



Recommendations and effects of COVID-19 vaccines

Reem M. Abd El Hamed, Ali A. Ali¹, Moustafa A. Ali.

Tropical Medicine Departments, Sohag Medical Hospitals, Faculty of Medicine,
Sohag University.

Abstract

COVID-19 virus infection 2019 (COVID-19) is the disease caused by the SARS-CoV-2 virus (severe acute respiratory syndrome coronavirus-2). Several studies detect that old aged persons as well as people with risk factors such as chronic hepatic disease, cirrhotic liver, cardiac illness, over bodyweight, and compromised immune systems due to other diseases or drugs are more likely to have a higher mortality rate from corona virus infection. Safe and effective vaccination has become a key tool to prevent the new corona virus illness. The world is racing to develop and produce COVID-19 vaccines. Healthcare workers were given priority for early immunization as they are at great risk of infection and may influence vaccine uptake in the general population. COVID-19 vaccines were well tolerated, secure, and create a resistance reaction against the infection in most cases. Most side effects that occurred after vaccinations were mild to moderate, which showed the building of a resistance by the body for protection. Vaccination apprehension is one of the major hurdles to world health. It is important to Know about a vaccine's unfavorable impacts and efficacy to improve public vaccine acceptance.

Keywords: COVID-19, corona virus vaccines, vaccine's side 'effects'.

Introduction:

New SARS-CoV-2 "severe acute respiratory syndrome

coronavirus-2" is the source of coronavirus disease which began at the end of 2019 and was declared a "public medical emergency of international importance" by the WHO in January 2020 due to its rapid dissemination. The WHO declared it a worldwide outbreak on March 11, 2020.

The virus primarily affects the upper respiratory tract and lungs².

It is transmitted mostly through airborne contaminants of respiratory or Salivary secretions from an infected patient during coughing or sneezing³.

The infected patients presented with high temperature, coughing, difficult breathing, muscular discomfort, disorientation, headache, hoarseness, runny nose, pain in the chest, diarrhea, nausea, vomiting, anosmia, and difficulty swallowing. Acute respiratory distress syndrome (ARDS), cytokines storm, cardiovascular problems, pulmonary ischemia, gastrointestinal and neurological symptoms, and renal disorders can cause massive damage to various organs and death^{5,6}.

Affirmed COVID-19 patients globally reported by WHO at 23 June 2022 were 539,893,858 confirmed cases

including 6,324,112 deaths, whereas 514,047 confirmed cases of COVID-19 with 24,722 deaths, in Egypt⁷. Early prophylaxis at the community level is difficult. The entire world has been attempting to vaccinate persons⁸ to eradicate the disease⁹. COVID-19 antibodies can secure persons from becoming contaminated with the virus or having serious manifestations by propelling the immune system to create antibodies^{10, 11}. After immunization, the antibodies follow the intruder spike protein and anticipate the organism from the passage into the cells¹².

COVID-19 vaccines:

SARS-CoV-2 vaccines can be categorized into:

mRNA-based vaccines: mRNA-based vaccines include the conveyance of manufactured mRNA into the cytoplasm of the host, which employs the host ribosomes to interpret antigenic proteins that initiate resistance against the organism. Pfizer BioNTech vaccine (BNT162b2) and Moderna vaccine (mRNA-1273) are involved in this class¹³.

Adenovirus vector vaccines: These include the utilization of a replication unfit adenovirus as a vector to enter the DNA coding for the spike protein into the host cells. The Johnson and Johnson vaccine and AstraZeneca-University of Oxford vaccine (ChAdOx1 nCoV-19) are involved in this category (JNJ-78436735)¹³.

The whole virion inactivated vaccine: The Bharat Biotech vaccine (BBV152) belongs to this class and includes b-propionolactone-inactivated whole virion¹⁴. The Egyptian government is working hard to ensure that large amounts of corona virus vaccines are accessible to the Egyptian people, which were initially given to physicians¹⁵.

