

Assessment of COVID-19 vaccine attitude in people with multiple sclerosis, its correlation with demographic factors, and fear of coronavirus: A cross-sectional survey

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Keywords

COVID-19; Multiple Sclerosis; Fear; Attitude; Vaccine; Trust

Abstract

Background: Despite special global considerations which have been made to prioritize vaccination of people with multiple sclerosis (MS), some are reluctant to get vaccinated. This study was aimed to evaluate the attitude toward coronavirus disease-2019 (COVID-19) vaccine and its probable correlations.

Methods: Considering the study objectives, two valid questionnaires including Fear of COVID-19 Scale (FCV-19S) and attitude questionnaires were administered pre and post COVID-19 vaccination among people with MS.

Results: The questionnaires were administered among 349 people with MS pre and post vaccination.

The mean age of participants was 38.78 ± 8.68 (range: 19 to 64) years. They all received the first dose of COVID-19 vaccine (Sinopharm). Although about 90% of participants felt satisfied after getting vaccinated and respected the preventive actions like social distancing and wearing face mask after vaccination, about 40% of them did not recommend vaccination to other patients. None of the demographic data was predictor of attitude score in COVID-19 vaccine and the only effective factor regarding fear of COVID-19 among people with MS was gender ($P = 0.001$).

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It was found that the more a patient's fear score was, the more he/she felt satisfied after vaccination. Those patients who had got the influenza vaccine last year felt more satisfied with the vaccine and accepted the COVID-19 vaccine easier than others.

Conclusion: This study revealed that there was an inverse correlation between fear of coronavirus and less trust in the vaccine in patients with MS. However, it should be mentioned that the patients felt more satisfied after COVID-19 vaccination.

Introduction

Although the coronavirus disease-2019 (COVID-19) pandemic affected all populations,¹ patients with underlying diseases like MS were at a higher risk for getting infected due to the nature of their treatment methods.² Recent publications in this regard demonstrated the mortality rate and possible consequences in people with multiple sclerosis (MS) on different disease modifying therapies (DMTs) which expose these patients to be at risk of COVID-19 infection.^{3,4}

Although the incidence of COVID-19 in patients with MS is not more than general population, their rate of hospitalization in Iran was more than what was expected to be.⁵ As preventing the different effects of COVID-19 on these patients is important, in other countries,⁶ vaccination was prioritized for this group and started in late April 2021.

Feeling of fear among patients with MS as a psychological emotion is a common sense; it can be started as soon as the disease is diagnosed.⁷ Further, it can be indicated during the treatment process⁸ or it can be demonstrated as the fear of progressing the disease and in general, fear of the future.⁹ During this critical pandemic, fear of COVID-19, as a psychological consequence, became a trend.¹⁰⁻¹²

The vaccination process in these threatening situations can be a turning point in this regard. Thus, patients with MS may experience a kind of fear before getting vaccinated. In fact, they seem to have many doubts about vaccination and its side effects and effectiveness. Many patients with MS are afraid their symptoms may get worsen. The possibility of relapse is also a common concern in this group of patients.¹³

On the other hand, although vaccination is recommended in patients with MS in advance, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccine hesitancy as a complicated public health issue is a new concern among them.^{14,15} Several recent studies have been

published in this regard.¹⁶ Despite the availability of vaccines, people are doubtful of getting vaccinated. Perhaps the most important reason for this is the fear of vaccine side effects.¹⁴

In studies on the vaccination of patients with MS, the findings indicated that the willingness of patients to receive the injection was inconsistent. While in some studies, the results showed that patients with MS were more inclined to get vaccinated, a percentage of patients were also skeptical about being vaccinated.¹⁷ Even those who have received the vaccine still do not have full confidence in its safety and effectiveness.

The aim of this study was to measure the post COVID-19 vaccine attitude among patients with MS and its correlation with relevant demographic factors and the fear of coronavirus. This would be one of the most challenging topics in this community during COVID-19 pandemic era.

Materials and Methods

We have conducted a cross-sectional study in Multiple Sclerosis Research Center, Sina Hospital, Tehran, Iran, a referral center for diagnosis and care of people with MS, in May 2021.

