

Impact of COVID-19 on Health Status and Management of Patients with CNS Demyelinating Diseases: A Single-Center Study

Kamonchanok Aueaphatthanawong, B.Sc., Onpawee Sangsai, M.Sc.

Siriraj Neuroimmunology Center, Division of Neurology, Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.

ABSTRACT

Objective: Study the effects of COVID-19 on health status and alterations in managing patients with CNS-IDDs.

Materials and Methods: A questionnaire-based approach was commenced at the MS and Related Disorders Clinic at Siriraj Hospital in Thailand from March 2021 to December 2021. The data obtained from the questionnaire was subjected to statistical analysis.

Results: The study comprised 92 patients with CNS-IDDs, with 72.8% female and a mean age of 44.6 ± 14.0 years. Overall, 67.4% of patients were vaccinated following Thai National guidelines. Only two patients were confirmed to have contracted COVID-19 infection. The most common treatment administered in the 92 CNS-IDD patients was Azathioprine (39.1%), prednisolone (32.6%), then 14.1% each in MMF and Rituximab. Sixty-one patients (66.3%) reported no relapse in the past year and no statistically significant difference among the diseases. The mean self-rated quality of life (QoL) score was 8.0 ± 1.9 before the COVID-19 pandemic then drastically decreasing to 5.4 ± 2.4 during the pandemic period. Overall, 56.5% indicated at least some impact on physical well-being, and 69.6% reported challenges to psychological health. 16.3% postponed or canceled their appointments during the COVID-19 pandemic, and 8.3% transitioned from face-to-face meetings with doctors in the clinic to telemedicine or telephone follow-up.

Conclusion: Our study revealed that patients with CNS-IDDs experienced no significant change in relapse and a low incidence of COVID-19 infection. During the pandemic, overall, patients' QoL decreased both physically and psychologically.

Keywords: Covid-19; questionnaire; CNS demyelinating diseases; quality of life; impact of the COVID-19 (Siriraj Med J 2024; 76: 152-159)

INTRODUCTION

The coronavirus disease (COVID-19) outbreak, triggered by severe acute respiratory coronavirus 2 (SARS-CoV-2) was identified in 2019.¹ Its clinical manifestations vary from asymptomatic cases to severe symptoms and even death. Older age and coexisting medical conditions like diabetes, hypertension, and cardiovascular disease are poor prognostic factors and independent predictors of COVID-19-related mortality.²

Besides respiratory symptoms, various neurological symptoms have been documented, including headaches, dizziness, encephalopathy, unconsciousness, stroke, convulsions, neuropathy-like inflammation, and altered taste or smell. While the likelihood of COVID-19 infection is not higher in individuals with Multiple Sclerosis (MS) than in the general population, certain factors increase the risk of a severe COVID-19 infection, such as steroid use, specific disease-modifying therapies, older age, and

Corresponding author: Onpawee Sangsai

E-mail: Onpawee.san@mahidol.ac.th

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ORCID ID: <http://orcid.org/0009-0001-0870-0285>

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severe disabilities. Like other viral infections, COVID-19 can exacerbate immune-mediated diseases. During the COVID-19 pandemic, physicians had to consider various aspects of care of patients with CNS demyelinating diseases (CNS-IDDs), and this was not limited to only the impact of COVID-19 on patients but also changes in care practices, monitoring, and management protocols, addressing psychological and social effects, and providing guidance on COVID-19 vaccinations in these patients. While many studies have reported on this issue, most are limited to Asia. In the context of the COVID-19 pandemic, vaccines were paramount for MS patients. Israel stood out as a country with a high vaccination rate, with 91.2% of the population receiving the BNT162b2 COVID-19 vaccine during the pandemic.³ Achiron et al. demonstrated the safety of the COVID-19 BNT162b2 vaccine in MS patients without increasing the risk of relapse activity.⁴ Another study also confirmed the safe use of the COVID-19 BNT162b2 vaccine and its efficacy against COVID-19 in MS patients.⁵ Globally, the Multiple Sclerosis Society recommends all patients with MS be vaccinated against COVID-19. However, reports on the impact of COVID-19 in patients with Neuromyelitis optic spectrum disorders (NMOSD) are scarce.⁶ This study aims to investigate the impact of the COVID-19 pandemic on patients' quality of life (QoL) through easy, self-rated patient assessments among Thais with CNS-IDDs in a single center.

