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Original Research

Knowledge and Self-Efficacy Levels of Family Physicians on Epilepsy Management in Türkiye: Pre- and Post-Education Evaluation

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Abstract

Objectives: Family physicians (FPs) are directly responsible for the care of people with epilepsy. However, their education about epilepsy may be inadequate or lacking. The aim of this study was to assess the basic knowledge and self-efficacy levels regarding epilepsy among FPs and to identify their educational needs in managing epilepsy.

Methods: The sample for this pre-test-intervention-post-test study consisted of 60 FPs. FPs attended a four-hour training on epilepsy management. The effectiveness of the training was assessed with the Epilepsy Knowledge and Self-Efficacy (EKSE) scale before and after the training. In addition, a survey was conducted to determine the problems encountered in the follow-up of epilepsy patients and their training needs.

Results: 60 physicians participated in the study [37 males (61.7%), mean age 37.97±8.92 years and professional duration 80.48±70.59 months]. While the total EKSE score of FPs was 90.23±10.97 before the training, it increased to 112.3±15.26 points after the training ($p<0.001$). After the training, significant score increases were observed in all subcomponents of the EKSE compared to before the training. After the training, there was a significant improvement in the physicians' ability to recognize diseases accompanying epilepsy, to have sufficient knowledge about antiseizure medications, and to follow up patients with epilepsy compared to before the training ($p<0.001$, $p=0.001$, and $p=0.002$, respectively).

Conclusion: This study demonstrated that FPs have need for education regarding epilepsy management and that the education provided has a positive impact.

Keywords: Epilepsy, education, family physician, primary care, health promotion

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Epilepsy is a brain disorder characterized by a predisposition to recurrent seizures, with serious cognitive, psychological, and social consequences.[1] It affects more than 50 million people worldwide, 80% of whom live in low- and lower-middle-income countries (LIMCs).[2] Nearly half of people with epilepsy living in LIMCs remain undiagnosed, and only one in five of those diagnosed receive appropriate treatment.[3] This situation is called the epilepsy diagnosis and treatment gap. A recent meta-analysis shows that the epilepsy treatment gap varies widely, from 5.6% in Norway to 100% in parts of Tibet, Togo and Uganda.[4]

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The World Health Organization (WHO) supports the inclusion of primary health care services in these processes in order to close the epilepsy diagnosis and treatment gap. [5] WHO emphasizes the importance of primary health care services in the detection of epilepsy cases, implementation of basic treatment protocols and follow-up of treatments. It also views epilepsy care as a shared responsibility between primary and secondary care providers.[5,6] The International League Against Epilepsy (ILAE) has developed a training curriculum to strengthen epilepsy diagnosis and care at the primary care level.[7] However, it has been stated that educational programs need to be developed and adapted to the needs of different environments due to differences between country income groups.[7] FPs are the first point of contact in providing medical care and social support to people with epilepsy. Despite the frequent encounters of FPs with patients with epilepsy, epilepsy management is not included in undergraduate and graduate curriculum, making it difficult for FPs to effectively help patients with epilepsy.[8]

In this study, training seminars were organized to improve the knowledge and self-efficacy perceptions of FPs regarding epilepsy management. Educational seminars have been made more functional by focusing on the difficulties and educational needs of physicians during the follow-up of epilepsy patients in a primary care setting. It has been predicted that increasing physicians' knowledge and self-efficacy levels regarding epilepsy may positively affect the care of epilepsy patients. The main aim of the study was to evaluate the basic knowledge and self-efficacy levels of FPs and general practitioners working in the eastern part of Türkiye about epilepsy. It was also aimed to determine the difficulties and training needs of physicians in epilepsy management in primary health care.

Methods

Participants

In Türkiye, primary care services are provided by family physicians or physicians who are not family physicians but have a "family physician practice authorization certificate" All of these physicians are called family physicians/general practitioners.[9] There is no postgraduate curriculum for epilepsy in Türkiye. It is also not included in the family medicine specialization curriculum.

