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Physicians Working At Different Clinical Settings: Can They Recognize and Manage Anaphylaxis?

Farklı Düzey Sağlık Basamaklarında Çalışan Hekimlerin Anafilaksi Tanı ve Yönetimi ile İlgili Bilgi Düzeyleri

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Abstract

Anaphylaxis is defined as a severe hypersensitivity reaction that can cause sudden onset and death. Therefore, it is vital that the diagnosis is made and the timely administration of epinephrine. In this study, it was aimed to determine the knowledge and attitudes of the physicians in Edirne city center regarding the diagnosis and treatment of anaphylaxis. The study was designed as cross sectional survey. Physicians were visited in their institutions. A written questionnaire was applied face-to-face and it included questions about diagnosis and management of anaphylaxis. A total of 347 physician agreed to participate in the study. 43.5% of the physicians did not read any literature, book chapters or guidelines about the diagnosis criteria. Only 16.7% of responders knew all sign and symptoms of anaphylaxis. Twenty eight percent of physicians knew that correct route and dose of epinephrine administration. Associated factors with the knowledge about correct dose and route of epinephrine administration were the number of encounters with anaphylaxis cases and presence of treatment scheme in the institution; OR (95% CI) were 3.520 (1.879-6.593) and 1.961 (1.168-3.290) respectively. 45.5% of the responders knew that there are no absolute contraindications to administer epinephrine in the case of anaphylactic shock. The study revealed that, knowledge of physicians relating diagnosis, treatment and management of anaphylaxis is unsatisfactory in our city. We think that it would be beneficial to provide physicians with in-service training regarding the diagnosis and management of anaphylaxis.

Keywords: Anaphylaxis; anaphylaxis management; physician; knowledge

Özet

Anafilaksi, ani başlangıçlı ve ölüme neden olabilen ciddi bir aşırı duyarlılık reaksiyonu olarak tanımlanır. Bu nedenle tanının konulması ve epinefrinin zamanında uygulanması hayati önem taşımaktadır. Bu çalışmada Edirne il merkezindeki hekimlerin anafilaksi tanı ve tedavisine ilişkin bilgi ve tutumlarının belirlenmesi amaçlanmıştır. Çalışma, kesitsel araştırma olarak tasarlandı. Hekimler kurumlarında ziyaret edildi. Yüz yüze yazılı bir anket uygulandı. Anket anafilaksi tanı ve yönetimi ile ilgili soruları içeriyordu. Toplam 347 hekim çalışmaya katılmayı kabul etti. Hekimlerin toplam %43,5'i tanı kriterleri ile ilgili herhangi bir literatür, kitap bölümü veya kılavuz okumamıştı. Yanıt verenlerin yalnızca %16,7'si anafilaksinin tüm belirti ve semptomlarını biliyordu. Hekimlerin yüzde yirmi sekizi, epinefrin uygulamasının doğru yolunu ve dozunu biliyordu. Epinefrinin doğru dozu ve uygulama yolu bilgisi ile ilişkili faktörler; anafilaksi vakaları ile karşılaşma sayısı ve kurumda tedavi şemasının varlığı; OR (%95 GA) sırasıyla 3,520 (1,879-6,593) ve 1,96 (1,168-3,290) idi. Yanıt verenlerin %45,5'i, anafilaktik şok durumunda epinefrin uygulamak için mutlak kontrendikasyon olmadığını biliyordu. Çalışma, ilimizde anafilaksi tanı, tedavi ve yönetimine ilişkin hekimlerin bilgilerinin yetersiz olduğunu ortaya koymuştur. Anafilaksi tanı ve yönetimi konusunda hekimlere hizmet içi eğitim verilmesinin faydalı olacağını düşünmekteyiz.

