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Original article

A year with the fear of COVID-19 in multiple sclerosis patients: Examination of depression, sleep quality and quality of life before and after the pandemic

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ABSTRACT

Background: The COVID-19 outbreak, which has caused great fear and has affected many aspects of life even in healthy individuals, could become more threatening for people with multiple sclerosis (PwMS).

Aim: The aim of the present study was to evaluate depression, sleep and quality of life before and one year after the COVID-19 pandemic in PwMS and the association between the fear of COVID-19 and these parameters.

Methods: A total of 89 PwMS and 262 healthy controls were included in this descriptive cross-sectional study. The study compared the data collected before the pandemic with the data collected online approximately one year after the onset of the pandemic. The Fear of COVID-19 Scale (FCV-19S), the Worry and Anxiety Questionnaire (WAQ), the Beck Depression Inventory (BDI), the Pittsburgh Sleep Quality Index (PSQI) and the MS Quality of life scale (MSQoL-54) were used as data collection tools.

Results: The mean age of the patients was 41.08 (± 10.2) years; 62% were female and half (50.6%) of the patients were not working. The mean EDSS and the mean duration of diagnosis were found to be 1.33(± 1.6) and 7.73 (± 6.1), respectively. The mean age of the control group was 38.08 (± 11.4) and 51.5% were female. In both groups, social (PwMS 79.8% vs HC 89.3%) and psychological (PwMS 61.8% vs HC 51.9%) fields were found to have been affected by the COVID-19 pandemic most. Of the patients, 19% reported that the frequency of exacerbations increased during the pandemic. In the patient group, the fear of coronavirus ($p=0.808$) and the sleep quality ($p=0.906$) were found not to be different to those in control group; however, the anxiety ($p=0.001$) and depression ($p=0.001$) levels were determined to be significantly higher. Compared to the pre-pandemic period, the sleep quality of the patients was seen to be impaired during the pandemic ($p<0.05$); however, the depression scores were seen not to change ($p>0.05$). Although there were improvements in energy/vitality ($p<0.001$) and sexual function ($p=0.002$) scale scores, compared to the pre-pandemic period, deterioration in many sub-dimensions of quality of life was detected. Multiple regression analysis demonstrated that the anxiety, depression, and the sleep problems were predictors of both the physical health ($p<0.001$) and the mental health ($p<0.001$) sub-dimensions. The fear of coronavirus was determined not to have a significant effect on the quality of life ($p>0.05$).

Conclusion: It was determined that PwMS and were psychosocially affected by the COVID-19 pandemic, and had a significant deterioration in sleep quality at the end of a year spent with the pandemic. In addition, there was a deterioration in depression scores, although it was not statistically significant. Considering the fact that many subdimensions of quality of life, especially those associated with mental health, were impaired, it can be said that providing psychosocial support to patients is an important necessity.

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1. Introduction

Coronavirus outbreak (SARS-CoV-2) emerged in Wuhan province of China towards the end of 2019 and it was announced as a pandemic on March 11, 2020, when the first case was reported in Turkey (Acar et al., 2020; WHO, 2019). The spread of the coronavirus influenced the daily routines, social and economic lives of the people and this pandemic period in which even healthy people were under a great risk, has become more traumatic for elderly people and for those who have chronic disorders (Salari et al., 2020).

It has been reported that people with multiple sclerosis (PwMS) can be in the risk group, as this is a chronic disease, and these patients use medications that affect the immune system. Although some studies have reported that PwMS do not have a higher incidence of COVID-19 infection, more severe disease, or mortality (Capuano et al., 2021; Carandini et al., 2020; Stojanov et al., 2020), in this pandemic period, when there is a lack of clarity with fear and even healthy individuals are deeply affected, PwMS should be followed more closely (Akhoundi et al., 2020). In patients with MS who already have a high incidence of psychiatric symptoms such as anxiety and depression (Boeschoten et al., 2017), these problems are likely to be deteriorated by the fear of coronavirus (Chiaravalloti et al., 2021). It may be stated that cancellation of routine neurology examinations due to the fear of being infected with the virus, the problems experienced in the supply of drugs and the socioeconomic effects of the epidemic are other factors contributing to the worsening of mental health (Demir et al., 2020; Stojanov et al., 2020). Sleep problems caused by changing daily routines and increased stress can also worsen anxiety and depression (Motolese et al., 2020). Therefore, it is expected that many factors such as fear, anxiety, loneliness, hopelessness, depression, and sleep problems experienced during the pandemic period negatively affect the quality of life of the patients (Stojanov et al., 2020; Akhoundi et al., 2020). The aim of this study was to investigate the changes in depression, sleep, and quality of life during the COVID-19 pandemic, and the relationship between the fear of COVID-19 and these parameters in people with multiple sclerosis.