This intervention study was conducted among FPs and general practitioners (GPs) receiving specialist training in the Department of Family Medicine at a university hospital in eastern Türkiye. Physicians were invited to attend epilepsy seminars held during regular training hours. A total of sixty physician volunteers who attended the training seminars and completed the pre-training survey were included in this study.

Intervention

Four sixty-minute educational seminars were planned, one week apart, about epilepsy, including the medical and social aspects of the disease. Participants were invited to participate in the study using a pre-test-intervention-post-test design. They were asked to fill out questionnaires before and after the training. When creating the content of the training seminar, the content described in the training curriculum developed and recommended for use by the ILAE Education Council, which is evidence-based and consensus-based for the management of epilepsy in the primary health care setting, was first reviewed. [7] The medical portion of the training consisted of a short classical lecture that included information on how physicians diagnose epilepsy, counsel people with epilepsy on a range of issues, provide treatment and follow-up for people with epilepsy, refer patients to higher care facilities as appropriate, manage epilepsy emergencies including status epilepticus, and recognize and provide basic care for psychiatric and somatic comorbidities. The social part was about psychosocial issues such as stigma, possible consequences, health reports (military service, driver's license, work permit, sports certificate) and daily life problems that patients with epilepsy may encounter. As a basis for the social aspects of epilepsy, information on the website of the Turkish chapter of the ILAE was used.[10] The training was enriched with real-life cases. All training was carried out by a neurologist (GY). The seminar content has been designed in accordance with ILAE standards, and a detailed summary of the core training content is presented in Supplemental material 1.

Data Collection Tools

Data Collection Form

This section provides information on the sociodemographic characteristics of the participants, such as age, sex, length of service, and professional status (family physician/general practitioner). In addition, additional descriptive questions were included to understand the participants' knowledge and experience of epilepsy. The questions used in this section were taken from the first section (five multiple-choice questions) measuring epilepsy knowledge of a survey evaluating the knowledge and attitudes of primary care physicians about epilepsy.[11] These questions cover topics such as the definition of epilepsy, the source of epilepsy information, first exposure to an epileptic seizure, first treatment experience, and self-assessed satisfaction with epilepsy information. The second section of the survey assessing attitudes toward epilepsy was excluded from the scope of our study.

Family Physicians' Epilepsy Knowledge and Self-Efficacy Scale

Epilepsy knowledge and self-efficacy (EKSE) scale was applied under supervision before (pre-) and after (post-test) the intervention. EKSE is a scale that questions the needs of family medicine in terms of epilepsy management from the perspective of core competencies. EKSE evaluates physicians' perceptions of some knowledge and self-efficacy regarding epilepsy management using 24 positive and 5 negative statements on a 5-point Likert scale. Positive questions are calculated as 1 point for the answer 'strongly disagree', 2 points for the answer 'disagree', 3 points for the answer 'undecided', 4 points for the answer 'agree', and 5 points for the answer 'strongly agree'. Negative statements were coded as the opposite of positive questions. The lowest and highest scores that can be obtained from the 29 statements in the survey are between 29 and 145 points. The Cronbach alpha internal consistency coefficient of the scale was reported as 0.848 (Supplemental material 2).[8]

The World Organization of Family Physicians (WONCA) European definition of the competencies expected from a family physician consists of six subcomponents including primary care management (PCM), person-centered care (PCC), holistic approach (HA), comprehensive approach (CA), specific problem-solving skills (SPSS) and community orientation (CO).[12] The items in the EKSE scale are included in the family medicine core competencies. Primary care management (questions 1-4), Person-centered care (questions 5-7), Holistic approach (questions 8-10), Comprehensive approach (questions 11-23), Specific problem solving skills (questions 24-28) and Community orientation (question 29) are listed.

