

# Assessing How Pediatricians, General Practitioners and Family Physicians Take an Approach to Seizure in Children

## Çocuk Hekimleri, Pratisyen ve Aile Hekimlerinin Çocukluk Çağındaki Nöbetlere Yaklaşımının Değerlendirilmesi

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### Abstract

**Introduction:** A survey was conducted with the aim of evaluating the attitudes, behaviors and knowledge of physicians in the same province towards pediatric patients with seizures.

**Materials and Methods:** Questionnaires requested to be filled on a voluntary basis were distributed to pediatricians and general practitioners working in university hospitals, district state hospitals and private hospitals; family physicians working in family and community health centers. The interventions to be performed on the patient with febrile and afebrile seizures, the drugs used, their doses, and which patients to refer to pediatric neurology center were asked.

**Results:** A total of 110 doctors -58 family physicians, 32 general practitioners, 20 pediatricians- participated in the study. There was a significant difference in the answers about the second drug that should be administered in ongoing seizure and the rectal diazepam dosage according to the title, institution and the duration of status epilepticus according to the institution and whether or not to give medication to the patient whose seizure had stopped according to the title and the duration in practice of the physician. Also, significant difference was determined in the answers about the time to start drug treatment according to the title and response to questions about the complicated febrile convulsion criteria, 3<sup>rd</sup> line drug to be administered and body temperature accepted as fever according to the institution.

**Conclusion:** Physicians were found to have different approaches in pediatric patients with seizures. It was thought that it would be possible to use common treatment protocols by conducting in-service training.

### Keywords

Seizure, child, pediatricist, general practitioner, status epilepticus

### Anahtar kelimeler

Nöbet, çocuk, pediatricist, aile hekimi, status epilepticus

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### Öz

**Giriş:** Aynı ildeki hekimlerin nöbet geçiren pediatrik yaş grubundaki hastaya karşı tutum, davranış ve bilgilerinin değerlendirilmesi, sonuçlar doğrultusunda hizmet içi eğitim programları düzenlenebilmesi hedeflenerek anket çalışması yapıldı.

**Gereç ve Yöntem:** Çalışma Giresun ilinde yapıldı. Üniversite hastanesinde, ilçe devlet hastanelerinde ve özel hastanelerde çalışan çocuk hekimlerine ve pratisyen hekimlere; aile ve toplum sağlığı merkezlerinde çalışan aile hekimlerine anket formu yollandı. Febril ve afebril nöbetle gelen hastaya yapılacak müdahaleler, kullanılan ilaçlar ve dozları, hangi hastaları çocuk nöroloji bölümüne sevk edeceklerine dair soruların gönüllülük esasına uygun olarak doldurulması istendi.

**Bulgular:** Toplam 110 hekim çalışmaya katıldı. Bunların 58'i aile hekimi, 32'si pratisyen ve 20'si çocuk hekimiydi. Nöbeti devam eden hastada ilk doz ilaçla durdurulamayan nöbette uygulanması gereken ikinci ilacın ne olduğu ve rektal diazepam uygulama dozu sorularında unvan, kurum ve hekimlik süresine göre;

nöbetin kaçınıcı dakikasında status epileptikus kabul edileceği sorusunda kurum ve hekimlik süresine göre; acile geldiğinde nöbeti durmuş hastaya ilaç verilip verilmeyeceği sorusunda unvan ve hekimlik süresine göre anlamlı farklılık vardı. İlaç tedavisinin hangi dakikada başlaması gerektiği unvana göre, nöbeti durmayan hastada 3. uygulanacak ilaç, ateş değeri ve komplike febril nöbet kriterlerinden olmayan hangisidir sorularında kuruma göre anlamlı farklılık tespit edildi.

**Sonuç:** Hekimlerin acile nöbet ile gelen çocuk hastalarda birbirinden farklı yaklaşımları olduğu görüldü. Hizmet içi eğitim yapılarak ortak tedavi protokollerinin kullanılmasının sağlanabileceği düşünüldü.

