



# The attitude, knowledge, and behavior of family physicians about childhood asthma in Sakarya province

Sakarya ilindeki aile hekimlerinin çocukluk çağı astım hastalığı hakkındaki tutum, bilgi ve davranışları

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**Cite this article as:** Uluç NN, Özdemir Ö. The attitude, knowledge, and behavior of family physicians about childhood asthma in Sakarya province. *Turk Pediatri Ars* 2019; 54(4): 225–37.

## Abstract

**Aim:** This study aimed to determine the knowledge, attitude, and behavior of family physicians working in family health centers in Sakarya province related to childhood asthma.

**Material and Methods:** One hundred seventy-two physicians participated in this study, which was conducted as a survey. The questionnaire included 46 questions that measured the attitude and behavior, sociodemographic characteristics, professional practices, theoretical/clinical knowledge of the family physicians.

**Results:** A total of 172 physicians including 144 certificated general practitioners, 7 family medicine specialists, and 21 contracted family medicine residents were enrolled in the study. Less than half (44.2%) of the participants agreed that family physicians could make a diagnosis of asthma, 61.6% agreed that family physicians could follow up and maintain treatment, and 86% agreed that family physicians could give treatment in cases of mild asthma attack. Some 44.6% of the physicians stated that they always/frequently referred patients with asthma, 92% stated that they always/frequently interrogated if the disease was under control, and 79.7% stated that they always/frequently reminded their patients about triggers and the use of inhaler drugs. The mean number of correct answers was 6.23±1.56 for 10 theoretical questions and 10.33±1.90 for 16 clinical questions. It was observed that age, sex, district of work place, time since graduation, representative visits, and the frequency of prescriptions were the characteristics of family physicians that caused significant changes in attitude and behavior. Being a specialist or residents, working in a central district, and absence of poster/brochure in family health center were found to be factors that affected success in questions related to clinical cases. It was observed that general practitioner family physicians interrogated the control status more frequently than specialists and residents, reminded their patients with asthma about triggers and inhaler drug use with a higher rate and exhibited a positive attitude in terms of giving treatment for asthma attacks.

**Conclusion:** In this study, a deficiency was observed in terms of basic information related to asthma and in terms of practical applications. It was observed that family physicians' attitudes about asthma did not always coincided with their behaviors. No significant correlation was found when the relations of attitude, behavior, and knowledge level were evaluated between themselves.

**Keywords:** Asthma; attitude; behavior; family practice; knowledge; pediatrics; Sakarya

## Öz

**Amaç:** Sakarya ilindeki aile sağlığı merkezlerinde çalışan aile hekimlerinin çocukluk çağı astım hastalığıyla ilgili tutum, bilgi ve davranışlarının saptanması amaçlanmıştır.

**Gereç ve Yöntemler:** Anket şeklinde düzenlenen çalışmaya 172 hekim katıldı. Ankette aile hekimlerinin tutum ve davranışı, sosyodemografik özellikleri ve mesleki uygulamaları, teorik ve klinik bilgilerini ölçen 46 soru vardı.

**Bulgular:** Çalışmaya 144 aile hekimi sertifikalı pratisyen aile hekimi, 7 aile hekimi uzmanı, 21 sözleşmeli aile hekimi uzmanlığı araştırma görevlisi olmak üzere toplam 172 hekim katıldı. Katılımcıların %44,2'si astım tanısını koyabilir, %61,6'sı izlem ve idame tedavisini yapabilir, %86'sı ise hafif astım atağı tedavisi verebilir görüşündeydi. Hekimlerin %44,6'sı astım hastalarını her zaman-sıklıkla sevk ettiğini, %92'si her zaman-sıklıkla hastalığının kontrol durumunu sorguladığını, %79,7'si her zaman-sıklıkla tetikleyiciler ve inhaler ilaç kullanımını hakkında hatırlatmada bulunduğunu belirtti. Katılımcıların teorik bilgi sorularındaki doğru cevap ortalaması 6,23±1,56;16 klinik olgu sorularında ise 10,33±1,90 idi. Yaş, cinsiyet, çalışılan ilçe, mezuniyetten itibaren geçen süre, münessil ziyareti, astım ilacı reçete etme sıklığının tutum ve davranışta anlamlı değişiklik oluşturan aile hekimi özellikleri olduğu görüldü. Klinik olgu sorularındaki başarıyı etkileyen etkenlerin uzman ya da araştırma görevlisi olmak, merkez ilçede çalışmak, aile sağlığı merkezinde afiş/broşür bulundurulmaması olduğu saptandı. Pratisyen aile hekimlerinin uzman ve araştırma görevlilerine göre hastaların kontrol durumunu daha çok sorguladıkları, astımlı hastalara tetikleyiciler ve inhaler ilaç kullanımı hakkında daha çok hatırlatmada bulunduğu ve atak tedavisi verilebilir tutumunda olduğu görüldü.