Challenges and Educational Needs of Family Physicians

A questionnaire was created to obtain information about the difficulties/problems physicians encounter in managing patients with epilepsy in the primary care setting and thus to determine their training needs. After the literature review, a question pool was created by the researchers on this subject. The questions were then selected from this pool by an expert panel. A pilot application was conducted with 20 physicians before the study. The form consists of twelve yes/no questions. Frequencies and percentages of responses were calculated before and after the training (Table 1). It was thought that this questionnaire could de-

Table 1. Difficulties encountered by family physicians in the follow-up of patients with epilepsy

Questions	Answers	Pre-training (n=60)	Post-training (n=60)	p*
Lack of knowledge about epilepsy	No	37 (61.7)	45 (75.0)	0.201
	Yes	23 (38.3)	15 (25.0)	
Not knowing how to follow up an patient with epilepsy	No	22 (36.7)	32 (53.3)	0.144
	Yes	38 (63.3)	28 (46.7)	
Not knowing the diseases that accompany epilepsy	No	20 (33.3)	42 (70.0)	<0.001
	Yes	40 (66.7)	18 (30.0)	
Having difficulty prescribing anti-seizure medication	No	34 (56.7)	43 (71.7)	0.151
	Yes	26 (43.3)	17 (28.3)	
Not having enough information about drug dosage/side effects	No	11 (18.3)	31 (51.7)	0.001
	Yes	49 (81.7)	29 (48.3)	
Insisting on prescribing drugs without a report	No	27 (45.0)	46 (76.7)	0.002
	Yes	33 (55.0)	14 (23.3)	
Not being able to allocate enough time due to patient density	No	37 (61.7)	42 (70.0)	0.472
	Yes	23 (38.3)	18 (30.0)	
Difficulty managing the patient in special situations	No	38 (63.3)	43 (71.7)	0.383
	Yes	22 (36.7)	17 (28.3)	
Patient non-compliance with treatment	No	40 (66.7)	43 (71.7)	0.700
	Yes	20 (33.3)	17 (28.3)	
Difficulty in referring the patient to a specialist and consulting	No	43 (71.7)	50 (83.3)	0.210
	Yes	17 (28.3)	10 (16.7)	
I don't have any problems	No	59 (98.3)	53 (88.3)	0.070
	Yes	1 (1.7)	7 (11.7)	
Not knowing what to do with health reports	No	41 (68.3)	49 (81.7)	0.152
	Yes	19 (31.7)	11 (18.3)	

Answer categories are expressed as frequency (percent); *: McNemar's chi-square test; The p-values lower than 0.05 highlighted as bold.

termine the difficulties/problems experienced by family physicians in the management of patients with epilepsy and that training seminars prepared according to the needs on this subject could be useful.

Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki and was approved by the Inonu University Ethics Committee (date:14.11.2023, no: 2023/5240). The participants of the study signed written informed consent.

Statistical Analysis

According to the theoretical power analysis, the sample size required to find a statistically significant difference between the groups was calculated as at least 34 physicians.[13] In the study, variables were summarized appropriately according to different measurement levels. Mean±standard deviation and median (interquartile range) were used for continuous variables (Tables 2 and 3), while categorical variables were presented as frequency and percentage (Table 1). In statistical analyses, type 1 error level was set as α=0.05. Normality assumption for continuous paired measurements was checked by Shapiro-Wilk test. Paired t-test was used for variables with normal distribution, and Wilcoxon signed rank test was used for variables with non-normal distribution. In pre- and post-training comparisons, Wilcoxon signed-rank test and paired samples t-test were used in dependent groups according to the assumption of normal distribution (Table 2). Wilcoxon signed-rank test was used in subgroup analyses according to occupational groups (Table 3). McNemar chi-square test was used to compare

Table 2. Evaluation of knowledge and self-efficacy perceptions regarding epilepsy management

Subgroups	Pre-training (n=60)	Post-training (n=60)	p
PCM	8.27±2.46 | 8 (5-14)	12.68±4.58 | 11 (4-20)	<0.001*
PCC	10.07±2.11 | 10 (5-15)	12.05±1.91 | 12 (7-15)	<0.001*
HA	10.67±2.00 | 10 (7-15)	12.02±1.98 | 12 (7-15)	<0.001*
CA	38.3±7.42 | 39 (18-53)	49.58±7.39 | 50 (25-65)	<0.001*
CO	2.97±1.09 | 3 (1-5)	3.63±1.07 | 4 (2-5)	0.002*
SPSS	19.97±2.24 | 20 (15-25)	21.83±2.45 | 22 (15-25)	<0.001*
Total score	90.23±10.97 | 90 (59-119)	112.3±15.26 | 111 (72-146)	<0.001**