## Introduction

Seizures are among the most common neurological emergencies encountered in children. It has been reported that 4-10% of children have a non-triggered seizure up to the age of 16 (1). Seizures constitute 1% of emergency admissions (2). Every physician should have sufficient knowledge about the approach to seizures. Pediatricians are more familiar with the seizure management (3).

General practitioners and family physicians who do not keep emergency shifts are unfortunately staying away from this issue because they do not use their knowledge in the clinic. The conditions of the centers worked may cause the formation of different algorithms. For this reason, a questionnaire was sent to physicians working in the city center and districts, family health, community health centers and private hospitals in our city, and their applications were learned.

## Materials and Methods

The study was conducted in the province of Giresun. The questionnaire forms were delivered to pediatricians and general practitioners/family physicians in university hospitals, district state hospitals and private hospitals by hand and via e-mail, and they were requested to be filled in on a voluntary basis.

We prepared a questionnaire containing questions to determine the attitude, awareness and level of knowledge of physicians in managing patients with seizures. The sociodemographic data form consisted of seven questions, including age, gender, title, duration of practice, the institution where they were employed, the status of being on shifts, and how many patients with seizures they see per month. In the questionnaire form, there were 20 questions about the febrile and afebrile seizures, interventions and doses of the medications should be used for a patient who had a seizure. These questions were asked as multiple choice

and fill in the blanks, and some questions offered more than one correct option.

Due approval was obtained from Giresun University Clinical Research Ethics Committee for the study (approval number: 15, date: 18.02.2021).

## Statistical Analysis

IBM SPSS 23 package program was used. The differences between groups were examined using Kruskal-Wallis test, which is one of the non-parametric tests, and then the binary differences were compared with Tamhane's T<sup>2</sup> test.

## Results

A total of 110 physicians participated in our study. 39 were female, 63 were male and eight physicians did not specify their gender. The questionnaire was filled out by 20 (18%) pediatricians, 58 (53%) family physicians (4 specialist family physicians) and 32 (29%) general practitioners. 52 (47.3%) of the physicians work in family health center (FHC), 3 (2.7%) in community health center (CHC), 22 (20%) in district state hospital (DH), 22 (20%) in university hospital, and 11 (10%) in the private hospitals. 62 (56%) of the physicians stay on duty at the hospital. 46 (43%) physicians did not meet any patient with seizures in the pediatric age group, 52 (47%) physicians meet less than five, and 11 (10%) physicians meet 5 or more patients with seizures per month.

All of the interventions that should be done in the patient who came to the emergency department with an ongoing seizure were given as the choices and wanted to be marked. 26 physicians (11 general practitioners, 11 family physicians, 4 pediatricians) marked all of them. The marking rate of the other procedures with decreasing rates was: supplying vascular access (85%), supplying oxygen (83%), measuring fever (77%), measuring blood glucose (69%), testing biochemical parameters (54%), measuring blood pressure (50%) and aspiration of the patients mouth (48%).

The survey included questions whether the drug would be given to the patient whose seizure had stopped; which drug should be preferred; when to start the drug treatment; what should be the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> line drugs; how long the seizure lasts should be considered as status epilepticus; which temperature should be accepted as fever; which were not included in the criteria of complicated febrile seizure (FS); which patient should be referred to the pediatric neurology department and dosage of rectal diazepam, benzodiazepine (BZ) and phenytoin (PHT). The answers of the physicians changed according to the title, the institution studied and the duration of practice. Only the statistically significant ones were written in Table 1-3.

Most of the physicians in FHC left blank the questions asking the dosage of the above written drugs and their correct response rate was very low. The rate of accurate knowledge in the university hospital (BZ: 59% and PHT: 59%, respectively) was lower than the DH (BZ: 77%, PHT: 90%) and the private hospital (BZ: 72%, PHT: 90%). As for the title, it was seen that more than half of family physicians and general practitioners left blank, the rate of correct answer

decreased as pediatrician, general practitioner and family physician, respectively, 85-44-28% for BZ and 95-38-25% for PHT.

Administration routes of midazolam was asked and the answers were marked in decreasing order as intravenous (IV) 90%, intramuscular (IM) and nasal 43%, rectal 38%, buccal 20%. Only 5 physicians (3 family physicians, 1 general practitioner, 1 pediatrician) marked all of them.

