



Editorial

COVID-19 Vaccines

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The fateful year of 2020 will go down the annals of history as the year during which global pandemic COVID-19 spread across the globe causing widespread confusion, panic, chaos and mayhem. As this respiratory disease-which primarily affects lungs and, in case of complications, many other organs of body-spread rapidly across the world, scientists and biologists began their hectic efforts to develop protocols for treatment and prevention of this disease. As is the case with all other viral diseases, the best tool that can save humanity from this ongoing pandemic is a potent vaccine. Realizing the urgency of the matter at hand and the enormous potential of revenue generation, a number of companies started this race of developing vaccine at an accelerated rate. From securing funding from research to gaining approval of regulatory authorities after clinical trials, it normally takes a long time to develop a vaccine. However, owing to the great global demand and willingness of governments to provide generous funding, vaccines for COVID-19 have been developed at a much faster pace than ever before.

At this point in time, more than 30 million doses of vaccines have been administered to the public mostly in resourceful countries which shows global inequality of distribution of this life saving vaccine.¹ The countries which have the resources to be able to procure the vaccines have currently bought the currently scarce vaccines for their population. COVID-19 Vaccines Global Access (COVAX) has been established to address the issue of unequitable distribution

of these life-saving vaccines.² Since it will take time for the vaccines to be freely available for everyone, therefore a high risk approach should be used for vaccinating. Healthcare professionals, immunocompromised people, old age population and those with comorbidities should be given precedence over the general population. Similarly, children develop relatively mild disease symptoms and are, therefore, not included in high priority group. Moreover, most of the clinical trials have been conducted on adult population due to which safety of vaccines in children is still questionable.³

The leading vaccine now is Pfizer/ BioNTech. This company was the first to get validation from World Health Organization (WHO) for emergency use on 31 December 2020. After 2 months follow up, this vaccine has shown 95% efficacy with 2 doses which are administered 21-28 days apart. This 2 dose regime is considered complete and boosters are not required. This RNA vaccine works by producing spike proteins to which the immune system responds.⁴ This vaccine can be used safely as there are no specific contraindication except for severe allergy with polyethylene glycol which is a component of vaccine. Anaphylactic reactions have been reported in individuals who have no previous history of allergies. It is, therefore, advisable to administer vaccine in a setting where prompt management can be done.^{5,6} This vaccine can be administered to individuals who are immunocompromised, HIV positive, elderly and have autoimmune disease. Pregnant women can be vaccinated if the benefits outweigh the risks. Individuals

who have COVID-19 infection both symptomatic and asymptomatic can get vaccinated but it is suggested to delay vaccine in those who are having acute COVID-19 stage. Prior antibody testing has not been recommended by the vaccine developers. As the trial done did not include very elderly population, more study is required in elderly population. In Norway, 23 elderly died after vaccination. Therefore more studies should be done on very frail elderly. As they are not sure whether the cause is due to vaccine or not. Best way to protect very frail elders is practice of primary prevention measures.⁷ The major challenge with the use of this vaccine in Pakistan is that it requires ultra-cold storage of temperature as low as -70°C. Managing such a cold supply chain in a developing country like Pakistan would be very difficult. Hence, this vaccine has demonstrated promising results but is not feasible in resource constrained countries.

Another RNA vaccine Moderna was approved by the Food and Drug Administration (FDA) of the USA. This is also being used after emergency authorization in few countries. This mRNA vaccine has 94.5% efficacy with 2 doses 28 days apart. Right now, this vaccine is recommended for individuals more than 18 years old. This vaccine should also be given in settings where anaphylaxis can be treated promptly.⁸ This vaccine needs ultra-cold chain (-20°C) to maintain stability hence it is difficult to use in developing countries with limited resources.

AstraZeneca/Oxford vaccine is a DNA that codes S protein and is encased in a capsid from a chimpanzee adenovirus. This adenovector infects the cell and delivers the DNA strand which causes production of RNA from cells RNA polymerase. Two doses are given intramuscularly 4 weeks apart with efficacy of 70%. This vaccine gives 100% protection against severe disease. The advantage of this vaccine is that it can be stored in refrigerator for up to 6 months.⁹ Ultra-cold storage, which is very difficult to maintain in our country, is not required for AstraZeneca. Drug Regulatory Authority of Pakistan (DRAP) has given approval for emergency use of Oxford-Astrazeneca's vaccine.^{10,11} The common side effects of this vaccine include arm pain, fever, headache and joint pains but they subside quickly. The vaccine should not be used

on individuals who have recently had severe allergic reaction to previous dose. This vaccine does not contain polyethylene glycol so it can be used in those who are allergic to this substance.

With the development of a number of vaccines for COVID-19, there is a prevalent view that this pandemic is now on the decline and that normalcy will return to life in not too distant future. While this narrative is not far from reality, it is of paramount importance for the public to not become complacent as yet and to continue taking precautions such as wearing mask, washing hands, maintaining social distance and avoiding overcrowded areas in order to contain the spread of this virus.

References:

1. Scientists tackle vaccine safety, efficacy and access at global R&D forum. World Health Organization; Available from: <https://www.who.int/news/item/16-01-2021-scientists-tackle-vaccine-safety-efficacy-and-access-at-global-r-d-forum>
2. Kupferschmidt K. Global plan seeks to promote vaccine equity, spread risks. *Science*. 2020 Jul 31 ; 369 (6503) :489-490. doi: 10.1126 / science .369 .6503.489.
3. Schoch-Spana M, Brunson EK, Long R, Ruth A, Ravi SJ, Trotochaud M, et al. The public's role in COVID-19 vaccination: Human-centered recommendations to enhance pandemic vaccine awareness, access, and acceptance in the United States. *Vaccine*. 2020 Oct 29.
4. Interim recommendations for use of the Pfizer-BioNTech COVID-19 vaccine, BNT162b2, under Emergency Use Listing. World Health Organization; Last Updated 8 January 2021. Available from: https://www.who.int/publications-detail-redirect/WHO-2019-nCoV-vaccines-SAGE_recommendation-BNT162b2-2021.1
5. Mahase E. Covid-19: People with history of significant allergic reactions should not receive Pfizer vaccine, says regulator. *BMJ: British Medical Journal (Online)*. 2020 Dec 10;371.
6. Oliver SE, Gargano JW, Marin M, Wallace M, Curran KG, Chamberland M, et al. The Advisory Committee on Immunization Practices, Interim Recommendation for Use of Pfizer-BioNTech COVID-19 Vaccine-United States, December 2020. *Morbidity*

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- and Mortality Weekly Report. 2020 Dec 18;69 (50):1922.
7. Torjesen Ingrid. Covid-19: Norway investigates 23 deaths in frail elderly patients after vaccination B-MJ 2021; 372 :n149
 8. Information about the Moderna COVID-19 Vaccine. Center of Communicable disease Control; Last Updated Jan. 1, 2021. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/Moderna.html>
 9. Knoll MD, Wonodi C. Oxford-Astra Zeneca COVID-19 vaccine efficacy. The Lancet. 2020 Dec 8.
 10. Pakistan approves AstraZeneca COVID-19 vaccine for emergency use. Reuters. January 16, 2021. Available from: <https://www.reuters.com/article/us-health-coronavirus-pakistan-astrazene/pakistan-approves-astrazeneca-covid-19-vaccine-for-emergency-use-idUKKBN29L0DO>
 11. AstraZeneca Covid-19 vaccine approved for emergency use in Pakistan. The Express Tribune. January 21, 2021. Available from: <https://tribune.com.pk/story/2280204/astrazeneca-covid-19-vaccine-approved-for-emergency-use-in-pakistan>