Subgroups are expressed as mean±std. deviation and median (interquartile range); *: Wilcoxon signed-rank test; **: Paired-samples t-test; The p-values lower than 0.05 highlighted as bold; PCM: Primary care management; PCC: Person-centred care; HA: Holistic approach; CA: Comprehensive approach; CO: Community orientation; SPSS: Specific problem-solving skills.

Table 3. Evaluation of knowledge and self-efficacy perception regarding epilepsy management (According to occupational groups)

Subgroups	Occupational group	Pre-training (n=60)	Post-training (n=60)	p*
PCM	GP	7.95±2.70 | 7 (5-14)	11.89±4.57 | 11 (7-20)	0.01
	FP	8.41±2.37 | 8 (5-14)	13.05±4.60 | 12 (4-20)	<0.001
PCC	GP	9.95±2.20 | 10 (5-14)	11.79±2.23 | 12 (7-15)	0.036
	FP	10.12±2.10 | 10 (6-15)	12.17±1.76 | 12 (7-15)	<0.001
HA	GP	10.37±2.14 | 10 (7-14)	11.74±2.28 | 12 (7-15)	0.145
	FP	10.80±1.94 | 11 (7-15)	12.15±1.84 | 12 (8-15)	<0.001
CA	GP	36.11±8.49 | 38 (18-52)	48.32±6.66 | 49 (38-61)	0.001
	FP	39.32±6.75 | 39 (25-53)	50.17±7.72 | 50 (25-65)	<0.001
CO	GP	2.74±0.99 | 3 (1-4)	3.26±1.24 | 3 (2-5)	0.217
	FP	3.07±1.13 | 3 (1-5)	3.80±0.95 | 4 (2-5)	0.005
SPSS	GP	19.63±2.31 | 20 (16-25)	21.58±2.95 | 23 (16-25)	0.044
	FP	20.12±2.22 | 20 (15-24)	21.95±2.21 | 22 (15-25)	<0.001
Total score	GP	86.74±13.10 | 89 (59-112)	108.58±14.45 | 109 (89-139)	0.002
	FP	91.85±9.57 | 92 (75-119)	114.02±15.5 | 111 (72-146)	<0.001

Subgroups are expressed as mean±std. deviation and median (interquartile range); *: Wilcoxon signed-rank test; The p-values lower than 0.05 highlighted as bold; PCM: Primary care management; PCC: Person-centred care; HA: Holistic approach; CA: Comprehensive approach; CO: Community orientation; SPSS: Specific problem-solving skills; FP: Family physician; GP: General practitioner.

categorical variables (Table 1). Statistically significant results (p<0.05) are emphasized in bold font in the tables. Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) Statistics 27.0 (IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0 Armonk, NY: IBM Corp. USA)

Results

Data Collection Form Results

Sixty physicians [(37 male (61.7%); 41 family physicians (68.3%)] answered the EKSE scale before and after the training. The mean age of the participants was 37.97±8.92 years (range: 25-56 years) and professional duration was 80.48±70.59 months (range: 1- 276 months).

All 60 participants (100%) answered the question "What is epilepsy?" correctly.

According to the responses to the question "Where did you first get your information about epilepsy?", the vast majority of participants 95% (57 person) indicated medical school as their main source of information. On the other hand, 1.7% (1 person) indicated their role as a primary care physician and 3.3% (2 person) selected "other" but did not specify.

When participants were asked, "Where did you first witness a seizure?" 18.3% (11 person) reported observing the seizure in medical school, 10% (6 person) as a resident physician in a hospital, 21.7% (13 person) as a primary care physician, 11.7% (7 person) in another healthcare setting, and 30% (18 person) in "other settings." Additionally, 8.3% (5 person) of participants reported never having witnessed a seizure before.

