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Research Article / Araştırma Makalesi

# Effects of COVID-19 Pandemic on Childhood Epilepsy Management; A Survey Study

## *COVID-19 Pandemisinin Çocukluk Çağı Epilepsi Yönetimi Üzerindeki Etkileri; Anket Çalışması*

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## Abstract

The World Health Organization (WHO) declared the new coronavirus disease (COVID-19) pandemic on March 11, 2020. The pandemic has significantly impacted health systems worldwide, forcing them to reconsider the management of chronic diseases. Reorganization of health systems has inevitably prioritized the management of patients with COVID-19 infection, reducing hospital access for patients with other chronic diseases. Epilepsy is one of the most common chronic diseases of childhood, and pediatric neurologists have reviewed the methods they use in the management and treatment of epilepsy during pandemics. We organized a survey to evaluate the attitudes of pediatric neurologists in epilepsy management during the pandemic period. The 24-item questionnaire, created with Microsoft Forms, was sent to child neurologists via social communication platforms. Data were collected over two weeks. Variables were evaluated with Pearson chi-square and Student's t-test. Mann-Whitney U test and Student's t-test were used to compare the averages between the two groups. $p < 0.05$ value was considered statistically significant. 118 participants (79 women and 39 men) who answered all the questions were included in the study. The mean age of the participants was 41.46±7.49 years, and the median child neurology experience was 6 years (3 months-36 years). The participants mostly postponed the outpatient clinic appointments of patients whose seizures were under control (77.5%). Most participants preferred to reduce the number or postpone electroencephalographies (EEG) during this period. The outpatient clinic visits of patients with well-controlled epileptic seizures can be postponed during the pandemic. In cases where face-to-face communication is not possible during the pandemic period, the patients' medical history and video images may help diagnose. The telemedicine method can also be useful in the post-pandemic period in the follow-up and management of patients with controlled epileptic seizures.

**Keywords:** children, epilepsy, treatment, EEG, covid 19 pandemic

## Özet

Dünya Sağlık Örgütü (DSÖ), 11 Mart 2020'de yeni koronavirüs hastalığını (COVID-19) pandemi olarak ilan etti. Bu durum dünya çapında sağlık sistemlerini önemli ölçüde etkiledi ve kronik hastalıkların yönetimini yeniden gözden geçirmeye zorladı. Sağlık sisteminin salgın döneminde yeniden düzenlenmesi, kaçınılmaz olarak COVID-19 enfeksiyonlu hastaların yönetimine öncelik vererek, diğer kronik hastalıkları olan hastalar için hastaneye erişimi azalttı. Epilepsi, çocukluk çağının en yaygın kronik hastalıklarından biridir ve pediatrik nörologlar, pandemiler sırasında epilepsi yönetimi ve tedavisinde kullandıkları yöntemleri gözden geçirmek zorunda kalmıştır. Biz de pandemi döneminde epilepsi yönetiminde pediatrik nörologların tutumlarını değerlendirmek amacıyla bir anket düzenledik. Microsoft Forms ile oluşturulan 24 maddelik anket sosyal iletişim platformları aracılığıyla çocuk nöroloğlarına gönderildi. Veriler iki hafta boyunca toplandı. Değişkenler Pearson ki-kare ve Student's t-testi ile değerlendirildi. İki grup arasındaki ortalamaları karşılaştırmak için Mann-Whitney U testi ve Student's t-testi kullanıldı. $p < 0.05$ değeri istatistiksel olarak anlamlı kabul edildi. Tüm soruları cevaplayan 118 katılımcı (79 kadın ve 39 erkek) çalışmaya dahil edildi. Katılımcıların ortalama yaşı 41,46 ± 7,49 yıl ve ortanca çocuk nöroloji deneyimi 6 yıl (3 ay-36 yıl) idi. Katılımcılar çoğunlukla nöbetleri kontrol altında olan hastaların poliklinik randevularını (% 77,5) ertelemişlerdir. Katılımcıların çoğu bu dönemde elektroensefalografilerin (EEG) sayısını azaltmayı veya ertelemeyi tercih ettiler. İyi kontrollü epileptik nöbetleri olan hastaların poliklinik ziyaretleri pandemi sırasında ertelenebilir. Pandemi döneminde yüz yüze iletişimin mümkün olmadığı durumlarda hastaların tıbbi geçmişi ve video görüntüleri tanıya yardımcı olabilir. Teletıp yöntemi, pandemi sonrası dönemde, kontrollü epileptik nöbetleri olan hastaların takip ve yönetiminde de faydalı olabilir.