MATERIALS AND METHODS

Study design

We conducted a questionnaire survey among patients with CNS-IDDs who attended the Multiple Sclerosis and Related Disorders Clinic at Siriraj Hospital, Mahidol University, Thailand, between March and December 2021.

Our inclusion criteria were patients who (1) were aged 18 or older, (2) had undergone serum AQP4-antibody testing at least once, and (3) had a follow-up period of at least 6 months. We excluded patients with incomplete information or communication problems that hindered their ability to respond to the questionnaire. We recorded demographic data, including age, gender, diagnosis, attack history, and disability, measured by the Extended Disability Status Scale (EDSS) score at screening.⁷ During follow-up visits, patients engaged in a self-rating survey using the questionnaire to evaluate their QoL. In instances of doubt, the research assistant provided clarification and assistance in questionnaire comprehension for those who required it. We then analyzed the data accordingly.

Statistical analysis

This study analyzed data using descriptive statistics for social science research of baseline characteristics. Data was analyzed using PASW Statistics for Windows version 18.0 (SPSS Inc., Chicago, IL, USA). Frequency and percentages were calculated, along with the mean standard for the level of satisfaction, the standard deviation for measuring the data distribution, and organizing data presentation in a tabular or chart format. A P-value of less than 0.05 indicated statistically significant.

RESULTS

Demographic data

Of the 97 patients who attended the clinic during the study period, five were excluded due to other diagnoses than CNS-IDDs; two had other specified inflammatory diseases (CNS vasculitis), one had another established inflammatory disease (Hashimoto encephalopathy), one had Cyclic Vomiting Syndrome, and the last one had IgG-4 Related disorder. Among the 92 remaining patients, 40 (43.5%) had NMOSD (of which 36 were AQP4-positive), 27 had MS (29.3%), comprising 26 RRMS and 1 SPMS, 9 (9.8%) had Myelin oligodendrocyte glycoprotein antibody disorders (MOGAD), and 16 (20.7%) had other CNS-IDDs, including five with isolated Transverse myelitis (TM) (2 single TM, and 3 recurrent TM), five with isolated Optic neuritis (ON) (3 recurrent ON and 2 single ON), four with brainstem syndrome, and two with Tumefactive MS. We diagnosed CNS-IDDs based on current international diagnosis criteria (MS⁸, NMOSD⁹, MOGAD¹⁰, Isolated TM¹¹, Isolated ON¹², and Tumefactive¹³ (Fig 1).

There were 67 females (72.8%) and 25 males (27.2%). There were statistically significant differences ($P < 0.05$) in gender and age, with a mean age of 44.6 ± 14.0 years. When categorized by age group, the highest prevalence was observed among individuals aged between 21-40 and 41-60 years (Fig 2).

Most patients had a Bachelor's Degree in Education (40.2%). The average EDSS score was 1.2 ± 1.4 . Totally 22 patients (23.9%) reported depression, anxiety, or insomnia at least once in the last 6 months. There was equal distribution of these psychological well-being regardless of their specific disease (29.6% for MS, 25% for NMOSD, 11.1% for MOGAD, and 18.8% for other CNS-IDDs; $p = 0.46$). Most patients (67.4%) were vaccinated following Thai National guidelines.¹⁴ Of the total 92 patients, 19 (20.7%) with CNS-IDDs were tested for SAR-CoV2 during the study period, and only two MS (2.2%) were positive with mild symptoms. Both individuals successfully recovered, and no MS attacks were observed during their COVID-19 infection period (Table 1).