About five hundred patients with MS were called to get vaccinated by Iranian MS Association each week. Within two weeks, 621 patients with MS were vaccinated. All of the patients were asked to cooperate in answering the questions pre and post vaccination. Eventually, three hundred and forty-nine participants who were candidate for getting the first dose of vaccine filled both questionnaires before and after vaccination.

Inclusion criteria were age over 18, absolute diagnosis of MS based on 2017 McDonald criteria without alexia and agraphia (those who had the ability to read and write), and consent for participation. They all got vaccinated with the BBIBP-CorV, Sinopharm COVID-19 vaccine, which was approved for outside of China.¹⁸

The study aims and steps were explained for participants, and after they signed the written consent forms, they were recruited in the study. Before the injection, they were given the Fear of COVID-19 Scale (FCV-19S) questionnaire and in the monitoring phase after injection, they were asked to feel the attitude form.

The FCV-19S questionnaire is a tool recently developed and validated by Ahorsu *et al.*, which measures the fear of COVID-19.¹⁹ It is a seven-point scale in which the participants indicate their level of agreement with the statements using a five-item

Likert-type scale. Answers included “strongly disagree”, “disagree”, “neither agree nor disagree”, “agree”, and “strongly agree”. The minimum score possible for each question is 1, and the maximum is 5.

Its sum of scores (7 to 35) indicates the level of fear of COVID-19; the higher the score of this questionnaire is, the more afraid the patients are of COVID-19.

We also developed a pilot attitude form as a research base questionnaire which was filled by two patients with MS, and after the preliminary edition, it was reviewed by four MS experts and one epidemiologist. It contains questions related to COVID-19 vaccine, attitude toward the vaccine, observance of hygienic principles and social distance after vaccination, effectiveness of the vaccine, and if they recommend vaccine to others after getting vaccinated (Table 1).

Table 1. Findings of the attitude form questionnaire

Questions	Answers [n (%)]
Do you feel satisfied with the vaccine?	
Strongly disagree	1 (0.3)
Disagree	1 (0.3)
No difference	37 (10.6)
Agree	155 (44.4)
Strongly agree	155 (44.4)
Do you think that vaccine prevents corona?	
Strongly disagree	4 (1.1)
Disagree	7 (2.0)
No difference	129 (37.0)
Agree	134 (38.4)
Strongly agree	75 (21.5)
Do you think you have to wear a mask after vaccination?	
Strongly disagree	1 (0.3)
Disagree	1 (0.3)
No difference	13 (3.7)
Agree	101 (28.9)
Strongly agree	233 (66.8)
Do you think you have to observe social distance after vaccination?	
Strongly disagree	0 (0)
Disagree	4 (1.1)
No difference	11 (3.2)
Agree	85 (24.4)
Strongly agree	249 (71.3)
Do you recommend vaccination to other people with MS?	
Strongly disagree	0 (0)
Disagree	0 (0)
No difference	25 (7.2)
Agree	77 (22.1)
Strongly agree	247 (70.8)
Did you inject influenza vaccine last year?	
Yes	26 (7.4)
No	323 (92.6)

MS: Multiple sclerosis

It has five items and each item scores on a range of 1-5 (maximum total possible score would be 25); the more score summation demonstrates the higher level of COVID-19 vaccine acceptance. All vaccinated patients with MS were finally asked if they had received the influenza vaccine last year or not.

After all, the gathered data were analyzed by SPSS software (version 26, IBM Corporation, Armonk, NY, USA). Mann-Whitney, chi-square, and Spearman correlations were the utilized statistical tests. P-values less than 0.05 were considered significant.

The study protocol was approved by the Ethics Committee of Tehran University of Medical Sciences (ethical code: IR.TUMS.NI.REC.1400.012).