**Çıkarımlar:** Bu çalışmada astımla ilgili en temel bilgi ve pratik uygulamalarda eksiklik görüldü. Aile hekimlerinin astımla ilgili tutumlarının davranışlarıyla her zaman örtüşmediği gözlemlendi. Özellikle, tutum, davranış ve bilgi düzeyi arasındaki ilişkilerin kendi arasında değerlendirilmesinde anlamlı bir ilişki saptanmadı.

**Anahtar sözcükler:** Aile hekimliği; astım; bilgi; davranış; pediatri; Sakarya; tutum

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**Received /Geliş Tarihi:** 07.02.2019 **Accepted /Kabul Tarihi:** 08.10.2019

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DOI: 10.14744/TurkPediatriArs.2019.39206

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## Introduction

Asthma is a chronic inflammatory disease of the airways. The cells and mediators involved in inflammation cause airway hypersensitivity and airway obstruction as a result (1). Airway obstruction is responsible for the prominent findings of asthma including wheezing, dyspnea, chest tightness and cough that increases towards morning (2). Asthma is the most common chronic disease in children. The prevalence of asthma, and in parallel, presentations to emergency departments with asthma attacks, hospitalizations, and the financial burden on the society increase gradually (3). When patients with asthma in Turkey are examined, it can be observed that an important proportion of patients is not under control and are outside the scope of preventive medicine (4).

In this study, we aimed to determine the knowledge, attitude, and behavior of family physicians working in family health centers (FHC) in Sakarya province related to childhood asthma and the influencing factors (5).

## Material and Methods

In this study, it was planned to include 276 family physicians who worked in FHCs in the province of Sakarya between February 2018 and April 2018 to the research group; a total of 172 physicians who could be reached and accepted to participate in the study, were included (Table 1). The study protocol was approved by Sakarya University, Faculty of Medicine, Ethics Committee (Number: 71522473/050.01.04/20, Date: 26.01.2018). The study was conducted in accordance with the Declaration of Helsinki and informed consent was obtained from all participants.

### Study type

This thesis study is a cross-sectional study that represents physicians working as family physicians between February 1<sup>st</sup>, 2018, and April 1<sup>st</sup>, 2018, in FHCs in the province of Sakarya and its districts.

### Study population

The study population was composed of family physicians who were working in FHCs in the province of Sakarya and its districts. Sampling was not planned and it was aimed to reach the entire population. One hundred seventy-two physicians (62.3%, 172/276), apart from those who did not accept to participate in the study, and who were not present at the workplace because of education, mobile service, health problems or legal holidays, could be reached.

### Questionnaire

In the study, a questionnaire composed of four parts was applied to the participants. The questions in the question-

naire were prepared by the investigators considering international guidelines. The first part of the questionnaire interrogated the family physicians' attitudes related to making a diagnosis of asthma, follow-up, and treatment of asthma, and giving treatment for attacks, and their behaviors related to referring asthma patients, interrogating if the disease was under control, and reminding patients about protection against triggers and techniques for using inhaler drugs. The second part of the questionnaire included questions about sociodemographic characteristics, professional applications, working conditions, and individual characteristics as listed below: sex, age, year of graduation, district where they worked, presence of mobile service, number of registered asthma patients, frequency of prescribing asthma drugs, frequency of seeing patients with asthma, presence of asthma patient among relatives, presence of posters/brochures on asthma in the FHC, status of participation in training on asthma, and the status of receiving visits from drug company representatives related to asthma drugs. The third part of the questionnaire included 10 closed-ended questions about asthma pathogenesis, diagnosis, follow-up, and treatment. The fourth part included a total of 16 questions about a patient aged 12 years who presented with asthma attack and improved with appropriate treatment (uncontrolled mild persistent asthma) and a patient aged 2.5 years with a history of frequent wheezing episodes triggered by viral infection (see questionnaire).