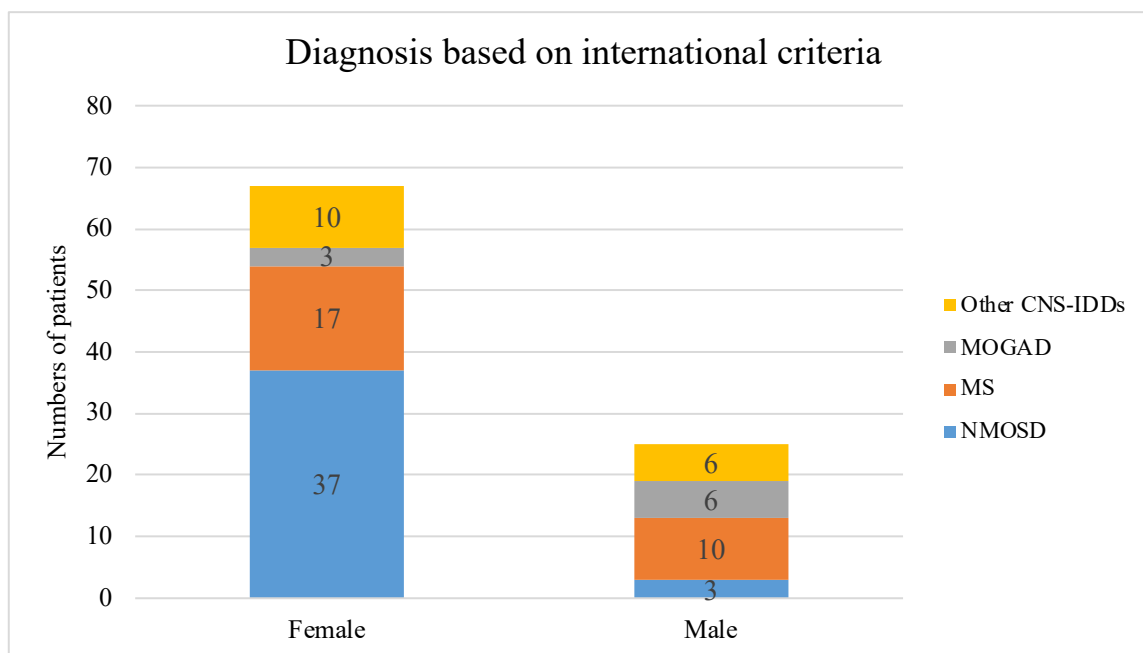


Fig 1. Distribution of CNS demyelinating diseases.

Abbreviation: NMOSD, neuromyelitis optica spectrum disorders; MS, Multiple sclerosis; MOG, MOG-IgG-Associated Disorders