Results

A total of 349 participants were included in this study. The response rate in this cross-sectional study was 56.2%. The mean age and years of disease diagnosis were 38.78 ± 8.68 (within the range of 19 to 64) and 8.96 ± 6.08 years, respectively. They all got the first dose of COVID-19 vaccine. More than half of participants were women (F/M = 3.53). The largest percentage of medication was for interferons and rituximab and majority of patients had relapsing-remitting MS (RRMS) (n = 146, 41.8%), followed by secondary-progressive MS (SPMS) (n = 17, 4.9%), primary-progressive MS (PPMS) (n = 2, 0.6%), and clinically isolated syndrome (CIS) (n = 2, 0.6%). These relevant demographic data are presented in table 2.

Table 1 presents the answers of patients with MS to the developed questionnaire about vaccine attitude.

The mean acceptance score was 22.00 ± 2.18 (range: 14 to 25). There was not any significant correlation between this score and relevant demographic data.

It was revealed that although most of the participants felt satisfied after getting vaccinated, many of them felt skeptical about the preventive properties of the vaccine (> 35% of participants). Female participants reported higher fear of getting coronavirus (Table 3). In general, there was a significant difference in total fear score of getting coronavirus between genders; women’s total score of fear was significantly more than men (P = 0.001). There was no correlation between duration of disease or type of MS (progressive vs. relapsing remitting) and total fear score (P = 0.091 and P = 0.900, respectively).

Table 2. Basic and demographic characteristics

Variables	n (%)
Sex (total = 349)	
Men	77 (22.1)
Women	272 (77.9)
Type of MS (valid = 167)	
RR	146 (87.4)
SP	17 (10.2)
PP	2 (1.2)
CIS	2 (1.2)
Type of medication	
Interferons	92 (26.4)
Interferon beta-1a (IM)	55 (15.8)
Interferon beta-1a (SC)	28 (8.0)
Interferon beta-1b	9 (2.6)
Rituximab	80 (22.9)
DMF	44 (12.5)
Fingolimod	31 (8.9)
GA	24 (6.9)
Teriflunomide	15 (4.3)
Ocrelizumab	13 (3.7)
Tysabri	12 (3.4)
Azaram	4 (1.1)
Novantron	1 (0.3)
IVIg	1 (0.3)
No medication at the time of study	32 (9.2)

MS: Multiple sclerosis; RR: Relapsing remitting; PP: Primary progressive; SP: Secondary progressive; CIS: Clinically isolated syndrome; DMF: Dimethyl fumarate; GA: Glatiramer acetate; IVIg: Intravenous immunoglobulin; IM: Intramuscular; SC: Subcutaneously

Spearman correlation analysis indicated that patients who were more afraid of COVID-19 respected social distancing rules more ($P = 0.011$); however, they less believed in preventive effect of vaccination ($P = 0.019$), especially those who were afraid of dying from the coronavirus ($P = 0.002$). They also felt more anxious and nervous when they were exposed to news and stories about coronavirus on TV or on social media ($P = 0.013$).

Table 3. Descriptive statistics of fear in each gender

Gender	Number	Min	Max	Mean \pm SD
Total	349	7	35	17.89 \pm 6.73
Women	272	7	35	18.45 \pm 6.65
Men	77	7	35	15.90 \pm 6.66

SD: Standard deviation

Chi-square analysis indicated that patients who were feeling damp and cold in their hands whenever they were thinking about coronavirus were much more satisfied with the vaccine after getting vaccinated ($P = 0.004$) compared to other patients.

Mann-Whitney test demonstrated that those patients with MS who were injected for the influenza vaccine last year had significantly higher score in acceptance of COVID-19 vaccine ($P = 0.036$). And, with respect to spearman correlation analysis, they believed in wearing mask and respecting social distancing rules more than others, even after vaccination ($P = 0.012$, $r = 0.13$).