2. Material and method

2.1. Study design and participants

This descriptive case-control study was conducted with PwMS registered in the neurology outpatient clinic of a university hospital. One hundred and seventy-eight patients whose EDSS scores, depression levels, sleep and quality of life were evaluated a few months before the onset of the pandemic (August-November 2019) were invited to the study one year after the onset of the pandemic (15-30 December 2020) (a plateau period after the second peak) (T.C. Sağlık Bakanligi-Republic of Turkey Ministry of Health, 2020). Study forms were sent electronically to these patients who had been diagnosed as definite MS, over 18 years of age, and who did not have a chronic disease (heart failure, major depression, etc.). In addition to the forms used in the previous study, two different scales to evaluate anxiety and the fear of coronavirus were added to the forms. Although all 178 patients were invited to the study, approximately half of them were not included in the study for various reasons (not wanting to participate in the study, not having a smart phone, not being able to fill in the electronic form, etc.) and the study was completed with a total of 89 people with multiple sclerosis. Therefore, all analyses were performed on 89 PwMS. In addition, 262 healthy individuals over the age of 18 who did not have a chronic health problem, were included in the study to compare the data of PwMS with the healthy control group (HC).

2.2. Measures

A patient information form was developed to collect data regarding sociodemographic and clinical characteristics of the patients. The form

also included questions regarding psychosocial effects of the COVID-19 outbreak on the people (such as areas of life affected by the pandemic, increase in the frequency of MS attacks, problems in supplying MS medications, remote support from healthcare professionals). The EDSS scores of the patients were obtained from the outpatient clinic records. In addition, the Fear of COVID-19 Scale, the Worry and Anxiety Questionnaire, the Beck Depression Inventory, the Pittsburgh Sleep Quality Index, and the Multiple Sclerosis Quality of Life-54 (MSQoL-54) scales were used, respectively, for examining the fear, anxiety, depression, sleep, and the life quality of the patients. The individuals in the control group were applied all of the scales except for MSQoL-54.

The Expanded Disability Status Scale (EDSS): EDSS is a scale that is used to evaluate disability in MS, which was developed by Kurtzke. The scale scores vary between 0 and 10 and increasing scores indicate an increasing disability (Kurtzke, 1983).

The Fear of COVID-19 Scale (FCV-19S): The scale consists of one dimension and 7 items and reflects the level of COVID-19 fear. The scale was developed by Ahorsu et al. (2020) and the Turkish adaptation was carried out by two separate studies, and the Cronbach's alpha coefficient was found to be high in both (0.86, 0.88) (Bakioglu et al., 2020; Ladikli et al., 2020).

The Worry and Anxiety Questionnaire (WAQ): The scale was developed by Dugas et al. (2001), which measures whether the individual has generalized anxiety disorder or not. The potential score of the 11 items varies between 0 and 80, and higher scores indicate higher anxiety. The validity and reliability study of the scale was conducted by Akyay et al. (2016) and the Cronbach's alpha coefficient was found to be 0.89.

The Beck Depression Inventory (BDI): This 21-item-scale was developed by Beck et al. (1961) and Turkish adaptation of the scale was conducted by Hisli et al. (1988). The scale measures the severity of the depressive mood. The potential total score varies between 0 and 63 and higher scores indicate depressive mood.

Pittsburgh Sleep Quality Index (PSQI): This scale evaluates sleep quality within the last one month and consists of 24 items and 7 subscales. The potential score of the scale varies between 0 and 21, and greater than 5 points indicate a poor sleep quality. The scale was developed by Buysse et al. (1989) and the Turkish adaptation study was conducted by Agargün et al. (1996).

The Multiple Sclerosis Quality of Life Scale-54 (MSQoL-54): The scale was developed by Vickrey et al. (1995) to evaluate the quality of life of PwMS; the Turkish adaptation was conducted by İdiman et al. (2006) and Tulek (2006). Higher scores of the scale indicate a good quality of life.