Vaccine hesitancy:

It is reluctance or postponement in accepting vaccination despite the accessibility of immunization administration; it is an obstacle to immunization program success¹⁶.

Reluctance toward COVID-19 immunization is mostly caused by stresses around security and adverse impacts of that emergency-delivered vaccines^{17, 18}. Improving vaccination acceptance requires raising open mindfulness of people about vaccine adequacy and being trusting about adverse effects¹⁹.

Efficacy and safety of the COVID-19 vaccines:

1. Pfizer-BioNTech vaccine (BNT 162b2):

The BNT 162b2 is an mRNA vaccine, it is given twice, and each dose is 0.3 ml through IM injection twenty-one days apart²⁰. The vaccine is accessible in multiple doses in the form of vials that should be refrigerated at -60 to -90 °C¹³. COVID-19 vaccine has a capacity of 95% in avoiding viral infection. Among its adverse impacts, local muscle pain was the most significant, high temperature, arthritis and shivering happened mostly in young aged persons and mostly happened after the 2nd dose²¹.

2. Moderna vaccine (mRNA-1273):

The mRNA-1273 is an mRNA vaccine that is given twice (100 µg, 0.5 ml each) twenty-eight days apart. It has a capacity of 94.1% in avoiding infection. General and local side effects mostly happened after the 2nd dose and in young persons²².

3. ChAdOx1 nCoV-19 vaccine (AZD1222):

This vaccine includes replication-deficient chimpanzee adenovirus as a vector carrying the gene encoding for the SARS-Cov-2 spike glycoprotein. It can be refrigerated between +2° to +8°C²³. The antibodies are given twice, each 0.5 ml given by

IM injection, four to six weeks apart²⁴. It has an efficacy of 70.1% in preventing corona virus infection. After 21 days following immunization, ten cases of COVID were documented, all of which were within the control arm, including two patients with massive COVID manifestation and one fatality. In 175 cases, adverse effects were reported, with only three of them possibly linked to the immunization²⁵.

4. **BBV152 vaccine:**

It is given in 2 doses 28 days apart through intramuscular injection; 6 mg each contains the entire virion inactivated viral antigen²⁶. It has an efficacy of 81%²⁷.

Tiredness, high temperature, headaches, soreness at the site of injection, nausea, and diarrhea are the most common adverse effects of coronavirus vaccinations²⁸. The adverse effects were more severe after the 1st dosage of the ChAdOx1 vaccination than after the 2nd one, whereas after the second dose of the BN-T162 vaccine, the seriousness of adverse manifestations was more prominent than after the primary dose²⁹. We advise using a low dose of antipyretics such as acetaminophen after immunization to improve reactions³⁰.

COVID-19 vaccines recommendations:

At 17 May 2022 WHO reported that COVID-19 vaccines are safe for people of 18 years and older. The Pfizer vaccine can be safe for children from 5 years of age. Both Moderna and Pfizer vaccines are authorized for use in children from 12 years of age³¹. We do not advise performing pre or after-immunization examinations for SARS-CoV-2 vaccines. However, the antibodies present in the serum mostly demonstrate previous infection or vaccination³⁰.

We advise you to continue all current drugs pre or post-vaccination. Patients taking monoclonal antibodies or convalescent plasma for the recovery from corona virus infection must hold up at slightest ninety days from the final dosage of immunization³⁰.

We advise every person to precede some manners to diminish the chance of COVID-19 infection (e.g., masking, hand washing, social separating, etc.)³⁰.

COVID-19 immunization in patients with longstanding hepatic illness:

Patients with chronic hepatic illness exposed to COVID-19 progress worse than the other population³². The European Association for the study of the liver (EASL), American Association for the study of liver disease (AASLD) preferred giving of corona virus immunization in patients with severe hepatic illness and patients who have autoimmune hepatic illness on immunosuppressive drugs^{13,33}. Those with chronic hepatic diseases on antiviral or immune inhibitory agents shouldn't stop their treatment during the time of immunization, but individuals with high temperatures are preferred not to be immunized till the disease is controlled¹³.