Anahtar Kelimeler: Anafilaksi, anafilaksi yönetimi, hekim, bilgi

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1. Introduction

Anaphylaxis is a serious, rapid onset allergic reaction that can be fatal (1). Although it is not known exactly, its lifetime prevalence is estimated to be 0.05-2% (2). Anaphylaxis is diagnosed by recognizing the characteristic symptoms and signs that occur in a short time after exposure to a potential or known trigger. Despite the increasing incidence of anaphylaxis, many cases have not been recognized or reported (3).

Intramuscular epinephrine is the main treatment for anaphylaxis. Steroids and antihistamines are considered to be second line therapies (3). One of the most important factors affecting mortality in anaphylaxis is the delay of epinephrine administration (4). Therefore, it is vital that the diagnosis is made and the timely administration of epinephrine. Physicians, should be knowledgeable and confident in the management of anaphylaxis. Previous studies revealed that physicians cannot adequately recognize anaphylaxis and provide appropriate treatment (5-9).

The main purpose of this study was to assess the knowledge and attitudes of the physicians in Edirne city center regarding the diagnosis and treatment of anaphylaxis.

2. Material and Methods

Ethics committee approval from Trakya University Faculty of Medicine Ethics Committee (TUTF-BAEK 2017/36) and necessary permissions from the centers where the data will be collected were obtained from Trakya University Faculty of Medicine, Trakya University Faculty of Dentistry, private hospital directorate, Edirne Provincial Health Directorate and Edirne Public Health Directorate.

Study population

The total number of physicians working in Edirne city center (university hospital, state hospital, private hospital, oral and dental health center, family health centers, Trakya University Faculty of Dentistry, 112 Emergency Health Service Stations) with 0-30 years of professional experience was 774, 420 physicians were reached, and 347 (46%) agreed to participate in the study. A questionnaire was applied to evaluate the knowledge and attitude of the physicians regarding anaphylaxis. Physicians were asked to answer questions without revealing their identity.

Study design

The study was designed as a cross-sectional survey. Physicians were visited in their institutions in June-July 2018 and a face-to-face questionnaire was applied. During the face-to-face interview with the physician, the necessary information was given verbally and in writing about the content, purpose and method of the study. Physicians who signed the informed consent form were included in the study. The guidelines of the World Allergy Organization, the European Academy of Allergy and Clinical Immunology were used to prepare the survey questions (3-10). The time required to complete the questionnaire was 5-10 minutes. Our study data were obtained from completed questionnaires. The questionnaire form consists of 4 closed-ended questions that evaluate demographic data; 4 true/false questions and 5 multiple choice questions that evaluate the knowledge; 5 multiple choice questions evaluating the attitude and 2 open-ended questions and a total of 20 questions. Correct situations or answers were scored as 1, and incorrect situations or answers were scored as 0 in the questions that evaluated the knowledge. Questionnaire form were evaluated over a total of 43 points.

Statistical analyses

The results obtained from the questionnaire were analyzed using the IBM SPSS Statistics for Windows, V.22.0 (IBM, Armonk, New York, USA) software. The data were presented as number and percentage (n,%), mean ± standard deviation was used for numerical data. Demographic data and responses to survey items are presented as proportions with 95% CIs. Multivariate logistic regression was used to identify factors associated that using of epinephrine correct administration dose and route. P value less than 0.05 considered statistically significant.

3. Results

Of the 347 physicians participating in the survey, 257 (74.1%) were resident, 61 (17.6%) were specialists and 29 (8.4%) were general practitioners. One hundred seventy nine (51.6%) of the physicians were male. The demographic characteristics and specialities of the physicians participating in the study are shown in Table 1.

