



**UNIVERSITY OF DIYALA
COLLEGE OF MEDICINE**

REVIEW STUDY ABOUT COVID-19 and VACCINATION

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ABSTRACT

Coronavirus disease (COVID-19) is an infectious disease (a contagious disease) caused by SARS-CoV-2 virus (severe acute respiratory syndrome coronavirus-2). Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age. The best way to prevent and slow down transmission is to be well informed about the disease and how the virus spreads. Protect yourself and others from infection by staying at least 1 metre apart from others, wearing a properly fitted mask, and washing your hands or using an alcohol-based rub frequently. Get vaccinated when it's your turn and follow local guidance. The virus can spread from an infected person's mouth or nose in small liquid particles when they cough, sneeze, speak, & breathe. These particles range from larger respiratory droplets to smaller aerosols. It is important to practice respiratory etiquette, for example by coughing into a flexed elbow, and to stay home and self-isolate until you recover if you feel unwell. vaccinated against COVID-19 is a key part of prevention this disease.

Therefore our review performed and analysis of the 24 reviews was conducted. Also this study critically reviews renewed scientific interest in the Coronavirus disease.

Keywords: COVID-19, SARS-CoV-2virus, Vaccination, Viral transmission.

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LIST OF SYMBOLS AND ABBREVIATIONS

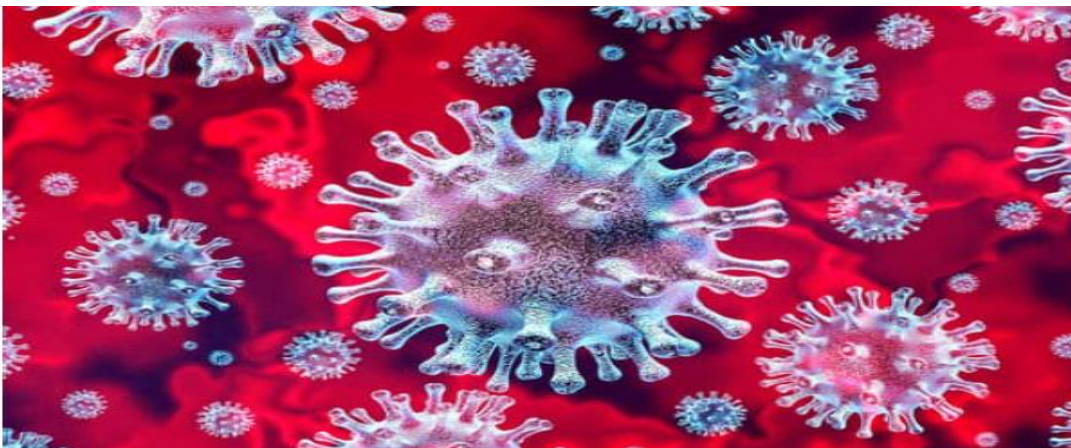
<u>Symbol</u>	<u>Description</u>
BTH	Baquba Teaching Hospital
WHO	World Health Organization
COVID-19	Corona Virus Disease
SARS-CoV-2virus	Sever acute respiratory syndrome corona virus-2
Mers -Cov	Middle east respiratory syndrome corona virus
PCR	Polymerase chain reaction

CHAPTER 1

INTRODUCTION & GENERAL INFORMATION

In early 2020, coronavirus disease 2019 (COVID-19) caused a pandemic, affecting the entire globe. Initially, the disease was relatively unknown. However, as COVID-19 became more widespread, our knowledge regarding the virus and its resultant disease increased.(1).

Coronaviruses (CoV) were first identified 1960s. The virus was named Corona due to the specific appearance of crown like sugary proteins that surround the particle. The CoV has the longest genome of any RNA-based viruses. CoV are commonly found in animals and it is possible to transmit some of the viruses to humans. Bats are a natural host of CoV, but they are not the only animal with the ability to transmit the virus to humans. The Middle East Respiratory Syndrome Coronavirus (MERS-CoV) has been found to be camel to human transmission while the Severe Acute Respiratory Syndrome Coronavirus-1 (SARS-CoV-1) is civet cat to human transmission .(2).