### Evaluation of the questionnaire

In the first part of the questionnaire, the responses given to attitude questions were divided into two groups as 'I agree,' and 'I am indecisive + I do not agree,' and compared with the other data. The responses to behavior questions were divided into two groups as always-frequently and sometimes-rarely, and compared. Classification by title was made such that family physicians and residents were included in one group and certified general practitioner family physicians were included in the second group (see questionnaire).

### Statistical analysis

Statistical analysis of the study was performed using the Statistical Package for the Social Sciences (SPSS) program version 22.0. It was found that the sample size should be at least 169 as a result of a sample calculation performed with consideration to the total number of family physicians of 276, a confidence interval of 95%, an estimated prevalence of 50% with positive and negative deviation of 5% and a design effect of 1.0. Descriptive statistics were calculated as frequency and percentages. Pearson's Chi-square independence test was used to measure the correlations between categorical variables. Non-parametric

**Table 1. Family physicians' sociodemographic characteristics and professional practices**

	n	%		n	%
Age			Once a month	31	18
<30	21	12.2	2–3 time monthly	51	29.7
31–40	54	31.4	A few times yearly	19	11
41–50	68	39.5	Frequency of prescribing asthma medications for asthma patients aged <18 years		
>50	29	16.9	At least once a week	75	43.6
Sex			Once a month	36	20.9
Female	65	37.8	2–3 time monthly	47	27.3
Male	107	62.2	A few time yearly	14	8.1
Time since graduation from medical faculty			Presence of relatives with asthma		
0–10 years	50	29	Yes	70	40.7
10–20 years	63	36.7	No	102	59.3
>20 years	59	34.3	Keeping posters/brochures related to asthma in family health center		
General practitioner family physician	144	83.7	Yes	100	58.1
Family medicine specialist	7	4.1	No	72	41.9
Contracted family medicine residents	21	12.2	Having read scientific article related to asthma or attended a meeting related to asthma		
District			Yes	72	41.9
Center	107	62.2	No	100	58.1
Periphery	65	37.8	Having been visited by drug company representative related to asthma		
Mobile healthcare service			Yes	89	51.7
Yes	67	39	No	83	48.3
No	105	61	Participation to training related to asthma organized by the Ministry of Health		
Number of asthma patients registered			Yes	68	39.5
1–10	66	38.4	No	104	60.5
11–20	62	36			
>20	44	25.6			
Frequency of seeing asthma patients aged <18 years					
At least once a week	71	41.3			

variance analysis tests (Kruskal-Wallis and Mann-Whitney U test) were used in the comparison of natural numbers in terms of groups with Fisher's exact test. In addition, the level of relationship between continuous variables was evaluated using Spearman correlation coefficients. A p value of <0.05 was considered statistically significant.

