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Commentary

Knowledge regarding COVID-19 pandemic in patients with multiple sclerosis (MS): A report from Iran

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1. Background

In December 2019, a novel coronavirus was introduced, causing viral pneumonia and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Wang et al., 2020). The outbreak spread from China to 24 other countries within a few weeks (Johns Hopkins CSSE Wc-ngcO 2020).

In Iran, the first COVID-19 related death was announced on Feb 19, 2020 (Takian et al., 2020). The incidence of the disease is high in Iran (4.6 per 1000,000) (Lai et al., 2020). Since Iran is one of the countries with a high prevalence of COVID-19, people's knowledge and attitude play important roles in preventing the disease. The issue is even more prominent for patients who receive immunomodulatory or immunosuppressive agents, like for MS patients. MS patients use disease-modifying therapies (DMTs) to control relapses and to decrease the progression of the disease (Azimi et al., 2019; Azimi et al., 2020), which predisposes them to the increased risk of infections (Wijnands et al., 2018).

Due to the importance of considering safety tips among MS patients, we designed this study to assess the knowledge of MS patients regarding the COVID-19 pandemic in Iran.

2. Methods

This cross-sectional study was conducted in the MS clinic of Tehran University of Medical Sciences in March 2020.

Inclusion criteria were age greater than 18, definite MS diagnosis based on 2017 McDonald criteria, and the ability to fill online forms (having access to social media).

The patients were firstly asked for their consent before starting the questions.

We developed a google form including basic demographic questions (age, sex, type of MS, duration of the disease, occupation, type of medication, and educational level) and questions specifically related to

COVID-19, asking about quarantine rules, countries, symptoms, prevention strategies, risk of infection in children, Iran situation compared to other infected countries, and the individual's role in preventing the disease.

Patients were grouped based on age (≤ 30 or ≥ 30) and educational level (academic versus non-academic). Data was presented as Mean \pm SD for continuous variables and as frequencies for categorical variables. The chi-square test was used for comparison between qualitative variables.

3. Results

Within three days, 233 filled forms were gathered. The mean age and years of education were 34.2 ± 8 and 13.3 ± 4.8 years, respectively. One hundred and eighty forms belonged to females (F/M = 3.3). The most common medication used was rituximab (Table 1).

Ninety percent knew that COVID-19 is in a pandemic stage, and 73% followed quarantine guidelines completely. All participants believed that the virus has a high person-to-person transmission rate (Table 2).

The answers to the questionnaire did not show significant differences comparing sex, age (≤ 30 or ≥ 30), or educational level (≤ 12 or ≥ 12 years) of the respondents. But the difference was significant between relapsing-remitting and progressive MS patients regarding the extent to which they follow quarantine guidelines. Most patients with relapsing-remitting form of the disease followed quarantine rules completely, while one patient with progressive form did not follow the rules at all (Table 3).

4. Discussion

According to our results, 90% of the enrolled patients were aware of the severity of the disease (the pandemic stage) and the protective role of gloves and masks. This level of awareness might be due to the

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Table 1
Basic characteristics of the patients.

Variables	
Age (mean ± SD)(year)	34.2 ± 8
Sex	
Male	53(22.7%)
Female	180(77.3%)
Type of MS	
RR	168(72.1%)
Progressive (PP and SP)	65(27.9%)
Duration of the disease (mean ± SD) (year)	7.4 ± 5
Education (mean ± SD) (year)	13.3 ± 4.8
Occupation	
Employed	135(57.9%)
Unemployed	98(42.1%)
Type of Medication	
INF	69(29.6%)
GA	24(10.3%)
Fingolimod	24(10.3%)
Triflunomid	1(0.4%)
Tysabri	1(0.4%)
Rituximab	83(35.6%)
DMF	20(8.6%)
Ocrelizumab	2(0.9%)
No medication at the time of study	9(3.9%)

PP: Primary progressive; SP: Secondary progressive.

Table 2
Findings of the questionnaire.

At which phase do you think the COVID-19 is currently?	
Epidemic	18 (7.7%)
Endemic	5 (2.1%)
Pandemic	210 (90.1%)
Can gloves and masks still protect people from coronavirus?	
Yes	209 (89.7%)
No	24 (10.3%)
How much do you follow quarantine guidelines?	
Completely	170 (73%)
Almost	62 (26.6%)
Never	1 (0.4%)
Do you think travel restrictions can prevent coronavirus?	
Yes	231 (99.1%)
No	2 (0.9%)
Do you think Iran is among severely affected countries?	
Yes	223 (95.7%)
No	10 (4.3%)
Do you think borders closure is helpful to prevent the disease?	
Yes	228 (97.9%)
No	5 (2.1%)
Do you think shutting down crowded places like museums and shopping malls is helpful?	
Yes	223 (100%)
No	
Can kids catch COVID-19?	
Yes	201 (86.3%)
No	32 (13.7%)
Do all affected people have severe symptoms like continuous cough or high fever?	
Yes	46 (19.7%)
No	187 (80.3%)
Do you think ignoring quarantine guidelines can contribute to the outbreak of the disease?	
Yes	230 (98.7%)
No	3 (1.3%)
Does Coronavirus have a high person-to-person transmission rate?	
Yes	
No	233 (100%)
How effective do you think is your role in preventing the spread of the virus?	
A little	19(8.2%)
Moderately	65(27.9%)
A lot	149(63.9%)

Table 3
Comparison between relapsing-remitting and progressive groups.