Table 1. Demographic characteristics of physicians

Characteristic	Primary and Secondary Care		Tertiary Care		All Responders	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Overall	89	25.6 (21.0-30.3)	258	74.4 (69.7-79.0)	347	-
Age						
25-30	23	25.8 (16.9-34.8)	204	79.1 (73.6-84.1)	227	65.4 (60.2-70.6)
31-35	21	23.6 (15.7-32.6)	47	18.2 (13.6-23.3)	68	19.6 (15.6-23.9)
36-40	21	23.6 (14.6-32.6)	1	0.4 (0.0-1.2)	22	6.3 (4.0-9.2)
41-45	13	14.6 (7.9-22.5)	4	1.6 (0.4-3.1)	17	4.9 (2.6-7.2)
46-50	7	7.9 (3.4-13.5)	1	0.4 (0.0-1.2)	8	2.3 (0.9-4.0)
51-55	3	3.4 (0.0-7.9)	1	0.4 (0.0-1.2)	4	1.2 (0.3-2.6)
>56	1	1.1 (0.0-4.5)	0	0.0	1	0.3 (0.0-1.2)
Sex						
Male	54	60.7 (49.5-70.8)	125	48.4 (42.2-54.7)	179	51.6 (46.1-56.5)
Female	35	39.3 (29.2-50.5)	133	51.6 (45.3-57.8)	168	48.4 (43.5-53.9)
Education						
General practitioner	29	32.6 (23.6-42.7)	0	0.0	29	8.4 (5.5-11.5)
Resident	0	0.0	257	99.6 (98.8-100.0)	257	74.1 (68.9-78.7)
Specialist	60	67.4 (57.3-76.4)	1	0.4 (0.0-1.2)	61	17.6 (14.1-22.2)
Clinical experience						
< 5 years	17	19.1 (11.2-28.1)	195	75.6 (70.2-81.0)	212	61.1 (55.9-66.0)
5-10 years	28	31.5 (22.5-41.6)	55	21.3 (16.3-26.4)	83	23.9 (19.9-28.2)
11-15 years	22	24.7 (15.7-33.7)	4	1.6 (0.4-3.1)	26	7.5 (4.9-10.4)
16-20 years	12	13.5 (6.7-21.3)	2	0.8 (0.0-1.9)	14	4.0 (2.3-6.1)
>20 years	10	11.2 (5.6-18.0)	2	0.8 (0.0-1.9)	12	3.5 (1.7-5.8)

While 38% of the physicians had not encountered any anaphylaxis cases, 58% had encountered anaphylaxis cases between 1-10 and 3.7% of them had more than 10 anaphylaxis cases. Total of 63.3% physicians who encountered anaphylaxis case stated that they did not hesitate in the treatment of anaphylaxis in terms of to administer epinephrine or not.

Considering the responses to the symptoms that may be seen in anaphylaxis, the rate of physicians who stated that all the symptoms given in the question could be seen was 9% in primary and secondary care and 19.4% in tertiary care.

To the question of the first drug to be administered in the treatment of anaphylaxis, 87.6% of the physicians answered epinephrine, 7.5% dexamethasone, 3.2% phenyramine, 1.4% isotonic and 0.6% dopamine. In the question of the route of administration, 51.9% of the physicians preferred intramuscular, 28.5% intravenous, and 19.6% subcutaneous injection administration. While 45% of the physicians knew the treatment dose of epinephrine, which was 0.01 mg/kg, correctly, 42.4% stated wrong dose and 12.7% stated that they did not know the dose. Total of 28% physicians correctly knew 0.01 mg/kg intramuscular epinephrine dose, the first drug to be administered in the treatment of anaphylaxis, so they had “correct knowledge about adrenaline treatment”. The situations in which epinephrine is absolutely contraindicated in the treatment of anaphylactic shock was questioned, 45.5% of the physicians stated that there were no absolute contraindications. To the question for at least how long the patient with anaphylaxis should be followed up in the hospital after being stable with the first intervention, 14.4% of the physicians replied as 6-8 hours. Assessment of physicians' responses regarding symptoms, signs and managements of anaphylaxis are shown in Table 2.