When the participants were asked the question "Where was your first experience of epileptic seizure treatment?", the responses were as follows: 13.3% (8 person) stated that they had their first experience of treatment at medical school, 5% (3 person) as a resident physician at a hospital, 45% (27 person) as a primary care physician, and 6.7% (4 person) at another health center. It was also noted that 30% (18 person) of the participants had never treated an epileptic seizure before.

When participants were asked the question "How would you rate your level of knowledge about epilepsy?", 30% (18 person) stated that they were very satisfied with their knowledge, 43.3% (26 person) were partially satisfied, and 1.7% (1 person) were not satisfied. These findings reflect the satisfaction level of the participants with their knowledge about epilepsy according to their own assessment.

Perceptions of Knowledge and Self-Efficacy Regarding Epilepsy Management

While FPs' EKSE scores before the training were 90.23±10.97, they increased to 112.3±15.26 points after the training (p<0.001). After the training, significant score increases were observed in all subcomponents of EKSE compared to before the training (Table 2). No statistically significant relationship was found between the age, sex, and professional duration of FPs and their EKSE scores (p>0.05). When the FP and GPs' EKSE total scores were compared before and after the training, a statistically significant increase was observed in both groups (p<0.001 and p=0.002, respectively). There was no statistically significant difference in the pre- and post-training HA and CO subcomponents in GPs (p>0.05) (Table 3).

Challenges and Educational Needs of Family Physicians

Following the training seminars addressing the difficulties that FPs reported in managing patients with epilepsy, improvements in their knowledge and self-confidence levels were observed to varying degrees. These improvements demonstrate the effectiveness of training that addresses the specific challenges physicians face. After the training, a significant improvement was observed in the knowledge levels of FPs regarding not having sufficient knowledge about the interactions, dosages and side effects of ASMs (81.7% vs. 48.3%, p=0.001), not recognizing the diseases seen together with epilepsy (66.7% vs. 30%, p<0.001) and having problems in the follow-up of patients with epilepsy (55% vs. 23.3%, p=0.002) (Table 1).

Discussion

In this study, a significant increase was observed in the EKSE total scores and all subcomponent scores of the physicians after the training compared to before the training. This suggests that education on epilepsy management increases FPs' perceptions of knowledge and self-efficacy. No statistically significant relationship was found between FPs' EKSE scores and their age, sex and professional duration. There was no significant difference in the HA and CO subcomponents of the GPs after the training compared to before the training. This can be interpreted as the GPs did not lack knowledge about these subcomponents or they considered themselves more competent.

There are few studies in the literature examining the effects of educational courses aimed at improving the knowledge and practice of primary care providers regarding epilepsy.[14-19] Because these studies used different populations and methodologies, their results cannot be directly compared.

This situation limits the generalizability of the research results. In a study conducted in Bolivia, a large proportion of general practitioners stated that they felt inadequate in the field of epilepsy before the training. However, after the training, a significant increase in the knowledge and skills of physicians regarding epilepsy was observed.[14] Similarly, an online epilepsy course in Latin America has created a significant shift in the way GPs approach patients with epilepsy. At the end of the course, physicians' confidence in disease management increased from 21% at the beginning to 73%.[15] In Thailand, a significant improvement in knowledge and attitudes of physicians and nurses was found after training on epilepsy care, highlighting the importance of epilepsy education.[16] A pediatric epilepsy education program for primary care physicians has been reported to increase knowledge and confidence in epilepsy management, potentially improving the large epilepsy treatment gap in children in Zambia.[17] A study using the methodology of Project ECHO (Extension for Community Healthcare Outcomes), a telementoring program, found that it offered primary care providers an effective approach to epilepsy management, with over 98% of participants reporting greater comfort and self-efficacy in treating patients with epilepsy or neurological disorders.[18] In this context, education programs are a cost-effective way to improve the knowledge, attitudes and practices of primary health care workers regarding epilepsy. Continuing education programs are needed to improve the management of individuals with epilepsy.[19] Although the new methodologies or online trainings mentioned have reported success in terms of applicability and reaching more healthcare personnel, we think that face-to-face training and feedback from participants after the course is a more effective approach. Another important issue is that inadequate knowledge of healthcare personnel has been reported as a contributing factor to the epilepsy treatment gap.[20] Therefore, the need for continuous and effective education campaigns, especially for healthcare personnel in rural communities, has been emphasized to increase knowledge about epilepsy and close the epilepsy treatment gap.[13] In the current study, a significant increase in FPs' EKSE scores was observed after the training compared to before the training. This shows the positive effect of their training on epilepsy.