**Anahtar Kelimeler:** Çocuk, karaciğer nakli, canlı aşılama

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## 1. Introduction

In March 2020, the WHO declared the COVID-19 pandemic. As a result, governments have introduced some control measures to reduce transmission and ease the health systems' burden. The COVID 19 pandemic has reshaped the management of chronic diseases. The reorganization of health systems has inevitably prioritized patients with COVID-19 infection, reducing hospital access for patients with other chronic diseases.[1] Epilepsy is one of the most common chronic diseases affecting 60 million people worldwide.[2,3] The prevalence of epilepsy in childhood in our country is 0.8%, and epilepsy patients constitute most of the patient burden of pediatric neurologists.[4]

In the management of epilepsy, regular outpatient visits are carried out to regulate the antiepileptic treatment and manage behavioral or psychological problems related to epilepsy. The precautions and limitations brought due to the pandemic have affected the outpatient services.[1] For this reason, pediatric neurologists have reviewed the methods they use to manage and treat epilepsy, both by the government and hospital policy and with their preferences. Besides, patients did not prefer to go to the hospital, except in emergencies, due to infection risk. During this period, patients with epilepsy started to be evaluated by phone and video calls.[5] Since the pandemic's duration is not known, and patient evaluations cannot be postponed indefinitely, the use of telemedicine services has become particularly important during this period.[1] The physicians who could not benefit from telemedicine services communicated with their patients through various social communication networks, telephone and video calls, and short message services.[1]

The telemedicine method provides a real-time interactive conversation between the patient and the physician. There are 33750 articles about telemedicine in medical search engines until May 2020, of which about 1300 are related to COVID-19.[6,7] However, these publications do not mention the changes caused by the pandemic in the management of epilepsy. This survey study aimed to reveal how pediatric neurologists manage epilepsy patients during the pandemic period.

## 2. Methods

This study is a descriptive, cross-sectional survey study. A 24-item questionnaire was drafted using Microsoft Forms and distributed among pediatric neurologists via Turkey's social communications services. All participants were informed about the purpose and the anonymity of the study before starting the survey. The study was kept open for two weeks, and data were collected in two weeks period. The study protocol was approved by Republic of Turkey Ministry of Health (approval no: 2020-05-17T21_02_14). Ethics approval was obtained by the ethics committee of the health sciences University Behcet Uz Pediatric Hospital with the number 2020 / 18-04. The questionnaire included questions about the participants' socio-demographic characteristics and workplace of the measures taken during the pandemic period, how these measures affect patient management, and the methods used while applying these measures. (Figure 1)

### *Statistics*

Measurements such as mean, median, frequency, standard deviation (SD) from statistical analyzes were made with Statistical Package for Social Sciences (SPSS) software for Windows, version 23.0 program, and the results were given as mean ± SD, percentage values and median values . Variables were evaluated with Pearson chi-square and Student's t-test. Student's t-test were used to compare the averages between the two groups. $p < 0.05$ value was considered statistically significant.

## 3. Results

Among 121 participants, 118 participants who answered all the questions were included in the study. Seventy-nine women and 39 men completed the questionnaire. Eighty-four of the participants were pediatric neurologists and 39 were pediatric neurology residents. The mean age of the participants was 41.46±7.49 years, and the median child neurology experience was 6 years (3 months-36 years).

One hundred thirteen participants (96%) stated that they made changes in epilepsy management during the pandemic. There was a decrease in the number of outpatient clinic patients except for one participant. Only 35% of participants were involved in deciding hospital policy for the COVID-19 pandemic.

Participants stated that the main reason (68.6%) for the decrease in the number of outpatient visits was parents' preferences and concern about COVID-19 transmission (Figure 2). The most challenging part of outpatient follow-up during the pandemic was close contact with the patient during physical examination (Figure 3). While 42 participants (35.6%) stated no change in the diagnostic methods, the same number of participants stated that they postponed the electrophysiological examinations.