Coronavirus

CoV infections are not unusual around the world. These infections are commonly associated with human coronaviruses, CoV has the potential to mutate in animals and become transmittable to humans. When this occurs, it creates a new human coronavirus. This is the case for the COVID-19, SARS-CoV, and MERS-CoV-2. The novel Coronavirus 2019 (COVID-19) was first recognized and reported in Wuhan, Hubei Province, China on December 31, 2019 (World Health

Organization On January 30, 2020, the WHO announced COVID-19 as the sixth public health emergency requiring worldwide attention (WHO, 2020). This announcement follows the criteria used for H1N1 (2009), Ebola in West Africa (2014), Zika (2016), and Ebola in the Democratic Republic of Congo (2019). Finally, on March 11th, 2020 the WHO designated the outbreak a pandemic. (2)

The strategies for managing the health crisis triggered by the COVID-19 pandemic differ from country to country. The scientific community responded to the crisis by extensive mobilization of all research resources with an aim to shed light on the virus characteristics, mechanisms of its transmission, clinical aspects of the disease, and prevention and management strategies. (3)

The COVID-19 outbreak has had a detrimental impact on not only the healthcare sector but also every aspect of human life such as education and economic sectors. For example, over 100 countries have imposed nationwide closures of education facilities, which has led to over 900 million learners being affected. (4)

-The Diagnosis :

In 2020 examination of clinical data and bronchoalveolar specimens from five patients experiencing severe pneumonia related to COVID-19 admitted to the hospital between December 18 and December 29, 2020 in Wuhan, Hubei province China. Chest radiography showed diffuse opacities and consolidation in all patients. One patient death was recorded. A new, unidentified beta CoV strain was observed in the five patients. The strain isolated was 79% nucleotide identifiable with the SARS and 51% identifiable with MERS. The COVID-19 is most closely related to a SARS like CoV found in bats. (2).

-Transmission of Covid -19 strains:

COVID-19 is spread by human-to-human transmission via one on one contact or respiratory droplets. The median incubation time appears to be 4 to 5 days, but the ability to transmit the disease may extend to 14 days. (2)

Transmission can occur through travel, public outings, and family contacts before knowing the infection status. Super-spreaders may increase exposure to and burden of disease. (2).

-Symptoms:

Symptoms range from mild to severe and consist of cough, shortness of breath, and fever. Patients who screened positive for pneumonia associated with COVID-19 experienced high fever and persistent coughing. The symptoms closely resemble common symptoms of the influenza virus like Shortness of breath or

difficulty, breathing, Muscle aches, Chills, Sore throat, Runny nose, Headache, Chest pain, Pink eye (conjunctivitis), Nausea, Vomiting, Diarrhea, Rash.

For more serious cases, CT scans of the chest commonly demonstrate bilateral, peripheral, ill-defined, and ground-glass opacities and Positive PCR test results are considered confirmed cases.(2)(24)

-Prevention & Treatment

Primary prevention is the best method against COVID-19. Avoiding geographical areas affected and known individuals positive for the virus is best practice. As with any pandemic, complete avoidance of exposure may not be possible. Patient education is crucial for any infectious disease, but especially when media is playing a significant role in sharing information.

-COVID-19 has affected travel for populations across the globe. Travel allows for greater transmission of disease as seen with COVID-19, but the inability to travel affects access to health care, access to employment, and ability to connect socially. Frequent air travelers disproportionately travel more than other ground or the occasional air travelers. The public health effect is seen as these travelers socially interact with other frequent travelers in common spaces such as hotels and airports. These patterns can increase the incidence and prevalence of infectious diseases, including high contagion respiratory illnesses.(2)

Also WHO recommends getting vaccinated, staying at home, wearing a mask in public, avoiding crowded places, keeping distance from others, ventilating indoor spaces, managing potential exposure durations, washing hands with soap and water often and for at least twenty seconds, practising good respiratory hygiene, and avoiding touching the eyes, nose, or mouth with unwashed hands, in addition of a healthy diet, being physically active with exercises, managing psychological stress, and getting enough sleep for reducing the chances of infection.