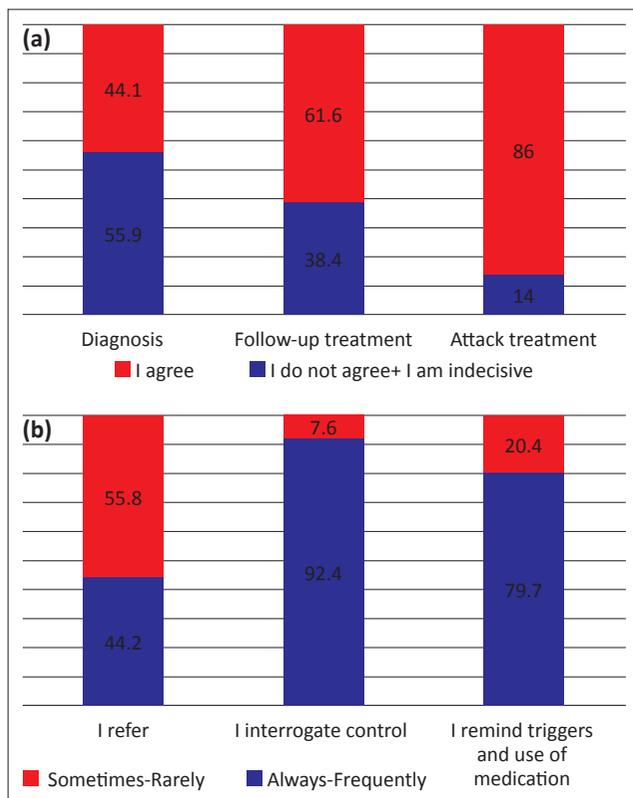
## Results

A total of 172 physicians including 144 certified general practitioner family physicians, 7 family physicians, and 21 contracted residents in the area of family medicine, participated in the study. The majority of family physicians who participated in our study were aged between 41 and 50 years (39.5%), male (62.2%), graduated 10–20 years ago (36.7%), worked in a district center (62.2%), did not give mobile healthcare service (61%), had 1–10 asthma patients

who were registered (38.4%), saw asthma patients aged below 18 years at least once a week (41.3%), prescribed medication for asthma patients aged below 18 years at least once a week (43.6%), did not have relatives who had asthma (59.3%), kept posters/brochures related to asthma in the FHC (58.1%), did not read scientific articles or attend any meetings related to asthma in the last one year (58.1%), had drug representative visits related to asthma in the last one year (51.7%), and did not participate in any training programs related to asthma organized by the Ministry of Health (60.5%) (Table 1).

## Evaluation of questions related to attitude by demographic data and between themselves

In the first part, which interrogated family physicians' attitudes and behaviors related to patients aged below 18 years, 44.2% of the participants responded "family physicians can make a diagnosis of asthma," 61.6% responded



**Figure 1. (a) Distribution of family physicians’ responses to statements related to attitudes about the disease of childhood asthma (b) Distribution of family physicians’ responses to statements related to behaviors about the disease of childhood asthma**

“family physicians can manage follow-up and maintenance treatment,” and 86% responded “family physicians can give treatment for mild asthma attack” by marking ‘I agree’ (Fig. 1a).

It was observed that being male, being aged above 50 years, having been graduated for more than 20 years, accepting drug representative visits, and frequent prescriptions were statistically significantly correlated with the development of an attitude of “can make a diagnosis” ( $p=0.014$ ;  $p<0.001$ ;  $p<0.001$ ;  $p<0.001$ ;  $p=0.017$ ). It was observed that drug representative visits and frequent prescriptions were statistically significantly correlated with development of attitudes of both “can make a diagnosis” and “can manage follow-up and treatment” ( $p<0.001$ ;  $p=0.016$ ). Being a general practitioner and working in peripheral districts were statistically significantly correlated with development of an attitude of “can give treatment for treatment of asthma attack” ( $p=0.010$ ;  $p=0.009$ ).

The participants who had an attitude of “can make a diagnosis” significantly agreed with the attitude of “can man-

age follow-up and treatment” ( $p=0.04$ ). No statistically significant difference was found when the responses of the participants who did and did not agree with the idea of “can make a diagnosis” and “can manage follow-up and treatment,” to the statement of “can give treatment for asthma attack” were compared ( $p=0.114$ ).