2.3. Statistical analysis

The sociodemographic and clinical characteristics of the participants were given as numbers and percentages. The mean scores and the standard deviations of the scales were given. The independent samples t-test was used for comparison of the scale scores of the PwMS group and the control group (and also analysis of covariance -ANCOVA- was performed for comparison of age-adjusted data), and the chi-square test was used for comparison of the categorical variables. Paired t-test was used to compare patients scale scores before and after the onset of the pandemic. The influence of fear of COVID-19, anxiety, depression, and the sleep on the quality of life was analyzed with the multiple linear regression analysis. The results were evaluated at 95% confidence interval and significance was evaluated at a p level of <0.05.

2.4. Ethical consideration

Ethics committee approval was obtained from the Samsun Ondokuz Mayıs University Clinical Research Ethics Committee (No:30.2.ODM.0.20.08/738-905). Written informed consents were obtained from all participants.

3. Results

The mean age of the PwMS was 41.08 (±10.2) years, 62% were females and less than half (41.6%) were working actively. The mean EDSS score was found to be 1.33(±1.6) and the mean duration of diagnosis was 7.73(±6.1) years. Compared to the PwMS, it was determined that the mean age of the HC was younger (p=0.029), the education level was higher (p=0.010), and the rate of actively working status was higher (p=0.001) (Table 1).

It was determined that the social and psychological fields of both patients and the control groups were mostly affected by the pandemic. It was also found that the healthy control group was affected significantly more economically (PwMS: 31.5% vs HC: 58.4%) and socially (PwMS: 79.8% vs HC: 89.3%) than the patient group. Of the patients, 19% reported an increased frequency of exacerbations during the epidemic, very few (6.7%) had problems in obtaining their medications and more than half (58.4%) had access to neurologist/nurses who could provide remote support (Table 2).

Analysis of age-adjusted data showed that the fear of coronavirus (p=0.808) and sleep quality (p=0.906) of the PwMS group were similar to the control group, while the levels of anxiety (p=0.001) and depression (p=0.001) were significantly higher (Table 3).

Compared to pre-pandemic period, the mean PSQI score was determined to increase indicating impaired sleep quality (p<0.001), and although the BDI score was found to increase, this was not significant (p=0.379). Despite no significant change in the MSQoL-54 physical and mental health composite scores (p=0.392, p=0.511, respectively), impairment was found in many subscales of the quality of life. However, the energy/vitality (p<0.001) and the sexual function (p=0.002) scores were seen to increase (Table 4).

Regression analysis demonstrated that EDSS (p<0.001), anxiety (p=0.006), depression (p=0.007) and sleep problems (p=0.013) predict the physical sub-dimension of the quality of life, whereas anxiety (p<0.001), depression (p<0.001) and sleep problems (p=0.036) predict the mental health sub-dimension. The fear of coronavirus was determined not to influence neither the physical (p=0.468) nor mental health (p=0.209) sub-dimension (Table 5).

4. Discussion

In this present study, the psychosocial effects of the COVID-9 pandemic on PwMS were examined by comparing patient data before and after the pandemic, as well as with healthy controls. Although

Table 1
Sociodemographic and clinical characteristics of people with multiple sclerosis and healthy controls.

	PwMS (N=89) n (%)	HC(N=262) n (%)	p
Sex	56 (62.9)	135 (51.5)	0.062
Female	33 (37.1)	127 (48.5)	
Male			
Education	32 (36.0)	73 (27.9)	0.010*
Primary-secondary school	25 (28.0)	47 (17.9)	
High school	32 (36.0)	142 (54.2)	
University			
Employment	37 (41.6)	186 (71.0)	0.001**
Employed	45 (50.6)	66 (25.2)	
Other (homemaker, student, retired)	7 (7.9)	10 (3.8)	
Unemployed			
Age (Mean±Sd)	41.08±10.26	38.08±11.46	0.029*
EDSS (Mean±Sd)	1.33±1.60	-	
Duration of MS (Mean±Sd)	7.73±6.18	-	

PwMS: People with multiple sclerosis, HC: Healthy control, EDSS: Expanded Disability Status Scale
*p< .05, **p< .001

Table 2
Comparison of the psychosocial effects of the COVID-19 outbreak on the people with multiple sclerosis and healthy controls.

