

Debunking COVID-19 Vaccine Myths using ChatGPT

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Abstract: *This article seeks to explore the responses generated by ChatGPT in relation to the topic of COVID-19 vaccines. It delves into the varying types of vaccines available, the benefits and disadvantages they pose and addresses the popular myths that surround the safety of these vaccines. Although this AI software hasn't been recently updated, it can most certainly provide knowledge and advice that is in accordance with scientific research.*

Keywords: COVID-19, Chat-GPT, AI, Vaccines, Myths

The global occurrence of the COVID-19 pandemic in March 2020, will forever be known as one the deadliest pandemics in modern mankind. With the rapid rise in death tolls worldwide, the first mass vaccination programme approved by WHO, commenced in December 2020¹.

As of 19th September 2023, a total of more than 13 billion vaccines have been administered with a little over 5.1 billion completing the primary vaccine series globally². However, the initial rollout of COVID vaccines had been challenged by misinformation and rumours correlated via social media. ChatGPT, created by OpenAI, launched in November 2022 and is an advanced language-based AI program which is freely accessible to the public. It appeals to many as being conversational and can perform well at providing objective answers³. Hence, its use can assist in mitigating any further propagation of misconceptions of COVID-19 vaccines.

The expansive usage of ChatGPT allows for generation and dissemination of concise data. It can improve the knowledge of the mass public on not only the history of the Corona virus, but on the varying types of vaccines available. Thus, it lends itself to facilitating quick access and learning of medical education⁴. Furthermore, it can allow for support in decision-making for individuals who are still sceptical on vaccines and its possible positive or negative effects. In contrast to these positives, ChatGPT can pose ethical and legal concerns such as promoting plagiarism and possible inconsistencies which can hinder its effectiveness for research purposes.

Table 1 depicts ChatGPT responses to common COVID-19 vaccine questions worldwide.

As per note, ChatGPT formulates responses to these questions in an easy-to-read numbered format which allows for a smooth flow of data. The responses are simple and factual such as "vaccination can lower the severity of the disease if you do get infected." It addresses both the benefits and disadvantages of COVID-19 vaccines thoroughly and without bias. It readily disputes the most popular false narratives of microchipping and its lack of safety by stating "this is not true; vaccines do not contain any tracking devices" and "the vaccines went through rigorous clinical trials and were authorized for emergency use based on safety and efficacy data."

It also highlights "vaccine efficacy" which entails the differences in the efficacy of vaccines and new strains by claiming "the effectiveness may vary somewhat depending on the specific vaccine and the presence of new variants, but they are still valuable tools in controlling the spread of the virus." The idea of discrepancies in efficacy can also be a contributing factor to "vaccine hesitancy" which can "slow down the vaccination efforts and hinder the achievement of herd immunity."

In general, the impact of AI on the healthcare sector can most certainly be beneficial by helping to overcome longstanding challenges. ChatGPT can provide medical knowledge to individuals, regardless of their educational background in a clear, "to-the-point" format. It can also be implemented in tele-health medicine and ultimately improve patient outcomes. In comparison to Google, ChatGPT can appeal to the masses as being more user-friendly and hassle-free which has stimulated the discussion of it possibly replacing the popular search engine.

However, we must also recognise the challenges associated with such technological advances. Individuals may opt to use these platforms, too eagerly, as its main source of information. It cannot be considered as a replacement for human capability and knowledge, as it is still plagued by the limitations AI faces⁴. There is also the concern of ChatGPT not being updated since September 2021⁵. Hence, it cannot provide any new information on developments that would have occurred in this post-pandemic era. Moreover, ethical considerations in AI must be addressed to ensure trust and transparency for all.

In conclusion, although we are now in a post-pandemic era, its effects are still felt worldwide. In my opinion, the implementation of Chat GPT can contribute a great deal to acquiring simple, factually sound knowledge on a broad topic such as COVID-19. However, it should be used cautiously and not be viewed as a replacement for scientific based evidence and experts' opinions. I hope that with the increasing accessibility and popularity of ChatGPT, it can further cease any remaining misconceptions associated with this historical pandemic and the strategies implemented to overcome it.