**Evaluation of the questions related to behavior by demographic data and between themselves**

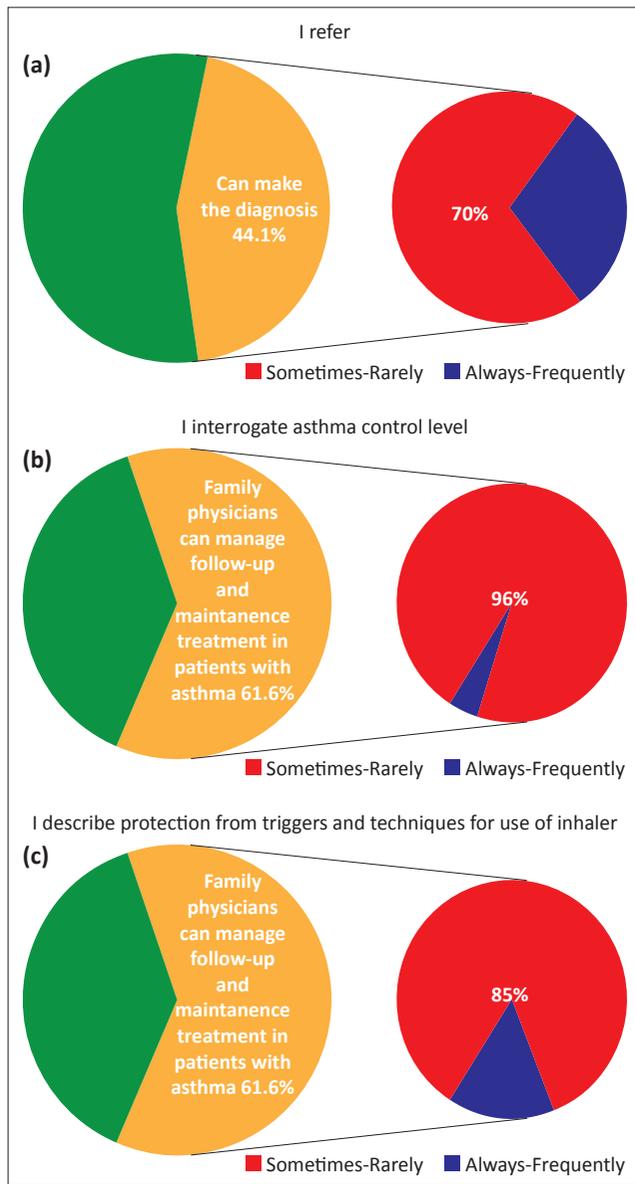
In the questions that interrogated behavior, 44.2% of the participants gave the response of “I always/frequently refer asthma patients aged below 18 years to upper level healthcare institutions,” 92.4% gave the response of “I always/frequently interrogate if the disease is under control,” 79.7% gave the response of “I always/frequently remind of precautions for protection against triggers and techniques for use of inhaler drugs” (Fig. 1b).

It was observed that working in district centers was correlated with the behavior of referring asthma patients ( $p=0.033$ ). It was observed that general practitioner family physicians interrogated the status of control more frequently than specialists and residents. Being a general practitioner family physician, being female, and having graduated more than 20 years ago were correlated with the behavior of reminding patients about triggers and use of inhaler drugs ( $p=0.007$ ;  $p=0.041$ ;  $p=0.017$ ).

No statistically significant difference was found between physicians who always/frequently and sometimes/rarely referred their patients in terms of the frequency of the behaviors of interrogating the status of control and reminding patients about triggers and using inhaler drugs ( $p=0.466$ ;  $p=0.084$ ). It was found that physicians who always/frequently interrogated the status of control of their asthma patients gave the response of “I always/frequently remind my patients about triggers and using inhaler drugs” with a statistically significantly higher rate compared with physicians who sometimes/rarely interrogated the status of control ( $p<0.001$ ).

**Evaluation of responses given to questions related to attitude-behavior between themselves**

The physicians who gave the response “I do not agree” or “I am indecisive” to the statement “Family physicians can make a diagnosis of asthma under FHC conditions in asthma patients aged below 18 years” responded the question related to referral behavior as “I always/frequently refer asthma patients to upper level healthcare institutions” with a statistically significantly higher rate compared with the ones who gave the response “I agree” to the same statement ( $p<0.01$ ). Nevertheless, it was



**Figure 2.** (a) The rate of referral of patients to upper level healthcare institutions in family physicians who agree with the following statement: “Family physicians can make a diagnosis of asthma in patients aged below 18 years under family health center conditions”. (b) The rate of interrogating if asthma is under control in family physicians who agree with the following statement: “Family physicians can manage follow-up and maintenance treatment in patients with asthma”. (c) The rate of reminding patients about precautions for protection from triggers and about techniques for use of inhaler drugs in family physicians who agree with the following statement: “Family physicians can manage follow-up and maintenance treatment in patients with asthma below the age of 18 years under family health center conditions”

found that 30% of the physicians who thought that family physicians could make a diagnosis of asthma, always/frequently referred asthma patients to upper level healthcare institutions (Fig. 2a).