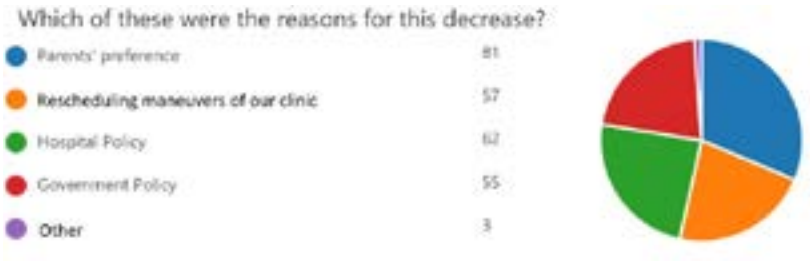


**Figure 2.** The reasons for the decrease in the number of patients

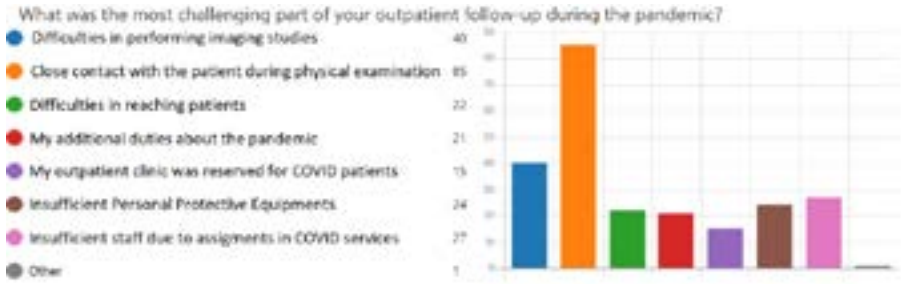


**Figure 3.**Difficult parts of the pandemic when doctors manage the out-patient

All participants stated that they used technological devices to solve their patients' seizure-related complaints at least once during the pandemic. There was no significant increase in the use of remote communication before and after the pandemic (Student's t-test). However, there was an increase, although not significant, among those using telemedicine. Most of the patients (77.5%) whose appointments were delayed were patients with well-controlled seizures. Of the 66 (56%) participants, there was an increase in the number of seizures in a very few number of patients whose appointments were delayed. There was no increase in the number of seizures in any of the 46 (39%) participants. Half of the participants avoided antiepileptic medication dose reduction during this period.

Many participants (62%) have reduced the number of relatives admitted to the patient's room. A considerable number of postponed EEG appointments or reduced the number of EEG appointments, but some preferred to take protective measures during EEG examinations (Figure 4). While evaluating the patient who presented with the first seizure, participants stated that they preferred different practices than the methods they used before. The most common method was the evaluation of the patient's history and video images together. (Figure 5).

When age groups were evaluated, there was no difference in out-of-hospital communication rates with the patient (Pearson chi-square).