The drugs which might be used in status epilepticus were chosen in decreasing rates as benzodiazepine 86%, phenytoin 80%, phenobarbital 55%, valproic acid and general anesthetics 54%, propofol 42%, levetiracetam 41%, thiopental/pentobarbital 33% and ketamine 25%. Six out of the seven physicians who marked all of them true in this question were pediatricians.

It is stated that no physician started an anticonvulsive drug to a patient with first simple FS. After the first simple FS, family physicians and general practitioners choose to refer pediatric neurology at a rate of 70% and this rate was 20% for the pediatricians. It was

Table 1. Questions showing a significant difference in the assessment by title

Questions	Family doctor		Pediatrist		Practitioner		Total		p
	No	%	No	%	No	%	No	%	
Would you give treatment to the patient whose seizure stopped?									
Yes	27	47.4	1	5.3	23	71.9	51	47.2	<0.001*
No	30	52.6	18	94.7	9	28.1	57	52.8	
At what minute of the seizure do you start treatment?									
1. min	36	69.2	10	52.6	28	87.5	74	71.8	0.025*
3. min	5	9.6	5	26.3	3	9.4	13	12.6	
5. min	8	15.4	4	21.1	1	3.1	13	12.6	
10. min	1	1.9	0	0	0	0	1	1	
15. min	2	3.8	0	0	0	0	2	1.9	
If the seizure has not stopped with the first dose of medication. what should be the second drug?									
<b>Benzodiazepine</b>	<b>24</b>	<b>46.2</b>	<b>14</b>	<b>70</b>	<b>22</b>	<b>68.8</b>	<b>60</b>	<b>57.7</b>	0.036*
Phenytoin	22	42.3	5	25	10	31.3	37	35.6	
Valproate	5	9.6	1	5	0	0	6	5.8	
Levetiracetam	1	1.9	0	0	0	0	1	1	
Rectal diazepam dosage									
True	16	28.1	17	85	15	46.9	48	44	<0.001*
False	41	71.9	3	15	17	53.1	61	56	

\*Tamhane's T<sup>2</sup> test

observed that the rate of referral to pediatric neurology including pediatricians increased significantly (>90%) in recurrent FS.

Physicians working in the university hospital answered the question about the indication for performing LP in febrile seizure correctly at the highest rate.

In the question asking about referral of the patient

with afebrile seizure to pediatric neurology, family physicians and general practitioners stated that they would refer the patient with first afebrile seizure at a rate of 50% and the patient with recurrent afebrile seizures at a rate of 80%. The referral rate of the pediatricians was 85% for the first and 95% for the recurrent afebrile seizure.

Table 2. Questions showing a significant difference in the assessment by institution

