgrounds, and beliefs suffering from covid and passing away without their loved ones brought me tremendous sadness and despair. Seeing my patients feeling better brought me hope. Leaving through pandemic made me a stronger, more appreciative, and caring person and a nurse.

Work Cited:

Al-Anzi, B., Alenizi, M., Dallal, J. A., Frage, L. A., & Ullah, A. (2020). An Overview of the World Current and Future Assessment of Novel COVID-19 Trajectory, Impact, and Potential Preventive Strategies at Healthcare Settings. *International Journal of Environmental Research and Public Health*, 17(19), 7016. <http://dx.doi.org/10.3390/ijerph17197016>

Jacobs, P., & Ohinmaa, A. P. (2020). The enforcement of statewide mask wearing mandates to prevent COVID-19 in the US: an overview. *F1000Research*, 9. <http://dx.doi.org/10.12688/f1000research.25907.1>

Kamat, D., Kamat, A., & Mathur, A. (2021). Immune Responses in Patients with COVID-19: An Overview. *Pediatric Annals*, 50(5), e222-e226. <http://dx.doi.org/10.3928/19382359-20210421-02>

Khalifa, S. A. M., Mohamed, B. S., Elashal, M. H., Du, M., Guo, Z., Zhao, C., Syed, G. M., Boskabady, M. H., El-Seedi, H., Efferth, T., & El-Seedi, H. (2020). Comprehensive Overview on Multiple Strategies Fighting COVID-19. *International Journal of Environmental Research and Public Health*, 17(16), 5813. <http://dx.doi.org/10.3390/ijerph17165813>

The History, Efficacy, and Safety of Potential Therapeutics: A Narrative Overview of the Complex Life of COVID-19. (2021). *International Journal of Environmental Research and Public Health*, 18(3), 955. <http://dx.doi.org/10.3390/ijerph18030955>

McNeely, J. A., & Mohan, M. (2021). Early Lessons from Covid-19: An overview, *Ambio*, 50(4), 764-766. <http://dx.doi.org/10.1007/s13280-021-01541-x>

Omicron, Delta, Alpha, and More: What To Know About the Coronavirus Variants
BY [KATHY KATELLA](#) APRIL 20, 2022

Zhu, H., Wei, L. & Niu, P. The novel coronavirus outbreak in Wuhan, China. *glob health res policy* 5, 6 (2020). <https://doi.org/10.1186/s41256-020-00135-6>