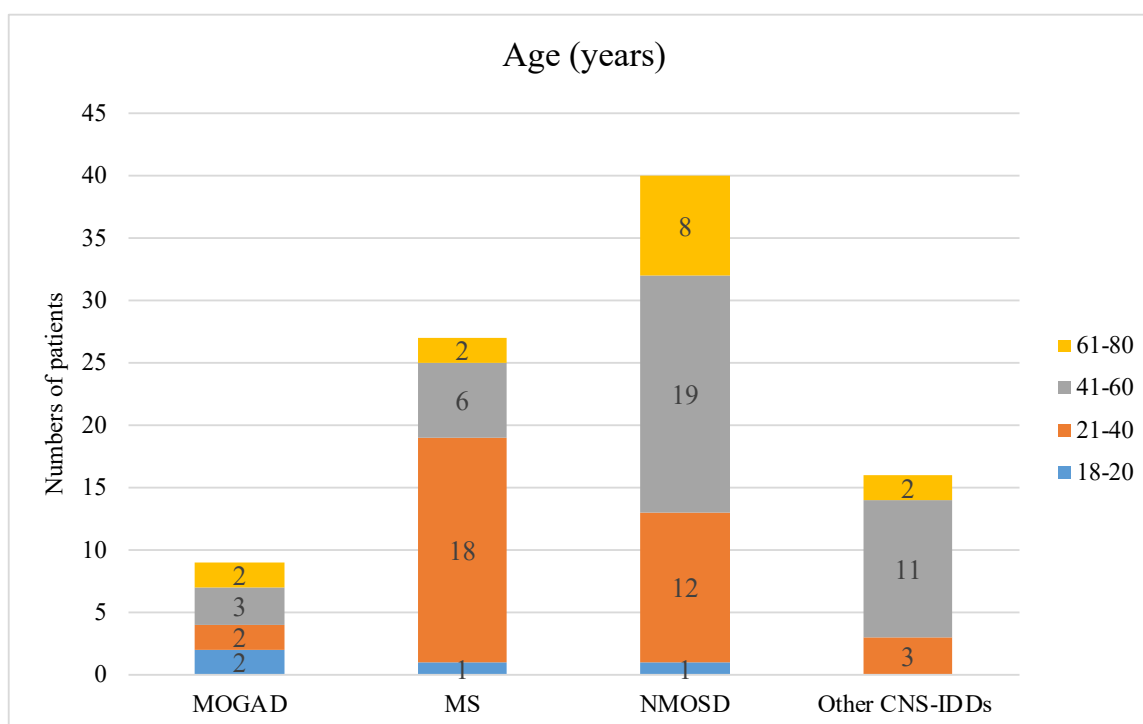


Fig 2. Patients with CNS demyelinating diseases classified by age.

Abbreviation: NMOSD, neuromyelitis optica spectrum disorders; MS, Multiple sclerosis; MOG, MOG-IgG-Associated Disorders

The most common treatment administered in all CNS-IDD patients was Azathioprine (39.1%, being least commenced in MS than other groups), followed by prednisolone (32.6%; 5 MS, 13 NMOSD, 6 each for MOGAD and 6 other CNS-IDDs). Rituximab was used

in 12 cases (14.1%; 5 MS, 6 NMOSD, 1 MOGAD). MMF was used in 12 patients (14.1%; 2 MS, 8 NMOSD, one each for MOGAD and other CNS-IDDs) (Table 1). Additionally, seven cases (7.6%) reported treatment changes in the last 6 months.

TABLE 1. Demographic data of patients with CNS demyelinating disease.

Parameter	Mean +/- SD	MS (n= 27)	NMOSD (n= 40)	MOGAD (n= 9)	Other CNS-IDDs (n=16)	P-value
Sex; n (% in the same group)						0.009
Female		17 (57.9)	37 (85.1)	6 (61.3)	10 (57.5)	
Age (year; mean±SD)	44.6±14.0	37.4±12.1	47.6±13.9	44.3±18.4	49.5±10.9	0.011
Highest Education (available data)		27	36	9	15	0.096
Primary School		3	4	2	6	
Junior High School		0	3	0	1	
Senior High School		2	2	2	1	
Diploma/High Vocational		0	5	2	2	
Certificate						
Bachelor Degrees		15	15	3	4	
Master Degrees		7	6	0	0	
Doctor Degrees		0	1	0	1	
EDSS (mean±SD)	1.2±1.5	1.0±1.7	1.2±1.4	1.5±1.3	1.2±1.5	0.864
No new attack in the past year; n (%)		18 (61.3)	28 (64.4)	4 (40.9)	11 (63.3)	0.529
Current treatment		27	38	8	15	
n (% in the same group)						
<i>DMD</i>		7 (23.9)	0	0	0	0.002
<i>Aza</i>		3 (10.2)	21 (48.3)	5 (51.1)	7 (40.6)	0.002
<i>MMF</i>		2 (6.8)	8 (18.4)	1 (10.2)	1 (5.8)	0.087
<i>Rituximab</i>		5 (17.0)	6 (13.8)	1 (10.2)	0	0.314
<i>Prednisolone</i>		5 (17.0)	13 (29.9)	6 (61.3)	6 (34.5)	0.064
No treatment		0	2 (4.6)	1 (10.2)	1 (5.8)	0.292
Psychological problems either depression, anxiety, or insomnia in the past 6 months; n (%)		8 (27.3)	10 (23)	1 (10.2)	3 (17.3)	0.406