	PwMS (N=89) n (%)	HC (n=262) n (%)	p
Areas of life affected by the pandemic			
Social	71 (79.8)	234 (89.3)	0.021*
Yes	18 (20.2)	28 (10.7)	
No			
Economic	28 (31.5)	153 (58.4)	<0.001**
Yes	61 (68.5)	109 (41.6)	
No			
Psychological	55 (61.8)	136 (51.9)	0.106
Yes	34 (38.2)	126 (48.1)	
No			
Physical health	17 (19.1)	30 (11.5)	0.067
Yes	72 (80.9)	232 (88.5)	
No			
Increase in the frequency of MS attacks	17 (19.1)	-	
Having problems supplying MS medications	6 (6.7)	-	
Remote support from healthcare professionals	52 (58.4)	-	

Note: PwMS: People with multiple sclerosis, HC: Healthy control
*p< .05, **p< .001

Table 3
Comparison of age-adjusted mean scores of psychological scales between the people with multiple sclerosis and healthy controls.

	PwMS(N=89) Mean±Sd	Adj. mean±Sd	HC(N=262) Mean	Adj. mean±Sd	p
FCV-19S	19.41±6.02	19.28±0.64	19.40±6.06	19.41±6.07	0.808
WAQ	40.25±19.96	41.27±2.18	32.91±21.43	32.57±1.27	0.001*
BDI	14.93±8.90	15.21±0.95	11.45±9.00	11.36±0.55	0.001*
PSQI	8.15±4.17	8.1±1.21	7.99±12.86	8.01±0.7	0.906

Note: PwMS: People with multiple sclerosis, HC: Healthy control, FCV-19S: Fear of COVID-19 Scale, WAQ: Worry and Anxiety Questionnaire, BDI: Beck Depression Inventory, PSQI: Pittsburgh Sleep Quality Index.
*p< .05

having chronic health problems suggests that PwMS are in a more vulnerable group and psychosocial effects would be higher, this study has shown that PwMS are not different from healthy individuals in terms of some parameters. PwMS reported that the social and psychological fields of their lives were most affected by the pandemic, which is an expected result. It is inevitable that the fear, anxiety, and obscurity created by the pandemic, lockdowns to prevent contamination, and the decrease in social support would harm both the psychology and the social life of individuals (Wang et al., 2020). In our study, the healthy group was seen to be affected more socially and economically. Due to the disease and symptoms that PwMS have, this may be due to the fact that they already live more isolated from the society before the pandemic and are less active socio-economically than the healthy group. Similar results were obtained from the study of Stojanov et al. (2020) in which it was reported that the healthy group was more affected by the pandemic in terms of economic status and daily life activities. In fact, in our study, it is seen that the majority of the healthy group is actively working and the unemployment rate is low. However, the negative impact of the economy of this group can be explained by the decrease in purchasing power and per-household income rather than unemployment. It is expected that the negative economic impact of individuals with MS, who have a relatively higher unemployment rate and a lower active working rate, will be more than the control group. However, individuals with MS attribute their economic problems to their chronic disease, perhaps rather than the pandemic. Because many of the patients

Table 4
Comparison of depression level, sleep quality and quality of life in people with multiple sclerosis before and after COVID-19 pandemic (N=89).

	T ₀ Mean (Sd)	T ₁ Mean (Sd)	p
BDI	13.93±10.56	14.93±8.90	0.379
PSQI	6.62±2.50	8.15±4.17	<0.001**
MSQoL-54 (Subscales)			
Physical health	56.24±28.22	46.12±30.23	<0.001**
Limitation due to physical problems	38.76±38.98	38.76±39.16	0.965
Pain	66.55±23.46	54.43±27.21	<0.001**
Energy	20.11±9.21	38.92±23.77	<0.001**
Social function	70.31±20.02	66.29±24.06	0.112
Health perceptions	44.10±23.62	43.08±22.37	0.614
Health distress	57.02±28.12	49.38±27.35	0.005*
Sexual function	69.73±26.19	84.65±44.30	0.002*
Limitation due to emotional problems	51.31±42.35	41.19±42.94	0.077
Emotional well-being	50.64±25.39	38.26±11.39	<0.001**
Cognitive function	59.32±25.21	53.70±27.85	0.017*
Overall quality of life	59.17±16.75	53.71±16.79	<0.001**
Change in health	45.50±22.78	44.94±25.05	0.820
Satisfaction with sexual function	56.17±36.20	64.75±30.25	0.044*
Physical Health Composite Score	51.38±18.66	50.31±20.53	0.392
Mental Health Composite Score	50.94±18.75	49.21±21.86	0.511

T₀: A few months before the COVID-19 pandemic, T₁: About a year after the onset of the COVID-19 pandemic, BDI:Beck Depression Inventory, PSQI:Pittsburgh Sleep Quality Index, MSQoL:Multiple sclerosis Quality of Life.