There is no sufficient data to prefer one COVID-19 vaccine over another. All are considered safe and effective³⁰. As regards patients undergoing liver transplantation, AASLD indicates administration of COVID-19 vaccine, not less than 3 months post hepatic transplantation, just the immunosuppressive drugs have been decreased. Persons with severe rejection should be vaccinated after rejection has been treated. However, donors and recipients must take the 2nd dose of the vaccine not less than two weeks pre-transplant¹³. For individuals with a hepatic malignant tumor, AASLD recommends the administration of corona virus vaccines and does not recommend int-

errupting locoregional or systemic therapy for HCC¹³.

1. World Health Organization WHO (a). WHO Director-General's Opening Remarks at the Media Briefing on COVID-19 2020.
2. Gautam S. air pollution remains low as people stay at home. *Air Qual Atmos Health* 2020; 13: 853-57. Doi.org/10.1007/s11869-020-00842-6.
3. World Health Organization WHO. Coronavirus overview 2021.
4. Docea AO, Tsatsakis A, Albulescu D, et al. A new threat from an old enemy: Re-emergence of coronavirus. *Int J Mol Med* 2020; 45: 1631-43. Doi: 10.3892/ijmm.2020.4555.
5. Chen X, Laurent S, Onur OA, et al. A systematic review of neurological symptoms and complications of COVID-19. *J Neurol* (2020); 268: 392-402. Doi: 10.1007/s00415-020-10067-3.
6. Thakur V, Ratho RK, Kumar P, et al. Multiorgan involvement in COVID-19: Beyond pulmonary manifestations. *J Clin Med* 2021; 10: 446. Doi: 10.3390/jcm10030446.
7. World Health Organization WHO (b). WHO Health Emergency Dashboard 2022, <http://www.who.int/>.
8. Tripathy S, Kabir R, Arafat SY, et al. Futuristic Technologies for Advanced Detection, Prevention, and Control of COVID-19. *Diagnostic Strategies for COVID-19 and other Coronaviruses*. Singapore 2020; 161-73.
9. Riad A, Sağiroğlu D, Üstün B, et al. Prevalence and Risk Factors of CoronaVac Side Effects: An Independent Cross-Sectional Study among Healthcare Workers in Turkey. *J. Clin. Med* 2021; 10: 2629.
10. Elgendy MO, Elmawla MNA, Hamied AMA, et al. COVID-19 patients and contacted person awareness about home quarantine instructions. *Int. J. Clin. Pract* 2021; 75: 13810.
11. Solomon Y, Eshete T, Mekasha B, et al. COVID-19 Vaccine: Side Effects After the First Dose of the Oxford AstraZeneca Vaccine Among Health Professionals in Low-Income Country: Ethiopia. *J. Multidiscip. Healthc* 2021; 14: 2577.
12. Noda K, Matsuda K, Yagishita S, et al. A novel highly quantitative and reproducible assay for the detection of anti-SARS-CoV-2 IgG and IgM antibodies. *Sci. Rep* 2021; 11: 1-10.
13. Fix OK, Blumberg EA, Chang K, et al. AASLD expert panel consensus statement: Vaccines to prevent COVID-19 infection in patients with liver disease. *Hepatol* 2021. Doi.org/ 10.1002/hep.31751.
14. Ella R, Vadrevu KM, Jogdand H, et al. Safety and immunogenicity of an inactivated SARS-CoV-2 vaccine, BBV152: A double-blind, randomised, phase 1 trial. *Lancet Infect Dis* 2021; S1473-3099: 3094-47. Doi.org/10.1016/S1473-3099(20)30942-7.
15. Rhodes A, Hoq M, Measey MA, et al. Intention to vaccinate against COVID-19 in Australia. *Lancet Infect Dis* 2021; 21(5):110. Doi.org/10.1016/S1473-3099 (20)30724-6.
16. MacDonald. SAGE Working Group on Vaccine Hesitancy: Vaccine hesitancy: Definition, scope, and determinants. *Vaccine* 2015; 33: 4161-64. Doi.org/10.1016/j.vaccine.2015.04.036.
17. Roy B, Kumar V, and Venk atesh A. Health care workers' reluctance to take the Covid-19 vaccine: A consumer marketing approach to identifying and overcoming hesitancy. *NEJM Catalyst Innovations in Care Delivery* 2021; 1 (6): 1-10. Doi.org/10.1056/CAT.20.0676.
18. Shekhar R, Sheikh AB, Upadhyay S. COVID-19 vaccine acceptance among health care workers in the United States. *Vaccines* 2021; 9: 119-34. Doi.org/10.3390/vaccines9020119.
19. Alhazmi A, Alamer E, Daws D, et al. Evaluation of Side Effects