Relapses during COVID-19 pandemic

Sixty-one patients (66.3%) reported no relapse in the past year and no statistically significant difference among the diseases (66.7% of MS, 70% of NMOSD, 44.4% of MOGAD, and 68.7% of other CNS-IDDs; $p=0.529$). For those who ever had a relapse, NMOSD seemed to have the highest average number of relapses (Fig 3). In relapse cases, patients were asked to self-rate their status compared to their pre-attack condition through a scoring system from zero to ten (0-2 = worse, 3-4 = stable, 5-6 = fair, 7-9 = good, and 10 = excellent). Most patients self-reported a positive recovery with an average score of 8.9 ± 2.2 .

Self-rated quality of life

We asked patients to rate their feelings regarding QoL on a scale of 1-2 = bad, 3-4 = poor, 5-6 = fair, 7-9 = good, and 10 = excellent. Before the COVID-19 pandemic, most patients indicated a good (56.5%) and excellent (25.0%) QoL with an average self-rated QoL scale of 8.0 ± 1.9 . A drastic decrease to 5.4 ± 2.4 and a general decline in their QoL during the pandemic were observed (Fig 4A & B). Similar results were seen in all groups of CNS-IDDs (mean pre-COVID and during COVID-pandemic scale were 8.3 ± 2.0 , 5.9 ± 2.0 for MS, 8.1 ± 1.7 , 5.4 ± 2.1 for NMOSD, 7.7 ± 1.9 , 5.3 ± 3.0 for MOGAD, and 7.7 ± 2.3 , 4.9 ± 3.1 for other CNS-IDDs, respectively).

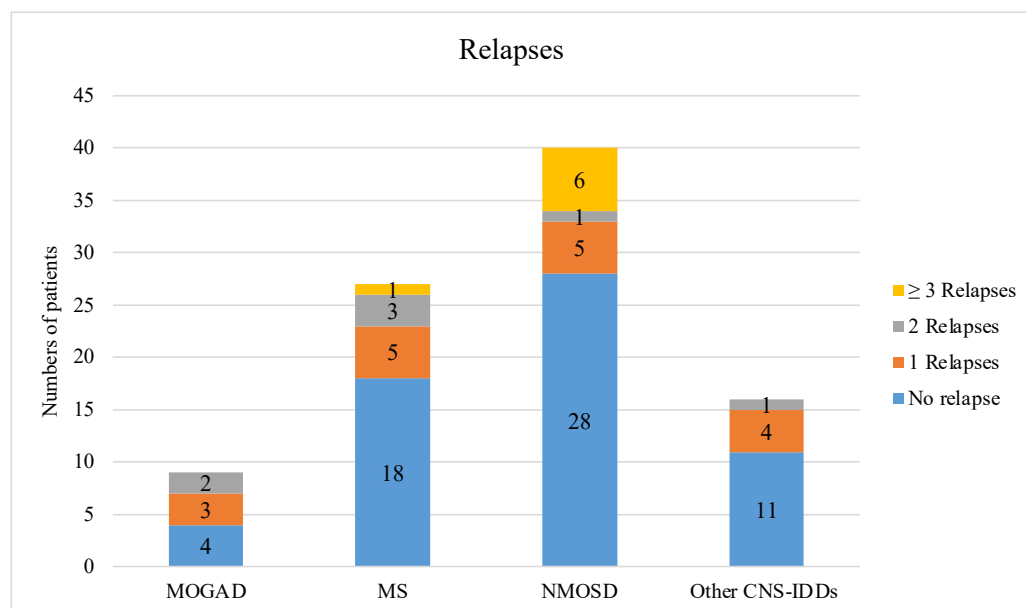


Fig 3. Number of relapses in the past year classified by each disease.

