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The effects of the COVID-19 pandemic on epilepsy patients

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Abstract

Background: Pandemics like the coronavirus disease 2019 (COVID-19) bring along many individual and social problems. We aimed to investigate the impact of the COVID-19 pandemic on anxiety, depression, and quality of life in patients with epilepsy and if seizures worsened because of it. *Methods:* During their routine outpatient follow-up appointments, the patients were probed using questionnaires prepared in advance and we also administered Beck depression and Hamilton anxiety scales to the patients. *Results:* The mean age of the patients was 34.9 years and 39.5% of the patients were male. It was asked whether patients had problems accessing medications, hospitals, and doctors or whether they had difficulty receiving tests such as EEG-MRI, and 14.9 % of the patients said they had issues accessing them. About 6.8% of all patients and 5/17 patients with COVID-19 infection reported an increase in seizure frequency of more than 50%. While 49 (30.3%) of 161 patients stated they had insomnia during the pandemic period, 58 (36.02%) patients said they started to experience symptoms of anxiety and depression during the pandemic period. Depression was diagnosed in 71 (44.1%), and anxiety was observed in 34 (21.2%) of 161 patients.
Conclusion: As a result of the COVID-19 pandemic and quarantine measures, epilepsy patients have been affected significantly. There was a considerable rise in the number of seizures in a large number of patients, and most of them expressed anxiety, depression symptoms, and insomnia. These rates were observed to be greater in individuals who had refractory epilepsy and a history of COVID infection.

Keywords: Epilepsy, COVID-19, depression, anxiety

INTRODUCTION

In late December 2019, after health officials in the Chinese city of Wuhan reported several cases of pneumonia that had no known cause, SARS-CoV-2 was found to be the new etiological agent for COVID-19 disease. The disease, which spread swiftly, was spotted in our country for the first time on March 11, 2020, and it was declared a global pandemic by the World Health Organization on that day. This newly discovered virus created an immediate international public health threat, necessitating strong public health measures to restrict the COVID-19 pandemic.

The COVID-19 disease, which resulted in prolonged quarantine periods from time to time, has resulted in severe psychiatric problems in society, including stress, anxiety disorders, and depression, and economic consequences and serious difficulties in finding work during those quarantine periods.[1] Patients with epilepsy who also suffer from psychological comorbidities, such as anxiety and depression, are particularly vulnerable. Furthermore, some have experienced dismissal from their jobs due to their seizures, and they have difficulties finding employment and have also been among the patient groups most adversely impacted by the pandemic.[2] Additional symptoms such as increased anxiety and depression and an increase in the frequency of seizures secondary to the infection may be observed depending on the individual's fear of having a seizure.[3]

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In this study, we aimed to investigate both the effects of the COVID-19 pandemic on anxiety and depression, as well as the quality of life in epilepsy patients, and whether there was a worsening of seizures in this process.

Thus, our study can shed light on future studies in terms of protecting epilepsy patients, one of the patient groups most affected by the pandemic, from the effects of pandemics, as well as predicting an increase in the frequency of seizures and an increase in the frequency of anxiety and depression during diseases with devastating effects such as the COVID-19 pandemic.

METHODS

Approval was obtained from the no: 6/14 ethics committee of Antalya Training and Research Hospital. The study subjects comprised of epilepsy patients over the age of 18 who were being monitored at our Antalya Training and Research Hospital Epilepsy outpatient clinic and visited our clinic between March 2021 and November 2021. During their routine outpatient follow-up appointments, the patients were probed using questionnaires prepared in advance. The questionnaires were in the native language, all questionnaires were conducted in the presence of a neurologist, and help was obtained from the relatives of the patients to learn the frequency of seizures more clearly. Age, gender, epilepsy duration and type, comorbidity, currently prescribed anti-seizure medicines (ASMs), previous COVID-19 diagnoses, medications used during COVID-19 treatment, side effects, the impact of the pandemic on insomnia and change in income were all asked about in the surveys. We also administered the Beck Depression and Hamilton Anxiety scales to the patients. Patients with severe and moderate mental disorders or previously diagnosed with psychiatric disorders were excluded from the study.

RESULTS

A total of 161 epilepsy patients took part in the study. Table 1 summarizes the sociodemographic characteristics of these participants.

The mean age of the patients was 34.9 years and 39.5% of the patients were male. The mean disease duration was 14.1 years. Of the participants, 20.4% of the patients had undergraduate and graduate education, and 45.9% were working. 104 (64.5%) patients were being treated with a single ASM at the time of the research, whereas 101 (62.7%) patients were being followed up after being diagnosed with focal epilepsy. There was just one patient who had undergone epilepsy surgery during the study (Table 1).