Questions	Family health center		District hospital		University hospital		Private hospital		Total		p
	No	%	No	%	No	%	No	%	No	%	
How many minutes of the seizure will you accept as status?											
5	8	15.1	5	22.7	11	50	0	0	24	22.2	0.015*
10	12	22.6	1	4.5	2	9.1	2	18.2	17	15.7	-
15	9	17.0	3	13.6	4	18.2	1	9.1	17	15.7	-
30	21	39.6	13	59.1	4	18.2	8	72.7	46	42.6	-
60	3	5.7	0	0	1	4.5	0	0	4	3.7	-
If the seizure has not stopped with the first dose of medication. what should be the second drug?											
<b>Benzodiazepine</b>	<b>14</b>	<b>35</b>	<b>12</b>	<b>85.7</b>	<b>10</b>	<b>83.3</b>	<b>1</b>	<b>33.3</b>	<b>37</b>	<b>53.6</b>	0.001*
Phenytoin	21	52.5	1	7.1	2	16.7	1	33.3	25	36.2	-
Valproate	5	12.5	0	0	0	0	1	33.3	6	8.7	-
Levetiracetam	0	0	1	7.1	0	0	0	0	1	1.4	-
Which drug should be administered if it has not stopped despite two doses of benzodiazepines?											
Benzodiazepine	9	25	7	50	2	16.7	0	0	18	27.7	0.011*
Phenytoin	13	36.1	6	42.9	8	66.7	1	33.3	28	43.1	-
Valproate	8	22.2	0	0	0	0	1	33.3	9	13.8	-
Levetiracetam	6	16.7	1	7.1	2	16.7	1	33.3	10	15.4	-
Rectal diazepam dosage											
True	8	14.8	18	81.8	14	63.6	8	72.7	48	44	<0.001*
False	46	85.2	4	18.2	8	36.4	3	27.3	61	56	-
Body temperature accepted as fever											
37	2	4.8	2	14.3	4	33.3	0	0	8	11.3	<0.001*
37.3	2	4.8	1	7.1	0	0	0	0	3	4.2	-
37.5	11	26.2	5	35.7	5	41.7	2	66.7	23	32.4	-
<b>38</b>	<b>19</b>	<b>45.2</b>	<b>4</b>	<b>28.6</b>	<b>3</b>	<b>25.0</b>	<b>1</b>	<b>33.3</b>	<b>27</b>	<b>38.0</b>	-
38.5	8	19.0	2	14.3	0	0	0	0	10	14.1	-
Which is not criteria of complicated FS?											
Seizure lasting more than 15 minutes	6	15.4	0	0	1	8.3	0	0	7	10.3	0.021*
More than one seizure in 24 hours	1	2.6	1	7.1	0	0	0	0	2	2.9	-
Postictal neurological abnormality	0	0	0	0	1	8.3	0	0	1	1.5	-
Focal seizure	11	28.2	3	21.4	1	8.3	0	0	15	22.1	-
Seizure lasting more than 5 minutes	<b>21</b>	<b>53.8</b>	<b>10</b>	<b>71.4</b>	<b>9</b>	<b>75</b>	<b>3</b>	<b>100</b>	<b>43</b>	<b>63.2</b>	-

\*Tamhane's T<sup>2</sup> test

Table 3. Questions showing a significant difference in the evaluation according to the duration of practice

Questions	Duration of medical practice								
	1-5 years		5-10 years		>10 years		Total		p
	No	%	No	%	No	%	No	%	
Would you give treatment to the patient whose seizure stopped?									
Yes	21	63.9	6	27.3	24	45.3	51	47.2	0.029*
<b>No</b>	<b>12</b>	<b>36.4</b>	<b>16</b>	<b>72.7</b>	<b>29</b>	<b>54.7</b>	<b>57</b>	<b>52.8</b>	-
How many minutes of the seizure will you accept as status?									
5	17	51.5	2	9.1	5	9.4	24	22.2	0.006*
10	3	9.1	4	18.2	10	18.9	17	15.7	-
15	1	3.0	6	27.3	10	18.9	17	15.7	-
<b>30</b>	<b>12</b>	<b>36.4</b>	<b>8</b>	<b>36.4</b>	<b>26</b>	<b>49.1</b>	<b>46</b>	<b>42.6</b>	-
60	0	0	2	9.1	2	3.8	4	3.7	-
If the seizure has not stopped with the first dose of medication what should be the second drug?									
<b>Benzodiazepine</b>	<b>23</b>	<b>67.9</b>	<b>15</b>	<b>68.2</b>	<b>22</b>	<b>44.9</b>	<b>60</b>	<b>57.7</b>	0.040*
Phenytoin	9	27.3	6	27.3	22	44.9	37	35.6	-
Valproate	1	3.0	0	0.0	5	10.2	6	5.8	-
Levetiracetam	0	0.0	1	4.5	0	0.0	1	1.0	-
Rectal diazepam dosage									
<b>True</b>	<b>20</b>	<b>60.6</b>	<b>12</b>	<b>54.5</b>	<b>16</b>	<b>29.6</b>	<b>48</b>	<b>44.0</b>	0.010*
False	13	39.4	10	45.5	38	70.4	61	56.0	-

\*Tamhane's T<sup>2</sup> test

## Discussion

Assessment and interventions of the patient who comes to the emergency room with a seizure should be performed simultaneously. For this reason, the team should have an algorithm for approaching the patient with a seizure, and this algorithm should be applied routinely to each patient. With this study, we tried to understand the approaches of physicians working in different centers with different titles. Since the deficiencies cannot be corrected without revealing the situation, this study was planned to determine the situation and then plan in-service trainings.