Abbreviation: NMOSD, neuromyelitis optica spectrum disorders; MS, Multiple sclerosis; MOG, MOG-IgG-Associated Disorders

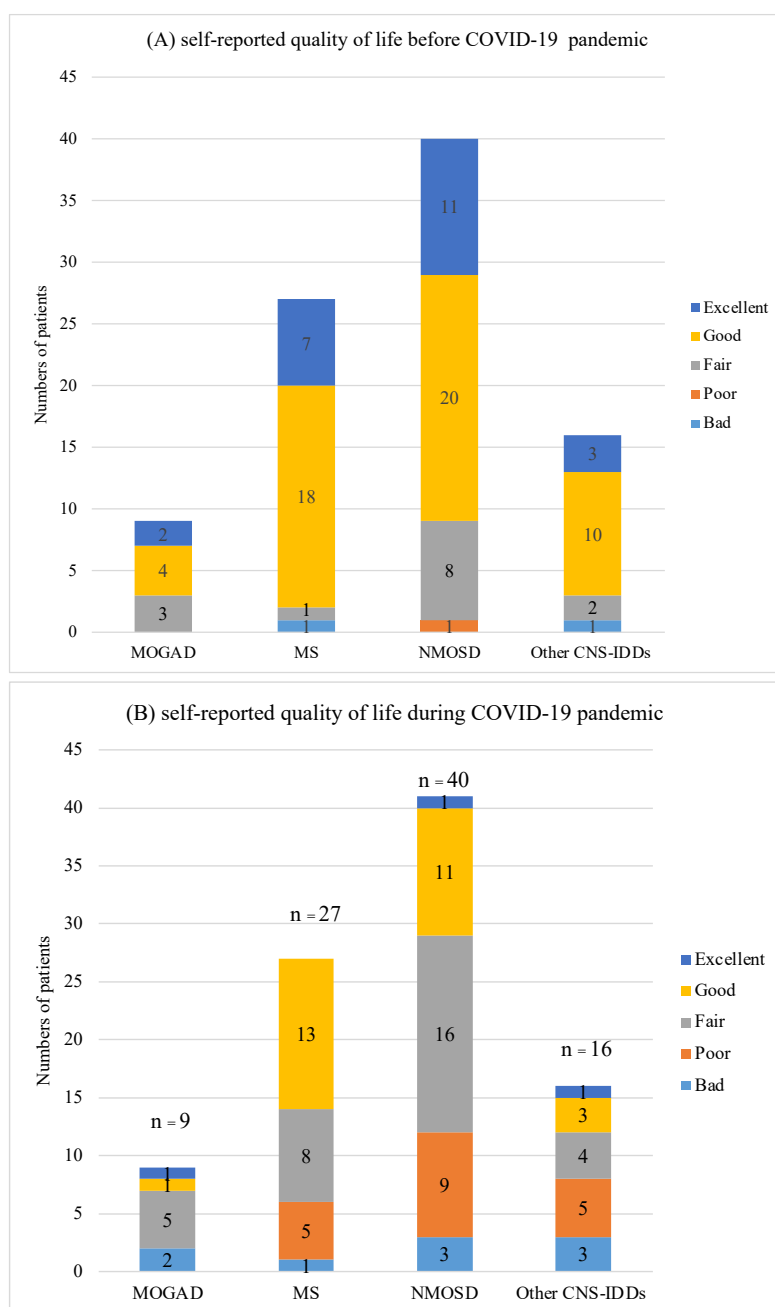


Fig 4. Self-reported quality of life before (A) and during (B) COVID-19 pandemic.