Table 1: ChatGPT responses to COVID-19 vaccine questions

Questions	Responses
1) What are the COVID-19 vaccines available?	<p>As of my last knowledge update in September 2021, several COVID-19 vaccines were approved and widely used around the world. Please note that the availability and approval status of vaccines may have changed since then, and new vaccines may have been developed. Some of the vaccines available at that time included:</p> <ol style="list-style-type: none"> Pfizer-BioNTech (Comirnaty): Developed by Pfizer and BioNTech, this mRNA vaccine was one of the first COVID-19 vaccines to receive emergency use authorization and full approval in various countries. Moderna: Similar to the Pfizer-BioNTech vaccine, the Moderna vaccine is an mRNA-based vaccine that was approved for emergency use to combat COVID-19. Johnson & Johnson (Janssen): The J&J vaccine is a viral vector vaccine that uses a harmless adenovirus to deliver a piece of the SARS-CoV-2 virus's genetic material. It received emergency use authorization and full approval in various regions. AstraZeneca-Oxford: Developed by AstraZeneca and the University of Oxford, this viral vector vaccine was approved for use in many countries, but its use was subject to regulatory changes due to concerns about rare blood clotting events. Sinopharm and Sinovac: These are inactivated virus vaccines developed in China and were widely used in various countries. Sputnik V: Developed in Russia, the Sputnik V vaccine is also an adenovirus-based vaccine. Covaxin: An inactivated virus vaccine developed by Bharat Biotech in India. Sinopharm BBIBP-CorV (BBIBP-CorV): Another inactivated virus vaccine developed by Sinopharm, a Chinese state-owned company. Sinovac (CoronaVac): This inactivated virus vaccine was developed by the Chinese company Sinovac. Novavax (NVX-CoV2373): Novavax developed a protein subunit vaccine for COVID-19, which showed promise in clinical trials. Covovax: A protein subunit vaccine developed by Novavax in collaboration with the Serum Institute of India. Bharat Biotech's Nasal Vaccine: In addition to Covaxin, Bharat Biotech was developing a COVID-19 vaccine in nasal drop form.
2) What are the benefits of the COVID-19 vaccine?	<ol style="list-style-type: none"> Protection from COVID-19: The primary benefit of COVID-19 vaccines is that they significantly reduce the risk of contracting COVID-19. While breakthrough infections are possible, they are typically less severe in vaccinated individuals. Reduction in Severity: Vaccination can lower the severity of the disease if you do get infected. This means that even if you get COVID-19 after being vaccinated, you are less likely to experience severe symptoms or require hospitalization. Prevention of Hospitalization and Death: COVID-19 vaccines have proven highly effective in preventing hospitalization and death due to the virus. Vaccination substantially reduces the risk of severe outcomes. Herd Immunity: Widespread vaccination contributes to herd immunity, which protects individuals who cannot receive the vaccine (e.g., due to allergies or medical conditions). Herd immunity reduces the overall spread of the virus in the community. Return to Normalcy: Widespread vaccination allows for a gradual return to pre-pandemic life, including the reopening of businesses, schools, and social activities. Protection of Vulnerable Populations: Vaccination helps protect those who are more susceptible to severe illness, such as the elderly and individuals with underlying health conditions. Economic Recovery: A vaccinated population is crucial for economic recovery, as it enables businesses to operate more safely and reduces the need for pandemic-related restrictions. Reduced Transmission: Vaccinated individuals are less likely to transmit the virus to others, which helps slow the spread of COVID-19 within communities. Global Public Health: Widespread vaccination is a global public health benefit, as it helps prevent the emergence of new variants and reduces the potential for the virus to continue spreading globally. Peace of Mind: Vaccination provides peace of mind for individuals and their families, reducing the fear and anxiety associated with the virus.
3) What are the disadvantages of COVID-19 vaccines?	<ol style="list-style-type: none"> Short-Term Side Effects: Most COVID-19 vaccines can cause short-term side effects, including pain at the injection site, fever, fatigue, headache, and muscle aches. These side effects are usually mild to moderate and resolve within a few days. Allergic Reactions: Although rare, some individuals may experience severe allergic reactions (anaphylaxis) after receiving a COVID-19 vaccine. This risk is highest in people with a history of severe allergic reactions to previous vaccines or their components. Blood Clots: Some COVID-19 vaccines, like the Johnson & Johnson vaccine, have been associated with an increased risk of rare blood clotting disorders. However, the risk of these events is very low, and the benefits of vaccination in preventing COVID-19 far outweigh this risk. Myocarditis and Pericarditis: In some cases, particularly among younger individuals, there have been reports of myocarditis (inflammation of the heart muscle) and pericarditis (inflammation of the lining around the heart) following mRNA COVID-19 vaccines (Pfizer and Moderna). These cases are generally mild and occur at a higher rate in males under 30. Thrombocytopenia: Certain vaccines have been linked to cases of thrombocytopenia, a rare condition involving low blood platelet counts. These cases are also very rare and often associated with specific vaccines like AstraZeneca and Johnson & Johnson.

	<ol style="list-style-type: none"> 6. Pregnancy and Breastfeeding: While the available evidence suggests that COVID-19 vaccines are safe for pregnant and breastfeeding individuals, there may still be concerns and a lack of long-term data in these populations. 7. Vaccine Hesitancy: The fear of potential side effects and misinformation has contributed to vaccine hesitancy, which can slow down the vaccination efforts and hinder the achievement of herd immunity. 8. Vaccine Efficacy: Some COVID-19 variants may be less susceptible to the protection offered by certain vaccines. This could lead to breakthrough infections, although vaccines still tend to provide good protection against severe disease and hospitalization.
4) What are the most popular COVID-19 vaccine myths worldwide?	<ol style="list-style-type: none"> 1. Microchipping: Some people believed that COVID-19 vaccines contained microchips to track individuals. This is not true; vaccines do not contain any tracking devices. 2. Altering DNA: There was a misconception that mRNA vaccines, like the Pfizer-BioNTech and Moderna vaccines, could alter a person's DNA. These vaccines do not change DNA; they work by instructing cells to produce a harmless piece of the spike protein found on the virus's surface. 3. Fertility concerns: False claims arose suggesting that COVID-19 vaccines could impact fertility. Extensive research and real-world data have not shown any evidence of such effects. 4. Quick development equals lack of safety: Some believed that the rapid development of COVID-19 vaccines meant they were unsafe. However, the vaccines went through rigorous clinical trials and were authorized for emergency use based on safety and efficacy data. 5. Natural immunity is better: While it's true that natural infection can provide some immunity, vaccines are designed to provide a more predictable and safer way to achieve immunity without the risks and uncertainties of natural infection. 6. Severe side effects are common: Severe side effects from COVID-19 vaccines are rare. Most people experience only mild to moderate side effects, such as soreness at the injection site, fatigue, or a mild fever. 7. Vaccinated individuals can still spread the virus: While breakthrough infections can occur, vaccinated individuals are generally less likely to transmit the virus to others compared to unvaccinated individuals. 8. Vaccines are not effective: COVID-19 vaccines have proven highly effective at reducing the risk of severe illness, hospitalization, and death. The effectiveness may vary somewhat depending on the specific vaccine and the presence of new variants, but they are still valuable tools in controlling the spread of the virus.

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