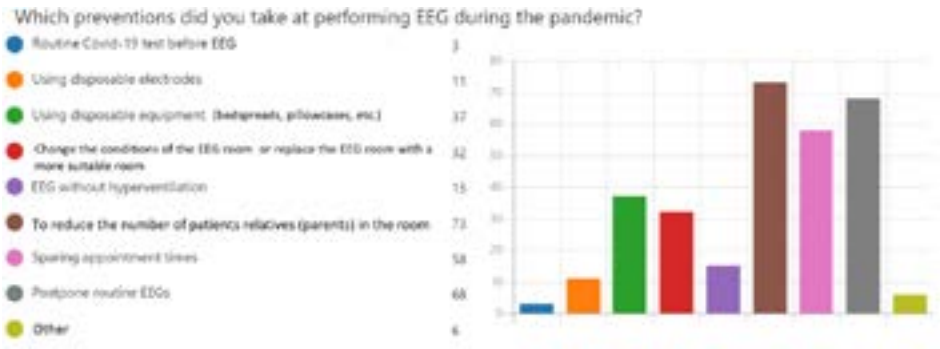


**Figure 4.** Which preventations did the doctors take at performing EEG during pandemic

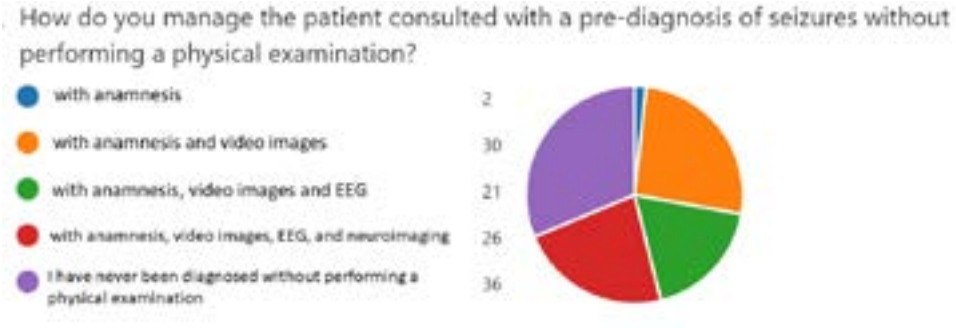


**Figure 5.** How the doctors manage the paient with a seizure without examination

## 4. Discussion

The COVID 19 pandemic has significantly impacted people, national economies, and health systems worldwide. In this period, physicians had to take some precautions to protect themselves and their patients with chronic diseases. Although guidelines have been published to manage chronic diseases during the pandemic period, each physician has created their protective measures, especially in the early period of the pandemic. Measures by Governments such as maintaining social distance and ensuring that people stay at home have reduced patients' hospital admissions other than emergencies. However, this may have caused epilepsy patients to have anxiety about reaching their physicians in an emergency**.** A recent study showed that patients with epilepsy during the COVID-19 outbreak have significantly higher psychological distress than the general population.[8] Anxiety reduces the quality of life in patients with epilepsy.[9] Therefore, even if the routine outpatient clinic visits of epilepsy patients were postponed, it should be ensured that they communicate with their physicians through methods other than face-to-face interviews. In our study, 96 participants (81.3%) postponed the routine outpatient visits. Instead, they stated that they used remote communication like social communication networks, telephone, video interviews, or telemedicine, at least once during the pandemic to evaluate their patients. Most of the patients (77.5%) whose appointments were delayed were patients with well-controlled seizures. No increase in seizures was observed in most patients whose outpatient visits were postponed ($p < 0.05$). Some participants (13%) stated that due to various hospital and government policies, they

had to postpone all their patients regardless of the patient's condition, and some of the participants (8%) did not postpone any of their outpatient visits. Among the participants who postponed outpatient visits, 40% did not observe seizures in any patient, and 57% of them observed seizures in only a few patients. This result suggests that patients with well-controlled epileptic seizures can be managed without a hospital application. In the literature, no statistically significant difference was found between epilepsy patients evaluated by telemedicine methods and face-to-face communication in terms of seizure frequency.[10]

All participants stated that they had used at least one national or international 'epilepsy management in pandemic' guideline during the pandemic period. Guidelines do not recommend hospital admissions except for the first seizure, status epilepticus, and seizures that cause physical injury[1,11,12] They state that a careful medical history and video images can be used to evaluate new patients, and physical examinations and examinations can be delayed.[12] In our study, only 26% of the participants preferred to diagnose epileptic seizures with the history of and video images of the patient. However, %30 of the participants did not diagnose the patient without examining the patient, and %41 did not give up electrophysiological methods or neuroimaging. This can be partially explained by the inadequate legal regulations regarding remote communication methods in health systems in our country. It may have been difficult for physicians to leave their old habits during the diagnostic process.

It was observed that the participants who did not communicate with out-of-hospital patients in any way before the pandemic or who only communicated via e-mail were working at the university hospital and were over 50 years old. One reason for this may be that these participants are mentors of the center where they work, and that out-of-hospital communication can be achieved with their assistants. However, this determination is not significant when we compare the participants over the age of 50 and those under 50 in the whole group. Because the participants who do not use any fast communication method are in a very minority (5%).

While nearly all participants used an easily accessible communication method for their out-of-hospital patients. The official professional telemedicine usage before the pandemic was 5%. These participants' common characteristics are that they work in a private office or hospital and are between 35 and 55 years old. Although it was not statistically significant, an increase in the use of telemedicine was observed than the pre-pandemic in our study. That may indicate that it will be used more in the future. Legal regulations are needed to use the telemedicine method, which has been applied globally for years. In a study, a program to diagnose epilepsy in children could detect epilepsy with a sensitivity of 91.5% and a specificity of 88.6%.[13] In another study, an application with 11 questions diagnosed epilepsy with 88% sensitivity and 100% specificity in adult patients.[14] Therefore, in cases where the patient cannot easily reach the physician, such as the pandemic period, telemedicine or other remote communication methods might help prevent delays in diagnosis and treatment

The major limitation of our study is that it is a survey study based on the statements of the participants.

In conclusion, the outpatient clinic visits of patients with well-controlled epileptic seizures can be postponed during the pandemic period. In cases where face-to-face communication is not possible during the pandemic period, the patients' medical history and video images may help in diagnosis. Telemedicine can be useful in the long-term management of these patients, even after pandemics. Remote management of patients with epilepsy may also be useful for patients living in rural areas, distant to tertiary centers. It is necessary to establish the technical structure and make the legal regulations for the wide use of telemedicine.

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