	RR form	Progressive form	P value
How much do you follow quarantine guidelines?			
Completely	132(78.6%)	38(58.5%)	0.004
Almost	36(21.4%)	26(40%)	
Never	0	1(1.5%)	

notifications from social media, such as the MS society Telegram channel and website, through which physicians inform their patients daily about prevention rules and disease control strategies.

We also found that although all individuals knew about high person-to-person transmission rate of the infection, 73% followed quarantine rules completely. Immunomodulatory or immunosuppressive agents that are used by MS cases, expose them to a higher risk of infection, so it is crucial for them to carefully follow quarantine rules (Wijnands et al., 2018).

Implementing preventive strategies is an important factor to control COVID-19 spread. A high-level quarantine is recommended in this health security emergency (Yoo and Hong, 2020). Quarantine is an old method of controlling a communicable disease outbreak, successfully used for the SARS epidemic in 2003 (Goh et al., 2006). Currently, quarantine is mandatory in most countries and people are asked to follow the guidelines. It is more essential for high-risk groups such as elderly, individuals with underlying diseases, and children.

All the respondents believed that closing crowded places, such as museums, is effective and 97% thought borders closure is helpful.

No significant differences were found between age, sex, and educational level groups. However, comparing MS patients with the relapsing-remitting form (RRMS) of the disease and those with progressive form, RRMSs took quarantine rules more seriously.

Patients with progressive MS have more disability rates, so it would be more exhausting for them to stay at home for a long time. They also need more health care, which may require visiting health professionals or referring to a hospital. Patients with progressive MS are more depressed and are less socially active (Solaro et al., 2016), while for RRMS patients, it is important to stay active and return to normal life. So, RRMS patients follow quarantine rules more carefully.

5. Conclusion

Patients with MS have a good understanding of the COVID-19 stage, while about one-third do not follow quarantine rules completely.

6. Protocol approval

The project protocol has been confirmed with "IR.TUMS.VCR.REC.1399.145" ethic code, in ethical committee of Tehran University of medical sciences.

Author contribution

Mohammad Ali Sahraian: Drafting the manuscript and approving the final format of the manuscript.

Abdorrezza Naser Moghadasi: Hypothesis, Supervision, Data collection, drafting the manuscript and approving the final format of the manuscript.

Mohammad Reza Gheini: Drafting the manuscript and approving the final format of the manuscript.

Mahsa Ghajarzadeh: Data analysis, Data collection, drafting the manuscript and approving the final format of the manuscript.

Nasim Rezaeimanesh: Drafting the manuscript and approving the final format of the manuscript.

Declaration of Competing Interest

The authors declare no conflict of interest.

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References

- Azimi, A., Ghajarzadeh, M., Sahraian, M.A., Mohammadifar, M., Roostaei, B., Samani, S.M.V., et al., 2019. Effects of vitamin D supplements on IL-10 and INF gamma levels in patients with multiple sclerosis: a systematic review and meta-analysis. *Maedica* 14 (4), 413–417.
- Azimi, A., Hanaei, S., Sahraian, M.A., Mohammadifar, M., Ramagopalan, S.V., Ghajarzadeh, M., 2020. Incidence of seroconversion and sero-reversion in patients with multiple sclerosis (MS) who had been treated with natalizumab: a systematic review and meta-analysis. *J. Clin. Neurosci.* 71, 129–134.
- Goh, K.-T., Cutter, J., Heng, B.-H., Ma, S., Koh, B.K., Kwok, C., et al., 2006. Epidemiology and control of SARS in Singapore. *Annals-Academy of Medicine Singapore* 35 (5), 301.
- Johns Hopkins CSSE Wc-ngco, <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/d>, 2020. bfbefAJ.
- Lai, C.-C., Wang, C.-Y., Wang, Y.-H., Hsueh, S.-C., Ko, W.-C., Hsueh, P.-R., 2020. Global epidemiology of coronavirus disease 2019: disease incidence, daily cumulative index, mortality, and their association with country healthcare resources and economic status. *Int. J. Antimicrob. Agents*, 105946.
- Solaro, C., Trabucco, E., Signori, A., Martinelli, V., Radaelli, M., Centonze, D., et al., 2016. Depressive symptoms correlate with disability and disease course in multiple sclerosis patients: an Italian multi-center study using the beck depression inventory. *PLoS ONE* 11 (9), e0160261.
- Takian, A., Raoofi, A., Kazempour-Ardebili, S., 2020. COVID-19 battle during the toughest sanctions against Iran. *Lancet* 395 (10229), 1035.
- Wang, L.S., Wang, Y.R., Ye, D.W., Liu, Q.Q., 2020. A review of the 2019 Novel Coronavirus (COVID-19) based on current evidence. *Int. J. Antimicrob. Agents*, 105948.
- Wijnands, J.M.A., Zhu, F., Kingwell, E., Fisk, J.D., Evans, C., Marrie, R.A., et al., 2018. Disease-modifying drugs for multiple sclerosis and infection risk: a cohort study. *J. Neurol., Neurosurg. Psychiatry* 89 (10), 1050–1056.
- Yoo, J.-H., Hong, S.-T., 2020. The outbreak cases with the novel coronavirus suggest upgraded quarantine and isolation in Korea. *J. Korean Med. Sci.* 35 (5).