Discussion

With the spread of different types of corona vaccines in the world, many studies have been done on the acceptance of these vaccines among general population.²⁰

The low response rate was probably due to the opinion of these patients¹³ about being infected with COVID-19 and being away from the hospital as an infected site. Therefore, they did not want to spend more time in such a place and despite the fact that the vaccination center followed health protocols, these patients wanted to go away as soon as possible. Another issue is the general tendency for vaccination in these patients which was estimated about 66 percent in the previous survey in Iran.²¹

An interesting finding in this survey demonstrated that patients with MS who were more afraid of getting COVID-19 showed more significant respect to social distancing and mask wearing rules (95.7%); however, a large number of them (37.0%) had no idea of the effectiveness of the vaccine. This result was expected according to pre-vaccination studies in this group of patients. For example, in a similar study, 30.0% of patients with MS were reluctant and unwilling to be vaccinated.¹⁷ This multifactorial result²² can be related to insufficient knowledge of some patients with MS on one hand, and the matter of distrust in science or medical system²³ and vaccine or society, on the other hand.²⁴

As far as the authors are concerned, this is the first study evaluating the attitude toward and trust in COVID-19 vaccine as well as its correlation with MS patients' fear of getting coronavirus and their relevant demographic data. In other words, the challenge is about how effective patients with MS think the vaccine is.

There has always been a lot of discussion about MS and vaccination; even some studies have considered MS as a side effect of vaccination.^{25,26} Naturally, this issue continues to challenge patients with MS and researchers working on the COVID-19 vaccine.

In this study, more than 88 percent of patients with MS who were injected by the Sinopharm vaccine felt satisfied with it. However, the results of previous pre-vaccination studies indicated a lower rate; for example, Moniz et al. reported 48.9% willingness before vaccination.²⁷ Perhaps after a long time without vaccine and the increase in the mortality day by day along with changes in the psychological status of patients like feeling afraid of getting coronavirus infection in patients with MS,^{28,29} facing with vaccine as a global solution could have increased their satisfaction. Due to the limitation in the number of patients who could be vaccinated, those being candidate for the vaccine were much more inclined to get vaccinated.

Although vaccine skepticism and current government distrust as silent reasons have been discussed in many studies among general population,^{30,31} these factors could be considered as confounding factors in results. In fact, they can be considered as confounding bias which are not related to the aims of this survey. Another issue in this study which was due to our limitation was the participants' level of education and their awareness of COVID-19 which have been discussed in other studies more. Most of those studies agreed that education had a significant relationship with the level of awareness.^{12,27,32}

Most of the participants (92.9%) in this study claimed that they would recommend COVID-19 vaccination to other patients. This result testifies to the good knowledge of patients with MS in Iran about the current situation and the need to follow health protocols, which is in line with the result obtained from a recent online survey in Iran.^{33,34} About 11.4% of valid data in this study were associated with progressive MS and most of patients had RRMS. Contrary to some studies which considered the progression of MS as a predictor of higher sense of fear in coronavirus,²⁷ in this study, no significant association was found between fear of COVID-19 infection in patients with MS and the progression of MS ($P = 0.091$). Further studies with larger sample sizes in the future can be conclusive in this regard.

According to the results, in patients with MS, fear of getting COVID-19 in women was

significantly more than men. In a current study in Iran, Ramezani et al. did not find significant differences in level of fear of COVID-19 and anxiety between genders.¹¹ However, in another similar study on general population, Broche-Perez et al. found a significant difference between genders regarding fear of COVID-19; women, in their study, had about three times higher fear score than men.³⁵

Therefore, it seems necessary for researchers in the field of MS to investigate the factors that cause patients to be hesitant about receiving vaccine, and to increase patients' awareness in this regard to address their concerns.

Despite the overlap of influenza and COVID-19 epidemics which has made a new concern in public health,³⁶ only 7.4% of patients with MS in this study had received the influenza vaccine. It is true that the relationship between these two vaccines has been investigated in terms of factors like age, confidence, complacency, and collective responsibility.³⁷ The present study found that influenza-vaccinated patients with MS were much happier with the COVID-19 vaccine.

Conclusion

It was found for the first time that although patients with MS who were more afraid of coronavirus had less trust in the preventive properties of the vaccines, they felt more satisfied after COVID-19 vaccination. On the other hand, those who had got the influenza vaccine last year, had significantly higher score in COVID-19 vaccine acceptance compared to other patients with MS.

Conflict of Interests

The authors declare no conflict of interest in this study.

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