We have seen that blood pressure measurement and aspiration remain secondary among the interventions that should be done to the patient with seizures. Even in the university hospital, interventions were performed at a low rate (aspiration 36%, blood glucose and pressure measurement 50%). In this question, physicians working in the private hospital marked measurement of the blood glucose and the temperature, supplying vascular access and oxygen as 100%. This situation emphasized the importance of establishing the routines of the centers

(2). In addition, this situation can be attributed to the fact that the people working in private hospitals change in a longer period, and the staff change period is shorter in the state hospital and university hospital.

Half of the family physicians and approximately one third of the general practitioners were in favor of administering medication to the patient whose seizure stopped. Most of these physicians did not seem to go on duty so they stay away from clinical practice. Pediatricians stated that they would not prescribe medicine.

When we asked about the time to start drug treatment during the seizure, we realized that all physicians would start at the 1st minute despite the correct answer would be 5 minutes. Since it is not known how long the patient has had a seizure at the arrival, it may be appropriate to start treatment immediately in a patient who comes to the emergency room with seizures. It was clear that our colleagues thought so.

It is known that the majority of seizures are brief, and once a seizure lasts more than 5 minutes it is likely to be prolonged (4). In this case, the first choice drug

preferred to stop seizure is benzodiazepines. If there is no response to the first dose, the second dose can be administered with an interval of 5 minutes (5,6). In the absence of intravenous access, buccal midazolam or rectal diazepam are therefore acceptable first-line anticonvulsants for the treatment of an acute tonic-clonic convulsion that has lasted at least five minutes (7).

As the year of practicing medicine got longer, it was seen that after the first benzodiazepine dose, second line drugs were used instead of second dose of BZ. It was observed that the rate of correct knowledge of the rectal diazepam dose decreased. It was also observed that as the year of practicing medicine got longer, the rate of acceptance of SE as 30 minutes increased. Physicians who had experienced less than 5 years stated SE as more than 5 minutes. We may find this logical if we consider the changes in status epilepticus over time. Also, young physicians were in favor of administering medication to a patient whose seizure had stopped. We thought that, approaches could change along with experience. This situation made us think that information that was not used over the years was forgotten, and stereotyped information was remembered.

There have been many changes in the definition of SE in terms of duration over the time (4,8,9). According to the generally accepted conventional view, it is the seizure activity that lasts 30 minutes or longer or the presence of two or more seizures without improvement in consciousness (10). In 1998, Lowenstein et al. (11) defined SE in children over 5 years old and adults as seizures lasting for at least 5 minutes or 2 or more seizures between which consciousness was not fully recovered. Current definition of SE is a condition resulting either from the failure of the mechanisms responsible for seizure termination or from the initiation of mechanisms, which lead to abnormally prolonged seizures (after time point t1). It is a condition, which can have long-term consequences (after time point t2), including neuronal death, neuronal injury, and alteration of neuronal networks, depending on the type and duration of seizures (12,13). It was reported as t1: 5 min, t2: 30 min for convulsive (tonic clonic) status, and t1: 10 min, t2 >60 min. for focal status with impaired consciousness. It should be taken into consideration that these periods may vary, as there is not enough evidence yet (10-12,14,15). We did not clarify focal or generalized SE and we accepted SE as 30 min.

Consensus reports define fever as 38.0 °C for febrile convulsion (16-18). We see that physicians working in family health centers gave correct answer to the question of body temperature accepted as fever statistically significantly. The pediatricians who encountered more febrile seizures mostly accepted fever as subfebrile fever of 37.5 °C. It was thought that pediatricians gave this answer, since seizures could occur even if the fever value was lower than 38 degrees.

In Keleş et al. (19) studies, 62.1% of the pediatricians participating in the study and 51.6% of the general practitioners stated that the fever should be at least 38.0 °C in order to be called FS.