Table 2. Assessment of physicians' responses regarding symptoms, signs and managements of anaphylaxis

Responses	Primary and Secondary Care		Tertiary Care		All Responders	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Initial medication						
Epinephrine	77	86.5 (79.8-93.3)	227	88.0 (83.3-91.9)	304	87.6 (83.9-90.8)
Dexametasone	12	13.5 (6.7-20.2)	14	5.4 (2.7-8.1)	26	7.5 (4.9-10.7)
Pheniramine	0	0.0	11	4.3 (1.9-7.0)	11	3.2 (1.4-5.2)
Isotonic fluid	0	0.0	5	1.9 (0.4-3.9)	5	1.4 (0.3-2.9)
Dopamine	0	0.0	1	0.4 (0.0-1.2)	1	0.3 (0.0-1.2)
Glucogon	0	0.0	0	0.0	0	0.0
Administration route						
Intravenous	32	36.0 (27.0-46.1)	67	26.0 (20.6-31.4)	99	28.5 (23.9-33.1)
Intramuscular	39	43.8 (34.8-53.9)	141	54.7 (48.4-60.9)	180	51.9 (46.4-57.3)
Subcutaneous	18	20.2 (12.4-29.2)	50	19.4 (14.3-24.4)	68	19.6 (15.6-23.6)
Administration dose						
0,01mg/kg	31	34.8 (24.7-44.9)	125	48,4 (42.3-54.3)	156	45 (40.1-50.1)
Unknown	17	19.1 (11.2-28.1)	27	10.5 (7.0-14.7)	44	12.7 (9.5-16.1)
Wrong doses	41	46.1 (36.0-56.2)	106	41.1 (34.9-46.9)	147	42.4 (37.2-47.8)
Symptom						
Respiratory distress	83	93.3 (87.6-97.8)	250	96.9 (95.0-98.8)	333	96.0 (93.7-98.0)
Urticaria	74	83.1 (75.3-89.9)	239	92.6 (89.1-95.7)	313	90.2 (86.8-93.1)
Hypotension	57	64.0 (53.9-74.2)	220	85.3 (81.0-89.5)	277	79.8 (75.5-84.1)
Loss of consciousness	59	66.3 (57.3-76.4)	187	72.5 67.1-77.5)	246	70.9 (66.0-75.5)
Collapse	47	52.8 (42.7-62.9)	177	68.6 (63.6-74.0)	224	64.6 (59.7-70.3)
Anxiety	41	46.1 (36.0-56.2)	169	65.5 (59.7-70.9)	210	60.5 (55.6-65.7)
Itchy throat	53	59.6 (49.4-69.7)	150	58.1 (52.3-64.0)	203	58.5 (53.3-64.0)
Cough	42	47.2 (36.0-57.3)	110	42.6 (36.8-48.8)	152	43.8 (38.6-49.3)
Vomiting	38	42.7 (32.6-52.8)	111	43.0 (36.8-49.2)	149	42.9 (37.5-48.7)
Itching in the palm	31	34.8 (24.7-44.9)	118	45.7 (39.5-51.9)	149	42.9 (37.8-48.7)
Abdominal pain	19	21.3 (13.5-30.3)	90	34.9 (29.1-40.7)	109	31.4 (26.8-36.3)
Diarrhea	16	18.0 (10.1-26.9)	72	27.9 (22.9-33.7)	88	25.4 (21.0-30.3)
Marking all symptoms	8	9.0 (3.4-15.7)	50	19.4 (14.3-24.0)	58	16.7 (12.7-20.7)

Factors associated with epinephrine preference, correct dosage and administration were determined. In a logistic regression model, encounters with anaphylaxis cases and presence of treatment scheme in the instutition was independent factor affecting the "correct knowledge about adrenaline treatment" (OR:3.52, 95% CI:1.89-6.59, p<0.001; OR:1.96, 95% Cl:1.16-3.29, p=0.011) (Table 3).