When the responses to the questions asked of the patients through the questionnaires are analyzed, it is discovered that 17 (10.5%) patients had recovered from COVID-19 disease. When asked whether there had been an increase in the frequency of seizures by more than 50% during the pandemic period, only 11 (6.8 %) patients stated that there had been an increase in seizures, while 17 (10.5 %) patients said that there had been a decrease in the frequency of seizures by more than 50%.

During the pandemic, it was asked whether patients had problems accessing medications, hospitals, and doctors or whether they had difficulty receiving tests such as EEG-MRI, and 14.9 % of the patients said they had issues accessing them. When asked about the pandemic's negative impact on economic income, 92 (57.1%) patients said their financial condition had gotten worse because of layoffs or because of quarantine periods and the pandemic's effect. While 49 (30.3%) of 161 patients stated they had insomnia during the pandemic period, 58 (36.02%) patients said they started to experience symptoms of anxiety and depression during the pandemic period.

Patients were asked if they were more worried about catching COVID-19 or having a seizure, and 62 (%38.5) patients said they were more concerned about having a seizure (Table 2).

In addition, the correlation between sex, epilepsy duration and the number of ASM was examined in patients with more than a 50% increase in the number of seizures and no statistical significance was observed (p .07- p .14- p .87, respectively). In addition, there was no statistically significant correlation when the patients who experienced economic deterioration in the pandemic and the patients who had sleep problems were examined in terms of an increase in seizures (p .070- p .16, respectively).

During the course of the disease, 15 of the 17 patients with COVID received Favipravir medication, with just two patients receiving no treatment at all. During the disease, 5 individuals had an increase in the frequency of their seizures (Table 3). Following the administration of questionnaires to the patients, the Beck depression and Hamilton anxiety measures were used to assess their levels of depression and anxiety. Depression was diagnosed in 71 (44.1%) of 161 patients. 5 patients were suffering from severe

Table 1: Sociodemographic and clinical characteristics of patients. (n=161)

Sociodemographic Characteristics of the Participants		
	n	**Percentage (%)**
Sex		
Male	64	39.75
Female	97	60.25
Marital Status		
Married	92	57.14
Single	69	42.82
Education Level		
Illiterate	1	0.62
Primary School	77	47.82
High School	50	31.05
University	33	20.4
Employment		
Employed	74	45.96
Unemployed	87	54.03
	Mean ± SD	**Min/ Max**
Age		
Male	37.12±10.57	20 / 63
Female	33.56±10.42	19 / 74
Total	34.98±10.59	19 / 74
Duration of epilepsy (years)	14.1 ±9.78	1 / 48
Epilepsy Type		
Focal	101	62.73
Generalized	31	19.25
Unknown	29	18.01
Anti-seizure Medication		
Single drug	104	64.5
Dual drug	38	23.60
Multidrug	19	11.80
Epilepsy Surgery		
Yes	1	0.62
No	160	99.37

depression, while 21 patients were found to be suffering from mild depression. According to the Hamilton anxiety scale, anxiety was observed in 34 (21.2%) of the patients, with major anxiety in 3 patients and minor anxiety in 31 patients.

When the anxiety-depression scores were contrasted to the patient's demographic and clinical characteristics, there was an increase in Beck depression and Hamilton anxiety scores as the number of ASMs used increased. This ratio was considered statistically significant (p .01-p .00).

Furthermore, when the Beck depression and Hamilton anxiety scores of patients with COVID-19 disease were compared to those who did not catch it, the scores of the individuals who caught the disease showed a statistically significant increase (p=0.03) (Table 4-5).

DISCUSSION

With this study, we hope to learn more about how the COVID-19 pandemic affected epilepsy patients' mental comorbidities, socioeconomic status, and seizures, as well as the challenges they faced during the pandemic era. As is well known, we observe psychiatric disorders such as depression and anxiety in epilepsy patients at a higher rate than in the general population.[4] In

Table 2: Relevant lifestyle changes during COVID-19 pandemic.(n = 161)