*p< .05, **p< .001

with MS already have unemployment or economic problems before the pandemic (Conradsson, 2020).

Another factor underlying this difference between PwMS and the healthy group may also be stigma. This can mean that patients who feel stigmatized due to MS are already normally isolated from the society and thereby not too socially affected by the pandemic. For example, a study with epilepsy patients with high stigma levels reported that patients were already isolated due to the stigma they felt, and hence, they were less exposed to the social impact of the pandemic than healthy individuals (Gul and Atakli, 2021). Therefore, stigma in the pandemic era should be another issue that needs to be addressed.

During the pandemic period, it was determined that patients experienced some problems with their disease. About one fifth of the patients reported an increase in the frequency of attacks. Stojanov et al. (2020) reported this rate as 27%, and almost half of the patients were reported to have difficulties accessing the drugs. Due to the pandemic, difficulties in accessing health professionals and medications, such as doctors,

Table 5
Multiple linear regression analyses for predicting quality of life in people with multiple sclerosis (N=89).

Variable	Unstandardized B	SE	Standardized β	t	Sig.	%95 CI Lower limit	Upper limit	Adjusted R ²
MSQoL-PHC (Constant)	89.61	4.66			<0.001**		19.22	0.64
EDSS	-4.06	0.89	-0.31	-4.56	<0.001**	-5.83	-2.28	
FCV-19S	-0.18	0.25	-0.05	-0.72	0.468	-0.68	0.31	
WAQ	-0.31	0.11	-0.30	-2.83	0.006*	-0.53	-0.09	
BDI	-0.64	0.23	-0.27	-2.75	0.007*	-1.10	-0.17	
PSQI	-0.99	0.38	-0.20	-2.55	0.013*	-1.76	-0.21	
MSQoL-MHC (Constant)	93.77	4.25			<.001**	85.30	102.24	0.73
EDSS	-0.73	0.81	-0.05	-0.90	0.369	-2.35	0.88	
FCV-19S	-0.29	0.23	-0.08	-1.26	0.209	-0.75	0.16	
WAQ	-0.47	0.10	-0.43	-4.71	<0.001**	-0.67	-0.27	
BDI	-0.83	0.21	-0.34	-3.94	<0.001**	-1.25	-0.41	
PSQI	-0.75	0.35	-0.14	-2.13	0.036*	-1.46	-0.05	

MSQoL-PHC:Multiple sclerosis Quality of Life- Physical Health Component, MSQoL-MHC: Multiple sclerosis Quality of Life- Mental Health Component, EDSS: Expanded Disability Status Scale, FCV-19S:Fear of COVID-19 Scale, WAQ:Worry and Anxiety Questionnaire, BDI:Beck Depression Inventory, PSQI:Pittsburgh Sleep Quality Index

*p< .05, **p< .001

nurses, increases the psychological burden of patients and their physical health may also be affected, as treatment will remain incomplete. Therefore, maintaining remote counseling services for patients is of particular importance during this period (Corea et al., 2021). In this study, more than half of patients have a doctor or nurse from whom they can receive remote support and they generally do not have problems with drug supply. Perhaps this support may have ensured that fear of COVID-19 levels was not higher than in the healthy group. In different studies conducted with healthy individuals, it was also found that the average score of the Fear of COVID-19 Scale was similar to this study. Therefore, it can be assumed that the level of fear of PwMS and healthy individuals is similar based on the factors such as the remote counseling services the patients receive, and the relatively large amount of time spent at home due to being considered to be on leave during the peak periods of the pandemic.

Similar to the fear of COVID-19, the sleep quality was found to be similar to the healthy group but deteriorated compared to the pre-pandemic period. It has been reported that sleep quality worsens with the pandemic in PwMS who normally have frequent sleep problems, regardless of the pandemic (Veauthier, 2015). It is expected that the quality of sleep would deteriorate with the increased time spent at home and the increased psychosocial burden of the pandemic (Motolese et al., 2020). In addition, the negative effect of sleep problems on the quality of life in the regression analysis better emphasizes the importance of this issue.