In order to plan training campaigns for healthcare professionals, basic knowledge levels need to be determined.[13] A study conducted in Türkiye found that most physicians in the primary care setting generally have sufficient knowledge about intervention during a seizure.[8] However, the same study showed that physicians need more information and support regarding the treatment and long-term follow-up of epilepsy patients. Especially in special cases such as pregnancy, breastfeeding and childhood, primary care physicians feel inadequate in prescribing ASM and experience indecisiveness in issuing documents such as driving, sports and work permits for patients with epilepsy.[8] Some studies also support the fact that physicians have difficulty in managing patients because they do not have sufficient knowledge about ASMs.[16,17] In the United States, FPs have been noted to have difficulties in stopping and starting ASM, changing ASMs, and managing patients throughout pregnancy. This suggests that FPs, who are responsible for protecting the health of patients with epilepsy and their babies, need more information and training on the use of ASM before and during pregnancy as part of a person-centered and comprehensive approach.[21] Similarly, in our study, it was observed that most of the FPs had difficulties because they did not have sufficient knowledge about ASM before the training, did not know the diseases that occur together with epilepsy, and did not know how to follow up patients with epilepsy. This situation reveals the need for training in epilepsy management in primary care in our country.

The current study revealed that a solution-oriented approach to the educational needs of FPs and the problems they encounter during the epilepsy management process is an effective way to increase their interest in education. The high level of interest and positive evaluations of the participants in the training show that this approach is successful in achieving the learning objectives. As a result, the role of physicians in the management of epilepsy in primary health care is important. It is clear that cases of complex or treatment-resistant epilepsy, especially those with initiation of ASMs, changes during pregnancy, psychiatric comorbidities or diagnostic uncertainty, should be appropriately referred to neurologists. Supporting primary care physicians in issues such as epilepsy monitoring and evaluation of comorbidities will increase clinical safety by strengthening collaborative care models. The training we have organized has increased physicians' knowledge and confidence in managing conditions that do not require a neurologist, and has also enabled them to better identify patients who need to be referred to a specialist. In the current study, the increase in self-confidence observed in the subjects that the participants stated they had difficulty with compared to before the training is an important indicator of this situation. Further studies are needed to assess whether these self-reported improvements lead to actual changes in clinical behavior.

The current study has several limitations. First, participants' knowledge and practice in the management of patients with epilepsy were based on self-reports. This may include potential bias in subjective assessments. Second, voluntary

participation may have introduced selection bias, which may affect the generalizability of our training program to the general population. Thirdly, the duration of the training seminars was limited due to the fact that the program was organized in a shorter format rather than a course or symposium. In this context, the fact that some of the participants came from family health centers caused the training hours to be limited in order to ensure their participation in all seminars and to prevent problems that may occur during the permission processes. Finally, although participants reported increased confidence in managing patients with epilepsy after the training, no review could be conducted to assess the extent to which this training was reflected in clinical practice and whether it increased patient referrals to the epilepsy center. More comprehensive research is needed in the future to observe the long-term impact of training on patient outcomes.

Conclusion

FPs, who frequently encounter patients with epilepsy, need training in epilepsy management. Training in this area will increase physicians' knowledge levels and self-efficacy perceptions. This study can form the basis for future research.

Disclosures

Ethics Committee Approval: The study was approved by the Institutional Ethics Committee of Inonu University (date:14.11.2023, no: 2023/5240).

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