During the Pandemic;	n	Percentage (%)
Insomnia		
Yes	49	30.43
No	112	69.56
Seizure Frequency		
Increasing more than %50	11	6.83
Reducing more than %50	17	10.55
No change	133	82.60
Worsening Economic Income		
Yes	92	57.14
No	69	42.85
Difficulty of Accessing to Hospital/Drugs		
Yes	24	14.9
No	137	85.1
Symptoms of Anxiety and Depression		
Yes	58	36.02
No	103	63.98
Infected with COVID-19		
Yes	17	10.5
No	144	89.5
Status Epilepticus		
Yes	1	0.62
No	160	99.38
Fear of COVID-19 or Seizure		
Seizure	99	64.09
COVID-19	62	38.51

a meta-analysis, psychiatric comorbidities were found in 21.9 % of epilepsy patients.[5]

During the pandemic, Assenza *et al*. conducted a study in Italy in which they evaluated the depression level of individuals with and without epilepsy using Beck depression scales. While signs of depression were found in 34.9% of epilepsy patients, this rate was found to be 24.4% in those who did not have epilepsy. When anxiety was measured in the same research, these figures

Table 3: Clinical features of confirmed COVID-19 cases in epilepsy patients (n=17)

Clinical features of confirmed COVID-19 cases in epilepsy patients	n	Percent (%)
Treatment (Favipravir)		
Yes	15	88.3
No	2	11.7
Disease Severity		
Mild Symptom	12	70.5
Moderate Symptom	2	11.7
Severe Symptom	3	17.4
Worsening of Seizure During Illness		
Yes	5	29.4
No	12	70.5

Table 4: Depression and anxiety rates of the participants (n=161)

Beck Depression Scale	**n**		**Percentage (%)**
Normal	90		55.9
	FEMALE	MALE	
Mild Depression	26	17	26.7
Moderate Depression	18	5	14.2
Severe Depression	4	1	3.1
Hamilton Anxiety Scale	**n**		**Percentage (%)**
Normal	127		78.8
	FEMALE	MALE	
Minor Anxiety	22	9	19.2
Major Anxiety	3	0	1.8

were 60.5 % and 52.5 %, respectively.[6] In our study, 44.1 % of our patients were diagnosed with depression using the Beck depression scale, with 26.7 % having mild depression, 14.2 % moderate depression, and 3.1 % having severe depression.

Anxiety disorder was found in 21.2% of the patients, with 19.2% having minor anxiety symptoms and 1.86 % having major anxiety symptoms. Anxiety levels were lower than expected in our study. This might be connected to the accuracy of the responses provided to the questions posed. It could be related to the fact that the Hamilton anxiety scale was administered by a clinician during the interview and not completed by a psychiatrist. Increased number of ASMs was associated with statistically significant elevations in the incidence of depression and anxiety among patients. Similar research has been done in the past, and some findings show that monotherapy may be beneficial in treating depression.[7] Our study also supported this data. Epilepsy patients are now recognized as at significant risk of job insecurity and socioeconomic vulnerability.[8,9]

In a survey of 255 epilepsy patients in Spain, 30% of the patients said the pandemic and quarantine measures had a negative economic impact on them.[10] In our study, this rate was above 50%. This distressing and unsettling finding indicates that epilepsy patients in Turkey are severely impacted socioeconomically by the pandemic. Furthermore, the negative economic effect was linked to an increase in seizure frequency in the same research, and this element was one cause of the spike in seizure frequency.[10] When we looked at the correlation between the negative economic effect and the rise in seizure frequency in our study, we discovered no statistically significant relationship. Approximately 30% of patients in our research reported insomnia, particularly at night, as well as drowsiness throughout the day. There was no significant correlation between insomnia and an increase in seizures.

When sleep difficulties in epilepsy patients during the pandemic era were examined, this rate was reported as 47% by Assenza *et al*., 71.2% by Alhotani *et al*., and 55% by Abokalawa *et al*. This rate was around 30% in our study.[6, 11,12] A sleep scale was used to assess sleep quality in the studies mentioned above. On the other hand, we did not utilize any scale to determine if the patient's sleep quality or pattern had changed. This may be the reason for the lower level of sleep disorder in our study compared to other studies. This is one of the limitations of our study.

In research including 182 epilepsy patients, Koh May *et al*. reported a rise in seizure frequency of 11% during the pandemic era, which was lowered to 8% with adequate AED medication.[13] Despite these unfavorable conditions, when the patient's seizure frequency was examined, we found that only around 6% of the patients experienced an increase in seizures over 50%, which is consistent with the literature. In addition, 10% of the patients in our study reported a decrease in the frequency of their seizures. In the study of Koh Mah *et al*., a similar reduction in seizure frequency was observed.[13] Although this decrease can be attributed to the fact that patients are less physically active during the pandemic period, independent of their anxiety, depression levels, sleep disorders, socioeconomic problems, lifestyle stability, and a lower incidence of infections except for COVID. Yet, this decrease may be only linked to the overall course of the disease.