Regarding the application of LP to the patient who has febrile seizures, it was observed that the approach of all physicians, including pediatricians was not clear. Patients with incomplete vaccination between 6-12 months were not marked by half of the pediatricians despite it should be considered as LP criteria. Misunderstanding of the question or the distracting old information "every patient under the age of 1 year" given in the other answer option may have been confusing. Indications for LP have been reported by the American Academy of Pediatrics for patients presenting with febrile seizures (20). In the report of APA in 1996, lumbar puncture (LP) was strongly recommended for children under 12 months who presented with the first simple febrile seizure, and it was suggested that it should be considered in children aged 12-18 months. APA renewed its recommendations for patients with simple febrile seizures in 2011. In this report, LP was recommended for every child with febrile seizures and clinical signs and symptoms of meningitis. It has been suggested that LP can be considered in babies aged between 6 and 12 months if Hib/pneumococcal vaccines are missing, if the vaccination status is unknown, or if antibiotics were used before the seizure (21).

Insufficient knowledge of the buccal route, one of the routes of application of midazolam was noteworthy. It is known that benzodiazepines can be administered intranasally, buccally and rectally (22), and buccal midazolam is effective in order not to waste time when intravenous route cannot be found (23-25).

We think that the buccal application is not marked because it is still not widely used in Turkey.

The difference between the institutions in the questions of the dosage of the drugs are challenging because in all centers, the patient is first greeted by the general practitioner, then referred to a specialist or pediatrician. It was thought that this result was obtained because the practitioners working in the university hospital directed the patient to the specialist more easily and did not manage the patient one-to-one. Another explanation may be that many different practitioners worked at the University hospital, in the other centers the staff is more stable.

It was more widely known by pediatricians that the patient who presented with the first afebrile seizure should undergo cranial imaging, have an EEG, and anticonvulsive drug should not be initiated. We think that it is because pediatricians have met with pediatric patients in their specialty education and work life.

The accuracy rates of defining febrile convulsion, initiation of antipyretic medication in the patient with febrile seizure and referral to pediatric neurology were listed as pediatrician, general practitioner and family physicians. That is because of the fact that most of the family physicians did not encounter a patient who had a seizure due to their studies on FHC and CHCs.

The fact that no physician would not initiate anticonvulsive drugs to the patient with the first simple FS showed that there was no information gap/ lack of knowledge on this subject.

In Keleş et al. (19) study, it was found that the majority of the practitioners (73.9%) referred the patients to pediatric neurology, while the rate of referral by pediatricians was 4%. In this study it is found that for simple FS referral to pediatric neurology by pediatricians was null; but 23.6% of family physicians and 35.5% of the practitioners referred to pediatric neurology. It is thought that the rate of referral to neurology for simple FS is decreasing by time fortunately. The referral rate, including pediatricians, increased significantly (>90%) in recurrent FS.

In the referral question of the patient with the first and recurrent afebrile seizure, all physicians stated that they referred to pediatric neurology. The rate of referral of pediatricians was 85% and 95% for the first and recurrent seizures, these rates were 53-80% and 68-65% respectively for the family physicians and general practitioners. This this means that there should be awareness on this issue in groups other than pediatricians.

In addition, 55% of the physicians working in private hospitals did not refer the patients with complicated FS and afebrile seizures to pediatric neurology. It was observed that the referral rate was high in DHs. This situation can be explained by the desire of families to go to a more advanced center and the insufficient medical facilities in the hospitals in districts. The situation in private hospitals, on the other hand, may be due to their efforts to deal with the problems within their own, since there were no pediatric neurologists in our city before.

### Conclusion

It is very important to reveal the attitudes and knowledge of pediatricians, family physicians and general practitioners about their approach to a child with seizures in terms of identifying deficiencies in this regard and organizing their education.

We have already conducted a study to understand the situation in our city, although it is not appropriate to reflect this to the general, we have seen that pediatricians keep their knowledge, and family physicians and general practitioners need in-service training, although it varies according to the center they work.

In this study, it was seen that there are different applications and deficiencies on the basis of institution and branch. Considering that practitioners in many centers meet the patients with seizures in the emergency room, we thought that their awareness on this issue should be increased.

### Ethics

*Ethics Committee Approval:* Due approval was obtained from Giresun University Clinical Research Ethics Committee for the study (approval number: 15, date: 18.02.2021).

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