- Associated with COVID-19 Vaccines in Saudi Arabia. *Vaccines* 2021; 9: 674.
20. Food and Drug Administration. Vaccines and Related Biological Products Advisory Committee Meeting FDA Briefing Document. Pfizer-BioNTech COVID-19 Vaccine 2021.
 21. Polack FP, Thomas SJ, Kitchin N, et al. Safety and efficacy of the BNT162b2 mRNA covid-19 vaccine. *N Engl J Med* 2020; 383: 2603-15.
 22. Baden LR, El Sahly HM, Essink B, et al. Efficacy and safety of the mRNA-1273 SARS-CoV-2 vaccine. *N Engl J Med* 2021; 384:403-16.
 23. COVISHIELD (ChAdOx1 nCoV-19 Corona Virus Vaccine). Pune (India): Serum Institute Of India Pvt. Ltd 2021.
 24. Folegatti PM, Ewer KJ, Aley PK, et al. Safety and immunogenicity of the ChAdOx1 nCoV-19 vaccine against SARS-CoV-2: A preliminary report of a phase 1/2, single-blind, randomized controlled trial *Lancet* 2020; 396: 467-78. Doi.org/10.1016/S0140-6736(20)31604-4.
 25. Voysey M, Clemens SAC, Madhi SA, et al. Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: An interim analysis of four randomized controlled trials in Brazil, South Africa, and the UK. *Lancet* 2021; 397: 99-111.
 26. COVAXIN (Whole Virion Inactivated Corona Virus Vaccine). Bharat Biotech International Ltd 2021.
 27. Indian council of medical research. Phase 3 Clinical Trial of COVAXIN, developed by ICMR & Bharat Biotech, shows 81% efficacy 2021.
 28. Andrzejczak-Grz, adko S, Czudy Z, et al. Side effects after COVID-19 vaccinations among residents of Poland. *Eur. Rev. Med. Pharm. Sci.* 2021; 25, 4418-21.
 29. Elgendy MO, El-Gendy AO, Mahmoud S, et al. Side effects and efficacy of COVID-19 vaccines among the Egyptian population. *Vaccines* 2022; 10: 109. Doi.org/10.3390/vaccines10010109.
 30. AASLD recommendations. COVID-19 vaccine recommendations for patients with liver disease. Based on the AASLD expert panel consensus statement: Vaccines to prevent COVID-19 infection in patients with liver disease 2021.
 31. World Health Organization WHO. Coronavirus disease (COVID-19): Vaccines 2022.
 - 32.] Marjot T, Moon AM, Cook JA, et al. Outcomes following SARS-CoV-2 infection in patients with chronic liver disease: An international registry study. *J Hepatol* 2021; 74: 567-77. Doi.org/10.1016/j.jhep.2020.09.024.
 33. Cornberg M, Buti M, Eberhardt CS, et al. EASL position paper on the use of COVID-19 vaccines in patients with chronic liver diseases, hepatobiliary cancer and liver transplant recipients. *J Hepatol* 2021; 74:944-51. Doi.org/10.1016/j.jhep.2021.01.032.