-The aim of the present study was to review and estimate the global effect of a contagious disease (Covid-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and compare the effect of Several COVID-19 vaccines which approved and distributed among people in our country.

CHAPTER 2

LITERATURE REVIEW

The global health and research community is in need of a way to survey the scientific literature to come up with a treatment and measures against the COVID-19.(5)

The COVID-19 infection people are at greatest risk of transmitting the disease while they are experiencing symptoms with an incubation period of 2 to 14 days.

- People appear most contagious at the time their symptom severity is highest, but several key characteristics of transmissibility, such as if transmission can occur prior to symptom onset, are currently unknown. It is possible to contract the live virus from touching a fomite (contaminated surface or object) and then transferring the virus to the mouth, nose, and so on, but the risk for this seems low.

It remains unclear how easily the virus is transmitted from person to person (preliminary estimates suggest an infection rate of approximately 2.2 people), but it appears that older adults and those with underlying health conditions are at higher risk for mortality.(2)

- reports it is important to assess the actions taken related to the SARS epidemic in 2003. Countries were successful at aggressive screening, early identification, patient isolation, contact tracing, quarantine, and infection control methods. These lessons learned have been successfully applied in many countries to address COVID-19 transmissions.(2)

Studies explained that, It is important to consider the real economic impact related to lost workdays due to quarantine and social isolation efforts as well as travel restrictions that may negatively impact access to care and ability to pay for care, treatment, and follow up for affected individuals and close contacts can reduce the number of infections, serious illness, and deaths.(2),for example

Statistics indicate that 3.3 million people applied for unemployment benefits.(4) Asymptomatic cases of any infection are of considerable concern for public health policies to manage epidemics. Such asymptomatic cases complicate the tracking of an epidemic and prevent reliable estimates of transmission, tracing, and tracking strategies for containing an epidemic through isolation and

quarantine. This has been a significant concern in the current coronavirus disease 2019 (COVID-19) pandemic.(6)

The World Health Organization recommends that “for confirmed asymptomatic cases, the period of contact is measured as the 2 days before through the 14 days after the date on which the sample was taken which led to confirmation.(6)

Research shows that Olfactory and gustatory dysfunction symptoms are common in patients with COVID-19 and may represent early symptoms in the clinical course of infection. Increased awareness of this fact may encourage earlier diagnosis and treatment of COVID-19, as well as heightened vigilance for viral spread.(7)

Also studies agree among Chinese patients, 2873 deaths had occurred, equivalent to a mortality rate of 3 · 6% while 104 deaths from COVID-19 had been reported outside of China (1 · 5%) However, these mortality rate estimates are based on the number of deaths relative to the number of confirmed cases of infection.(8).

There was Implementing Telemedicine in Response to the COVID-19 Pandemic such as urologists, Telemedicine optimizes both while we all attempt to navigate the COVID-19 state of emergency.(9)

The COVID-19 pandemic is causing severe disruptions to daily life and economic activity in the United States and around the world. These ruptures were immediately evident in financial markets, with equity prices declining sharply and market volatility spiking.(10)

-Strain of SARS-CoV-2

The virus changing, or mutate, as it infects, scientists have kept a close eye on variants like: Alpha,Beta,Gamma,Delta, Omicron,Lambda& Mu.(11)

-How do I know if it's COVID-19, a cold, or the flu?

Symptoms of COVID-19 can be similar to a bad cold or the flu.

Your doctor will suspect COVID-19 if: You have a fever and a cough, You have been exposed to people who have it within the last 14 days. people and this virus has done so. There are several variants that are now spreading, some proving to be more contagious as well as more deadly than the original virus.(11).