Table 3. Factors associated that using of epinephrine correct administration dose and route

Variable	OR (95% CI)	*p*
Age	0.876 (0.339-2.263)	0.784
Sex	1.372 (0.830-2.269)	0.217
Clinical experience	0.911 (0.360-2.305)	0.844
Clinical settings	1.295 (0.660-2.541)	0.452
Number of encounters with anaphylaxis cases	3.520 (1.879-6.593)	**<0.001**
Presence of treatment scheme in the instutition	1.961 (1.168-3.290)	**0.011**

The relationship between knowledge score and educational status, clinical experience, clinical setting and encounter with anaphylaxis case were evaluated. The knowledge score of the residents was found to be significantly higher than general practitioners and specialist (p<0.001). The knowledge score of physicians working at the tertiary care was significantly higher than those at primary and secondary care (p<0.001) (Table 4).

Table 4. Evaluation of physicians' knowledge scores

	Knowledge Score (mean ± SD)	*p*
Education		**<0.001**
General practitioner	28.00 ± 5.38	
Research asistant	30.50 ± 5.44	
Specialist	27.56 ± 5.55	
Clinical Experience		0.149
<5 years	30.12 ± 5.32	
≥5 years	29.23 ± 5.94	
Clinical settings		**<0.001**
Primary and secondary care	27.71 ± 5.50	
Tertiary care	30.48 ± 5.44	
Encounters with anaphylaxis cases		0.650
Encounters	29.88 ± 5.86	
Non-encounters	29.60 ± 5.12	

In our study, 83.9% of physicians reported that the centers they worked did not have a treatment scheme for anaphylaxis. After graduation from medical school or specialty training, 43.5% of the physicians did not read any literature, book chapters or guidelines about the diagnosis criteria and treatment of anaphylaxis and preferred an easy-to-understand treatment scheme that they could apply in case of emergency. Thirty two percent of them stated that they felt the need to read when they encountered such a patient, 12.7% did not read, thought their knowledge was sufficient, 11.5% did not read and did not think it was related to their specialities.

4. Discussion and Conclusion

Our study revealed that important gaps in knowledge of physicians regarding diagnosis and management of anaphylaxis.

As anaphylaxis can be fatal, it is important to know all system findings in terms of the importance of diagnosis for its correct and effective treatment. Only 16.7% of responders knew all sign and symptoms of anaphylaxis. Cough (43.8%), vomiting (42.9%), itching in the palm (42.9%), abdominal pain (31.4%), and diarrhea (25.4%) were reported by less than half of the physicians. Bekdas et al. (11) reported that, 47.3% of the physicians associated gastrointestinal symptoms with anaphylaxis. In another study from US, knowledge of physicians regarding symptoms of anaphylaxis was questioned, cough was associated with 30-55%, itching 6-15%, and abdominal pain 6-46% with anaphylaxis (12). Gastrointestinal symptoms (vomiting, abdominal pain, diarrhea), cough and itching on the palms/soles that were failure to associate with anaphylaxis may cause some cases to go undiagnosed and delays in epinephrine administration.

For a patient diagnosed with anaphylaxis, initiating fast, accurate and effective treatment is life-saving. In our study, 87.6% of the physicians stated epinephrine as the first treatment to be applied in anaphylaxis as in previous studies (5,9). In studies, the rate of physicians who chose the intramuscular route as the route of administration of epinephrine was found to be 44.7-85% (6,13-15). These rates were similar to our study. However only 28% of them correctly specified epinephrine as first treatment to be applied in anaphylaxis, its dose and route of administration. Celik et al. (16) reported in their study that only 15.3% of responders answered all three questions correctly. Depending on the fact that those in this study were dentists, the results may be considered poor, but although most of our participants were graduates of medical faculties working in tertiary care the results were worrisome even though those who knew 3 questions at the same time.

Associated factors that using of epinephrine's correct administration dose and route were the number of encounters with anaphylaxis cases and presence of treatment scheme. In our study, as the number of encounters with cases increased, the use of epinephrine at the correct dose and administration route increased. Similarly Grossman et al. (9) reported that the

use of intramuscular epinephrine was associated with an increasing volume of anaphylaxis cases.