Table 5: Comparison of the participant's demographic and clinical features and anxiety/depression scores (n=161)

Comparison of the participant's Demographic and Clinical Features and Anxiety/Depression Scores				
	n	**Percentage (%)**	***p-value***	
			BDS*	**HAS***
Sex			.05	.05
Male	64	39.75		
Female	97	60.25		
Marital Status			.55	.36
Married	92	57.14		
Single	69	42.82		
Education Level			.31	.27
Illiterate	1	0.62		
Primary School	77	47.82		
High School	50	31.05		
University	33	20.4		
Employment			.060	.079
Employed	74	45.96		
Unemployed	87	54.03		
Epilepsy Type			.99	.87
Focal	101	62.73		
Generalized	31	19.25		
Unknown	29	18.01		
Antiseizure Medication			**.01**	**.00**
Single Drug	104	64.5		
Dual Drug	38	23.60		
Multidrug	19	11.80		
Insomnia			.08	.95
Yes	49	30.43		
No	112	69.56		
Seizure Frequency			.08	.20
Increasing more than %50	11	6.83		
Reducing more than %50	17	10.55		
No change	133	82.60		
Worsening Economic Income			.05	.25
Yes	92	57.14		
No	69	42.85		
COVID-19 Infection			**.03**	**.003**
Yes	17	10.5		
No	144	89.5		

*BDS: Beck Depression Scale, *HAS: Hamilton anxiety scales

When asked if they had trouble getting to the hospital or accessing the antiseizure medications they were taking during the pandemic, 24 patients (14.9 %) said they had certain difficulties. It should be noted that this rate was relatively low when compared to other research in the literature.[14,15] Following the initial declaration of a pandemic in Turkey, the Ministry of Health made it possible for all patients suffering from chronic diseases to access their prescribed medications from pharmacies at no cost. Furthermore, even during the most intensive phase of the pandemic at our

hospital, outpatient clinics where epilepsy patients were monitored continued to operate effectively. These factors, we believe, may be linked to the causes of the low rate. Only 17 patients had a history of COVID at the time of the study, 5 (29.4%) of these patients had more frequent seizures, and only 1 patient experienced status epilepticus. Only 3 of the 17 participants required hospitalization due to serious symptoms related to COVID-19 infection (pulmonary involvement, etc.), and 2 of these patients experienced increased seizures during the infection. In 3 of 5 individuals with increased seizures secondary to the infection, antiseizure medications/dose adjustments were performed.

Patients who had COVID-19 had statistically higher levels of anxiety and depression. The increase in seizure frequency between patients who did not have COVID-19 and patients who did have COVID-19 was intended; however, a statistical comparison could not be achieved due to the small number of patients with higher seizure frequency secondary to infection. In this regard, our study has a limitation. In comparison to our study, research in China indicated that a small percentage of the patients involved in the study, approximately 9%, suffered an increased number of seizures during the COVID-19 pandemic. While 7% of individuals with no history of COVID-19 exposure experienced increased seizures, 27% of patients with a history of COVID-19 experienced seizure exacerbations. However, even though the higher incidence of seizures following a stressful event varied widely between 3 and 58 percents in earlier research, it was noted that the findings were remarkably similar to those of the two previous reports.[16] In our study, we found our comparable rates support similar results.

This study has some limitations. Since our study was designed as a non-randomized control study (descriptive), it may not represent the real epilepsy population, and reliable statistical inferences cannot be made. Because the study data came from a single tertiary centre, it may be biased (thus taking all the complex epilepsy cases) and may not reflect the 'true burden'. In our study group, the number was small and the effect of the pandemic on sleep disturbance and income level could have been determined more objectively by using different scales. On the other hand, our study, along with other similar studies in different populations, highlights once again the "need" for larger, more systematic studies to explore these issues (i.e. the depression, and anxiety problems faced by epilepsy patients during the pandemic). Our study is a slide of real outpatient demographics and represents a 'real life' scenario, as well as serves as a reminder for clinicians to consider these issues when dealing with their epilepsy patients in their daily practice.

As a result of the COVID-19 pandemic and quarantine measures, epilepsy patients have been affected significantly. An increase in seizures was observed in a significant number of patients. In addition, most of the patients expressed anxiety, depression symptoms and insomnia. More comprehensive randomized studies are required to prevent these problems from happening.

DISCLOSURE

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