Vaccination -Immune System- The Body’s Defense Against Covid-19

To understand how COVID-19 vaccines work, it helps to first look at how our bodies fight illness. When germs, such as the virus that causes COVID-19, invade our bodies, they attack and multiply. This invasion, called an infection, is what causes illness. Our immune system uses several tools to fight infection. Blood

contains red cells, which carry oxygen to tissues and organs, and white or immune cells, which fight infection. Different types of white blood cells fight infection in different ways:

-Macrophages are white blood cells that swallow up and digest germs and dead or dying cells. The macrophages leave behind parts of the invading germs, called “antigens”. The body identifies antigens as dangerous and stimulates antibodies to attack them.

-B-lymphocytes are defensive white blood cells. They produce antibodies that attack the pieces of the virus left behind by the macrophages.

-T-lymphocytes are another type of defensive white blood cell. They attack cells in the body that have already been infected.(12).

-How Covid-19 Vaccine work?

The first time a person is infected with the virus that causes COVID-19, it can take several days or weeks for their body to make and use all the germ-fighting tools needed to get over the infection. After the infection, the person’s immune system remembers what it learned about how to protect the body against that disease. The body keeps a few T-lymphocytes, called “memory cells,” that go into action quickly if the body encounters the same virus again. When the familiar antigens are detected, B-lymphocytes produce antibodies to attack them. Experts are still learning how long these memory cells protect a person against the virus that causes COVID-19. (12)

Different types of vaccines work in different ways to offer protection, It typically takes a few weeks after vaccination for the body to produce T-lymphocytes and B-lymphocytes. Therefore, it is possible that a person could be infected with the virus that causes COVID-19 just before or just after vaccination and then get sick because the vaccine did not have enough time to provide protection.

Sometimes after vaccination, the process of building immunity can cause symptoms, such as fever. These symptoms are normal and are signs that the body is building immunity. Talk to a doctor about taking over-the-counter medicine, such as ibuprofen, acetaminophen, aspirin (only for people age 18 or older), or antihistamines for any pain and discomfort.(12) (13)

Currently, there are three main types of COVID-19 vaccines that are approved or authorized for use in the United States or

that are undergoing large-scale (Phase 3) clinical trials in the United States..

mRNA vaccines (Pfizer-BioNTech/ Moderna) contain material from the virus that causes COVID-19 that gives our cells instructions for how to make a harmless

protein that is unique to the virus. After our cells make copies of the protein, they destroy the genetic material from the vaccine. Our bodies recognize that the protein should not be there and build T-lymphocytes and B-lymphocytes that will remember how to fight the virus that causes COVID-19 if we are infected in the future.

Protein subunit vaccines (vaccines under development) include harmless pieces (proteins) of the virus that causes COVID-19 instead of the entire germ. Once vaccinated, our bodies recognize that the protein should not be there and build T-lymphocytes and antibodies that will remember how to fight the virus that causes COVID-19 if we are infected in the future.

Vector vaccines (Oxford/AstraZeneca vaccine /Johnson & Johnson's Janssen) contain a modified version of a different virus than the one that causes COVID-19. Inside the shell of the modified virus, there is material from the virus that causes COVID-19. This is called a "viral vector." Once the viral vector is inside our cells, the genetic material gives cells instructions to make a protein that is unique to the virus that causes COVID-19. Using these instructions, our cells make copies of the protein. This prompts our bodies to build T-lymphocytes and B-lymphocytes that will remember how to fight that virus if we are infected in the future.(13)

-How is Vaccination ?

1. First, COVID-19 mRNA vaccines are given in the upper arm muscle. The mRNA will enter the muscle cells and instruct the cells' machinery to produce a harmless piece of what is called the spike protein. The spike protein is found on the surface of the virus that causes COVID-19. After the protein piece is made, our cells break down the mRNA and remove it.

2. Next, our cells display the spike protein piece on their surface. Our immune system recognizes that the protein doesn't belong there. This triggers our immune system to produce antibodies and activate other immune cells to fight off what it thinks is an infection. This is what your body might do to fight off the infection if you got sick with COVID-19.