Abbreviation: NMOSD, neuromyelitis optica spectrum disorders; MS, Multiple sclerosis; MOG, MOG-IgG-Associated Disorders

Next, we conducted a detailed sub-survey to assess the negative impacts of the COVID-19 pandemic on physical and psychological well-being. Patients were asked to self-rate the impact of COVID-19, defined as 0 = no impact, 1-2 = little impact, 3-5 = some impact, 6-8 = significant impact, and 9-10 = very bad. Forty (43.5%) reported no impact on their physical wellness; 12 of 27 MS (44.4%), 18 of 40 NMOSD (45%), 4 of 9 MOGAD (44.4%), 6 of 16 other CNS-IDDs (37.6%). Twenty-eight (30.4%) reported no impact on their psychological wellness; 8 of 27 MS (29.6%), 10 of 40 NMOSD (25%), 4 of 9 MOGAD (44.4%), 6 of 16 other CNS-IDDs (37.6%). On the other hand, 52 patients (56.5%) indicated at least some level of impact on physical well-being, and 64 (69.6%) reported challenges to psychological health. (Fig 5A & B).

Questionnaire development

To ensure the practical applicability of our questionnaire in real-life scenarios, an initial test involved five non-medical healthy individuals. The assessment revealed no need for revisions, affirming the questionnaire's robustness and suitability for the study's context.

Missing/unattended appointment

Fifteen patients (16.3%) postponed or canceled their appointments during the COVID-19 pandemic. The predominant concern was difficulties in traveling to the clinic (32.2%). Consequently, 8.3% transitioned from face-to-face meetings with doctors in the clinic to telemedicine or telephone follow-up.

