Safety and Efficacy of COVID-19 Vaccines Among Patients with Multiple Sclerosis: Letter to Editor

Dear Editor,

Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. SARS-CoV-2 is a member of the RNA family called Coronaviridae, which has swept the world from December 2019 onward.[1] Due to the morbidity, mortality, no definite therapy, and multiple problems that the virus has caused worldwide, most countries have tried to make vaccines with various technologies and methods.[1]

There has been a reluctance among people to receive COVID-19 vaccinations primarily because of inadequate information, especially regarding the requirement for authorization among immunosuppressive treatment recipients. Also, vaccine hesitancy is associated with a number of side effects, including injection site pain, headaches, flu-like symptoms, fever, and fatigue. As a result of COVID-19 vaccination, patients with autoimmune diseases such as arthritis, ankylosing spondylitis, SLE, vasculitis, and Sjogren's disease exhibit weakened immune responses, further complicating the situation.[1]

Multiple Sclerosis (MS) is a chronic autoimmune disorder affecting the central nervous system (CNS), impacting roughly 2.8 million people globally. This disease is characterized by the destruction of myelin sheaths on axons in the CNS, leading to varying degrees of damage to both the myelin and axons as the disease progresses.[1]

Table 1: Meta-analysis studies on safety-efficacy of COVID-19 vaccine in pwMS

First Author (Year)	Number of Studies Included	Aims of the Study	Outcome of the Study
Stefanou *et al*. (2023)[6]	19	Safety of COVID-19 vaccines in MS patients	COVID-19 vaccination does not appear to increase the risk of relapse and serious adverse events in MS
Gombolay *et al*. (2022)[3]	31	Immune responses to SARS-CoV-2 vaccination in MS patients	Antibody responses are decreased in S1PM and anti-CD20; however, cellular responses were positive in most anti-CD20 with decreased T cell responses in S1PM.
Wu *et al*. (2022)[2]	48	Response to COVID-19 vaccination in MS patients on DMTs	routine serological monitoring may be required for pwMS on anti-CD20 and S1PRMs after SARS-CoV-2 vaccination and highlighted the benefits of a booster dose.

In addition to safety and efficacy considerations, people with MS (pwMS) should consider other factors when deciding whether to vaccinate.[2,3] In a meta-analysis,[3] it was found that disease-modifying therapies (DMTs) for MS and vaccine efficacy were nuanced. There is a possibility that different DMTs may affect vaccination immunogenicity differently. It has been demonstrated that patients taking DMT or treatments such as interferons, glatiramer acetate, teriflunomide, natalizumab, or fumarates generally respond positively (positive SARS-CoV-2 antibody) following vaccination.[4] However, some therapies, such as S1PRM and anti-CD20, may adversely affect the vaccine's immunogenicity in pwMS.[3] Considering the specific DMT regimen a patient is undergoing, this finding provides important guidance for tailoring vaccination strategies for pwMS [Table 1].

Vaccine-induced immune responses are influenced differently by these DMTs because of their differing impacts on the immune system, specifically on B-cell functionality, which is critical for vaccination-induced immune responses. The T-cell response has been preserved across all DMTs, but those on treatments such as ocrelizumab are likely to experience increased vaccine-related side effects. Taking into account the type of DMTs MS patients are receiving, these findings emphasize the need for personalized vaccination strategies to optimize vaccine efficacy and safety for pwMS.[2]

In order to protect pwMS who have a weakened immune system against COVID-19, monoclonal antibodies have been of particular interest. This purpose was approved by the FDA in December 2021 as a combination of tixagevimab and cilgavimab, known as Evusheld. It has been shown to be efficacious in reducing the symptoms of COVID-19 infection, although its effectiveness may diminish against variants like Omicron. This was evidenced in a study where the reduction in COVID-19 infection among those treated with pre-exposure prophylaxis (PrEP) versus untreated patients did not achieve statistical significance, suggesting reduced efficacy against Omicron variants.[5]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Omid Mirmosayyeb[1,2], Elham Moases Ghaffary[1], Aram Zabeti[3], Vahid Shaygannejad[1,2]

[1]*Isfahan Neurosciences Research Center, Isfahan University of Medical Sciences, Isfahan, Iran,* [2]*Department of Neurology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran,* [3] *Department Neurology, University of Cincinnati, Cincinnati, OH, USA*

Address for correspondence:
Dr. Omid Mirmosayyeb, Isfahan Neurosciences Research Center, Isfahan University of Medical Sciences, Isfahan, Iran; Department of Neurology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.
E-mail: omid.mirmosayyeb@gmail.com

Received: 05 Jan 24 **Accepted:** 01 Apr 24
Published: 28 Sep 24

References

1. Mirmosayyeb O, Ghaffary E, Vaheb S, Pourkazemi R, Shaygannejad V. Multiple sclerosis (MS) and neuromyelitis optica spectrum disorder (NMOSD) following COVID-19 vaccines: A systematic review. Rev Neurol (Paris) 2023;179:265-81.
2. Wu X, Wang L, Shen L, Tang K. Response of COVID-19 vaccination in multiple sclerosis patients following disease-modifying therapies: A meta-analysis. EBioMedicine 2022;81:104102.
3. Gombolay GY, Dutt M, Tyor W. Immune responses to SARS-CoV-2 vaccination in multiple sclerosis: A systematic review/meta-analysis. Ann Clin Transl Neurol 2022;9:1321-31.
4. Jaber A, Patel M, Sylvester A, Yarussi M, Kalina JT, Mendoza JP, *et al.* COVID-19 vaccine response in people with multiple sclerosis treated with dimethyl fumarate, diroximel fumarate, natalizumab, ocrelizumab, or interferon beta therapy. Neurol Ther 2023;12:687-700.
5. Elias LB, Jaber A, Manzano M, Leekoff M, Sylvester A, Tremblay MA. Real-world efficacy of COVID-19 pre-exposure prophylaxis with tixagevimab/cilgavimab in people with multiple sclerosis. Vaccines (Basel) 2023;11:1855.
6. Stefanou MI, Palaiodimou L, Theodorou A, Christodoulou MV, Tzartos JS, Tzanetakos D, *et al.* Safety of COVID-19 vaccines in multiple sclerosis: A systematic review and meta-analysis. Mult Scler 2023;29:585-94.

Access this article online

Quick Response Code:

Website: www.ijpvmjournal.net/www.ijpm.ir

DOI: 10.4103/ijpvm.ijpvm_11_24

How to cite this article: Mirmosayyeb O, Ghaffary EM, Zabeti A, Shaygannejad V. Safety and efficacy of COVID-19 vaccines among patients with multiple sclerosis: Letter to editor. Int J Prev Med 2024;15:45.