3. At the end of the process, our bodies have learned how to protect us against future infection with the virus that causes COVID-19. The benefit is that we get this protection from a vaccine, without ever having to risk the serious consequences of getting sick with COVID-19. Any temporary discomfort experienced after getting the vaccine is a natural part of the process and an indication that the vaccine is working. (14)(15)

-How Viral Vector Vaccines Have Been Used During Recent Disease Outbreaks
Scientists began creating viral vectors in the 1970s. Besides being used in vaccines, viral vectors have also been studied for gene therapy, to treat cancer, and for molecular biology research. For decades, hundreds of scientific studies of viral vector vaccines have been done and published around the world. Some vaccines recently used for Ebola outbreaks have used viral vector technology, and a number of studies have focused on viral vector vaccines against other infectious diseases such as Zika, flu, and HIV.(15)(16)

-Side effects and safety

The COVID-19 vaccines approved for use in the UK have met strict standards of safety, quality and effectiveness.

They can cause some side effects, but not everyone gets them.

Any side effects are usually mild and should not last longer than a week, such as: a sore arm from the injection, feeling tired, a headache, feeling achy, feeling or being sick, More serious side effects, such as allergic reactions or blood clotting, are very rare., Find out more about COVID-19 vaccines side effects and safety

Pregnancy, breastfeeding and fertility

-You can get vaccinated against COVID-19 if:

you're pregnant or think you might be you're breastfeeding

you're trying for a baby or might get pregnant in the future

The vaccines you'll be offered depends if you're pregnant and how old you are.

The vaccines cannot give you or your baby COVID-19.(17)(18)

Unlike the flu, a lot of people aren't immune to the coronavirus because it's so new. If you do catch it, the virus triggers your body to make things called antibodies. Researchers are looking at whether the antibodies give you protection against catching it again.(19)(20)

The coronavirus also appears to cause higher rates of severe illness and death than the flu. But the symptoms themselves can vary widely from person to person. The older you are, the higher your risk of severe illness. In addition, Chronic kidney disease, Chronic obstructive pulmonary disease (COPD), A weakened immune system because of an organ transplant, Obesity, Serious heart conditions such as heart failure or coronary artery disease, Sickle cell disease, Type 1 diabetes, Type 2 diabetes, Cystic fibrosis, Hi blood pressure, Dementia, Liver disease, Pregnancy, Damaged or scarred lung tissue (pulmonary fibrosis), Smoking, Thalassemia, Depression, Anxiety, Schizophrenia.(19)(23).

Immune response and risk of reinfection – Infection induces a protective immune response for at least six to eight months. However, it is unclear how long the protective effect lasts beyond that period. The risk of reinfection within the first several months after initial infection is low.(21)(22)

Vaccines to prevent SARS-CoV-2 infection are considered the most promising approach for curbing the pandemic.(23)

CHAPTER 3

CONCLUSIONS AND RECOMMENDATIONS

- First identified in Wuhan, China, in December 2019, the outbreak of COVID-19 has been declared as a global emergency in January, and a pandemic in March 2020 by the World Health Organization (WHO). The cases of COVID-19 will continue to rise and the virus will be sustainable for future infections. Timely and appropriate public health interventions along with proper screening, treatment, and follow-up for affected individuals and close contacts can reduce the number of infections, serious illness, and deaths. For successful management of the epidemic, effective screening, and treatment of COVID-19 in infected patients health care providers should focus public health efforts at culturally appropriate methods of education, prevention, treatment, and follow-up.

-Patients should be properly educated and understand personal risk and personal methods to prevent infection. If diagnosed with COVID-19, patients should understand the need for self-quarantine or social distancing (measures to restrict when and where people can gather to stop or slow the spread of infectious disease) and other procedures to prevent transmission to others. Vaccination is an important way to protect people against infection, the variety types of vaccine prompt our bodies to recognize and protect us from the virus that causes COVID-19. None of these vaccines can give you COVID-19.

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