Epinephrine usage in the treatment of anaphylactic shock has no absolute contraindication (17). More than one third of physicians who encountered anaphylaxis case stated that they hesitated in treatment of anaphylaxis in terms of to administer epinephrine or not. Intramuscular epinephrine is the main treatment for anaphylaxis. It should be administered as soon as possible and without hesitation (18). It has been shown that delayed epinephrine administration is a risk factor for mortality in cases of anaphylaxis (1,19). Our study revealed that 54.5% of the physicians thought there was an absolute contraindication in the use of epinephrine in the treatment of anaphylaxis. Altman et al. (12) reported that 16% of allergy/immunology specialists and 38% of family physicians stated that there is an absolute contraindication in the use of epinephrine in the treatment of anaphylaxis.

Another striking output of our study, the majority of the physicians (83.9%) reported that the centers they worked did not have a treatment scheme for anaphylaxis treatment. Approximately one third of the physicians (32%) stated that they read the diagnosis criteria and treatment of anaphylaxis after they encountered anaphylaxis, while nearly half of them (43.5%) stated that they had not read any informative resources on this subject before. Kahveci et al. (20) pointed out that 11.5% of family physicians and 8.3% of pediatricians read the information on the website after an anaphylaxis training, but 57.7% and 75%, respectively, read the written documents. We think it would be beneficial to have an easily accessible treatment scheme for physicians. In addition, one study suggested that it may be beneficial to have anaphylaxis guides on or near the resuscitation chart (21).

The European Academy of Allergy and Clinical Immunology recommends that patients presenting with respiratory complaints should be followed for 6-8 hours and those presenting with poor circulation for 12-24 hours (10). In the follow-up of patients admitted to the emergency department due to anaphylaxis, the clinical severity at presentation, the time between the administration of adrenaline and the onset of symptoms should be taken into account when determining the duration. The follow-up period can be limited to 6-8 hours in cases with positive all characteristics (17).

Considering the answers given to the question for at least how long the patient with anaphylaxis should be followed up in the hospital after being stable with the first intervention in our study, the rate of physicians who observe for at least 6-8 hours was 14.4%. Approximately half of the physicians prefer the 24-hour observation period. Baccioglu et al. (6) reported that almost half of the participants stated that patients with anaphylaxis should be monitored for at least 6-8 hours. In the studies, the observation period after treatment was insufficient in 38-70% of the participants (7,8). Although the 24-hour observation period, which is the most specified observation period in our study, is not an absolute mistake, the longer observation period causes an increase in the duration of stay and costs in the emergency services.

We found the knowledge score of the residents was found to be significantly higher than general practitioners and specialist and the knowledge score of physicians working at the tertiary care was significantly higher than those at primary and secondary care. There was no statistical difference between the clinical experience and the encounter with anaphylaxis case and the knowledge score. This situation can be explained by the fact that the information of residents is up to date. It is seen that the level of knowledge has decreased over time. It would be beneficial to keep information on anaphylaxis up-to-date and to provide training in this direction at certain time intervals.

Our study is limited by the nature of our survey instrument. Physicians performed self-assessments of their own knowledge, which is not an objective evaluation. However, in this type of questionnaire surveys, it must be assumed that the responses are correct. In addition, our study is local, which compromises the generalizability of the results.

The majority of physicians did not seem to be aware knowledge and attitudes in the diagnosis, treatment and management of anaphylaxis, which is a common and life-threatening condition. Inexperience and lack of training to manage anaphylaxis may lead to undesirable outcomes. We believe that it would be beneficial to provide physicians with in-service training within the framework of a national training program in order to improve patient care, to prevent misdiagnosed cases and deaths due to anaphylaxis regarding the diagnosis and management of anaphylaxis

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