In addition to sleep quality, the anxiety and the depression levels of the patients were evaluated and there were significant differences compared to healthy individuals. Therefore, it would not be wrong to emphasize that the issue of mental health should be considered as a priority, because in the early stages of the pandemic, physical health was attempted to be maintained, and it was noticed in later times that the psychological effects of the pandemic reached traumatic levels (Passavanti et al., 2021). But it would not be correct to attribute this effect on the mental health of PwMS to the pandemic alone, because anxiety and depression are neuropsychiatric symptoms that are already seen at high rates due to the biopsychosocial effect of MS (Boeschoten et al., 2017). In addition to all these, it is necessary to consider the gender factor on mental health when comparing two groups. Studies conducted in recent years report that the rate of anxiety and depression is generally higher in women (Brunoni et al., 2020; Cheah et al., 2020; Shi et al., 2021). Therefore, the higher female rate in PwMS may have contributed to higher anxiety and depression scores in this group. In addition, the fact that the education level and the rate of active work were lower in the MS patient group compared to healthy individuals are also factors that

should be taken into account. A meta-analysis published in recent years clearly highlights that unemployment increases depressive symptoms (Amiri, 2021). Similarly, it has been reported that low education level is associated with increased levels of anxiety and depression (Brunoni et al., 2020; Cheah et al., 2020). Therefore, it would not be wrong to say that the disease itself has a more biopsychosocial effect on mental health than a pandemic in MS patients. In this study, the fact that the mean score of the COVID-19 fear scale was similar to the healthy group and the social and economic effects of the pandemic were less than the healthy group supports our interpretation. Similarly, the absence of a significant increase in patients' depression levels during the pandemic period highlights the MS-induced depression rather than the effect of the outbreak. Possessing the patients' pre-pandemic depression scores allowed us to compare them with the pandemic period, but it was not possible for anxiety. Although this can be considered as a limitation of the study, it should be especially emphasized that patients need psychological support at any time. The regression analysis showed that both anxiety and depression have a negative effect on the quality of life, confirming findings from earlier studies (Alsaadi et al., 2017). Since the need has increased during the pandemic period, attempts to protect the mental health of patients will be effective in increasing the quality of life.

The fear of COVID-19 was another investigated factor related to the quality of life. Although the fear of COVID-19 was found to be correlated with the quality of life in the univariate analysis, it was not found to be significant in the regression analysis. Based on the fact that the level of fear is also correlated with anxiety, depression and sleep, it may influence the quality of life indirectly. It seems more likely to create this indirect effect through mental health. In different modelling studies, the fear of COVID-19 was emphasized not to directly affect the quality of life but showed this effect through anxiety and depression (Ahorsu et al., 2020; Alyami et al., 2021). Hence, it should be remembered that mental health not only affects PwMS, but also the whole population.

Compared to pre-pandemic period, impairment was found in many subscales of the quality of life. In particular, the most serious deterioration was in the limitation due to emotional problems sub-dimension score reveals that mental health is affected mostly. Obtaining similar results in the study of Capuano et al. (2021) once again reveals the importance of mental health. Therefore, it would not be wrong to say that emotional well-being rather than physical health deteriorates, and patients need more psychological support during the pandemic. However, the energy/vitality ($p < 0.001$) and the sexual function ($p = 0.002$) scores were seen to increase as expected. The time spent at home could help patients who felt maximum fatigue even with minimal activity preserve their limited energy. Furthermore, the increasing time spent with family or partners could contribute to other sub-dimensions to improve. Similar results were obtained in different studies and the quality of life of the patients was reported not to change significantly during the pandemic period; some sub-dimensions were reported to even improve (Capuano et al., 2021; Chiaravalloti et al., 2021; Stojanov et al., 2020). Although not proven with studies, the importance of webinars arranged by a multi-disciplinary team for patients at MS centre where the study was conducted should be emphasized. From the moment the pandemic started, these education and counseling services may have been effective in preventing information pollution, unnecessary fear and anxiety, but their effectiveness needs to be proven by studies.

5. Conclusion

In conclusion, it is important that the COVID-19 pandemic has psychosocial effects on PwMS, and during this period it is necessary to focus especially on the mental health of the patients. Using the developing technology for the benefit of patients and ensuring uninterrupted education and counseling services should be one of the first steps to be taken.

CRediT authorship contribution statement

Kubra Yeni: Visualization, Data curation, Investigation, Writing – review & editing, Writing – original draft. **Zeliha Tulek:** Conceptualization, Formal analysis, Investigation, Writing – review & editing. **Murat Terzi:** Formal analysis, Investigation, Writing – review & editing.

Declaration of Competing Interest

The authors declare no conflict of interest.

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