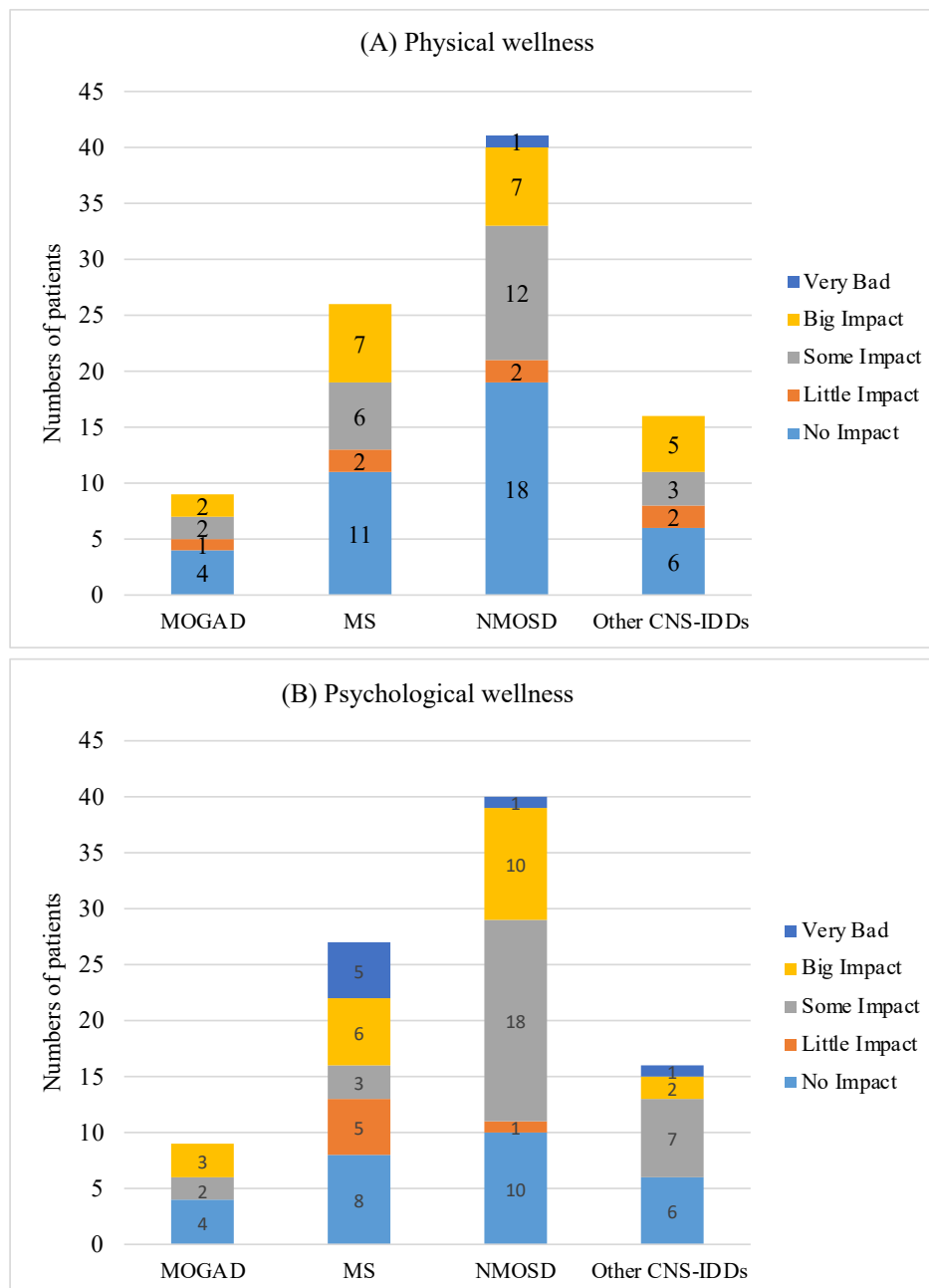


Fig 5. Self-rated questionnaire regarding the impact of the COVID-19 pandemic.

Abbreviation: NMOSD, neuromyelitis a spectrum disorders; MS, Multiple sclerosis; MOG, MOG-IgG-Associated Disorders

DISCUSSION

Our questionnaire survey of patients with CNS-IDDs revealed no significant increased relapse in our clinic during the COVID-19 pandemic. We found only two patients with confirmed COVID-19 infection, possibly due to a healthcare policy based on the national vaccination campaign and primary screening by healthcare providers at the hospital. Therefore, those suspected of being infected were transferred to a quarantine area. We found a low relapse rate in all patient groups in the past 6 months. These findings correspond to a previous study.¹⁵ This encompasses patients with MS, NMOSD, and MOGAD, who reported no significant changes in the frequency of relapse.⁴

The surge of the COVID-19 pandemic inevitably led to symptoms of depression, anxiety or insomnia, and other conditions.¹⁶ Furthermore, social distancing led to a perception of lower social support, strained family relationships, loss of freedom, and uncertainty.¹⁷ All these reasons explain the significant decrease in self-reported QoL during the pandemic compared to prior. Such psychosomatic and behavioral responses to stress are a psychological mechanism of self-defense. It is a natural, ordinary, and necessary response when people face dangerous situations. It's important to note that our patients' unusually low EDSS scores during the pandemic may have been influenced by the selective inclusion of patients who could travel to the clinic and engage in sufficient activities.

Our findings reveal that nearly 10% of patients transitioned from going to the clinic to telemedicine communication or telephone follow-up. Telemedicine provides a convenient, cost-effective, and readily accessible means of information exchange and communication through the Internet and associated technologies. This approach allowed patients to receive quality assessment and treatment without the need to visit a clinic for follow-up during the COVID-19 pandemic.^{18,19} Also, it allowed a way to reassure patients of their health and concerns during social distancing. If patients were reassured to cope with the COVID-19 pandemic and carefully adjust their lifestyle (e.g., regularly washing hands, social distancing, and wearing masks, etc.²⁰), they could better fight through this challenging situation.^{16,21}

Our study has limitations as the study was a single-center study with a limited number of patients, especially during COVID-19. However, this study is an example of the threatened situation by the dreadful disease on our CNS demyelinating diseases. It provides a picture of how that impacts the patient and may help modify how to help the patient in the future.

CONCLUSION

Our study shows that patients with CNS demyelinating diseases experienced low relapse and a low prevalence of COVID-19 infection during the pandemic. During the pandemic, patients' QoL drastically decreased in both physical and psychological conditions.

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None

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