It was observed that nearly all physicians who had the attitude of “can manage follow-up and treatment” interrogated the status of control and reminded patients about triggers and the use of inhaler drugs (Fig. 2b, c). However, no statistically significant difference was found between physicians who did and did not agree with the idea of “family physicians can manage follow-up and treatment of asthma patients” in terms of the rates of referring patients to upper level healthcare institutions ( $p=0.079$ ).

It was found that physicians who thought that family physicians could give treatment for asthma attack, gave the following answers with a statistically significantly higher rate compared with those who did not agree with this view: “I sometimes/rarely refer asthma patients,” “I always/frequently interrogate the status of control, I always/frequently remind my patients about triggers and the use of inhaler drugs” ( $p=0.02$ ;  $p=0.017$ ;  $p=0.021$ ).

A statistically significant difference was found between the responses of “I agree” to the questions of attitude and the following positive responses “I sometimes/rarely refer patients, I always/frequently interrogate the status of control and I always/frequently remind my patients” to questions related to behavior. It was observed that physicians who gave the response “I agree” to all three questions related to attitude exhibited positive behavior with a statistically significantly higher rate (Table 2).

**Evaluation of responses given to questions related to knowledge by demographic data and between themselves**

The mean number of correct answers for 10 questions related to theoretical information included in the third part was found as  $6.23 \pm 1.564$  (min.–max.: 2–10) and the mean number of correct answers to 16 questions related to clinical cases included in the fourth part was found as  $10.33 \pm 1.901$  (min.–max: 6–15) (Table 3).

No correlation was found between theoretical knowledge questions and demographic data, whereas working in central districts, being a specialist or residents, and not keeping posters in the FHC were found to be correlated with the level of knowledge related to clinical case questions ( $p=0.033$ ;  $p=0.007$ ;  $p=0.037$ ).

A weak positive correlation that could be considered statistically significant was found between the numbers of correct responses given to theoretical questions and clinical case questions ( $n=172$ ,  $r=0.232$ ,  $p=0.002$ ).

Although the rate of the physicians who preferred inhalers as prophylaxis was 71.5% for the clinical case question related to mild persistent asthma (#31), the rates of

**Table 2. The relation of the responses given to questions related to attitudes and behaviors between themselves**

	Positive responses to questions related to behaviors						Total	P
	1 and below		2		3			
	n	%	n	%	n	%		
Number of the response “I agree” to questions related to attitudes								
0	5	41.7	6	50	1	8.3	12	
1	10	25	19	47.5	11	27.5	40	<b>&lt;0.001</b>
2	8	11.8	36	52.9	24	35.3	68	
3	0	0	10	19.2	42	80.8	52	

antibiotic prescription, mucolytic prescriptions, and performing chest radiography for this patient who presented with acute asthma attack were found as 5.2%, 20.9%, and 44.8%, respectively. The rates of administering inhalers and leukotriene receptor antagonists to the patient aged 2.5 years who had a history of frequent wheezing were found as 54.1% and 41.3%, respectively (Table 3).

#### Evaluation of the correlations of attitude, behavior, and knowledge level between themselves

No statistically significant difference was found in the comparison of the number of correct responses given to theoretical and clinical case questions and the number of correct responses given to attitude-behavior questions. No statistically significant difference was found between the physicians’ response “I agree” given to attitude questions and the positive behaviors “I sometimes-rarely refer patients, I always/frequently interrogate asthma control and I always/frequently remind patients” and theoretical and clinical case questions.

#### Discussion

Although there are many international consensus reports and guidelines related to asthma, it is known that different variables including postgraduate education, professional experience, and sociocultural characteristics determine physicians’ approaches to asthma patients (6). In this study, it was aimed to demonstrate family physicians’ attitudes, knowledge, and behaviors related to childhood asthma.

It was observed that the main demographic characteristics that affected attitude and behavior included family physicians’ title, age, sex, time passed since graduation from medical faculty, frequency of prescription of asthma medications, drug company representative visits (in the province of Sakarya, in center or periphery), and district of work. It was found that drug company representative visits were correlated with the development of the idea of

“can both make a diagnosis and give treatment” in physicians together with other factors (Table 4). Factors including physician’s observation of regression of symptoms described by patients by using the method of moving from treatment to diagnosis and increased experience about the disease, may contribute to the idea of “can make a diagnosis and give treatment” in family physicians whose frequency of prescribing asthma drug is predicted as a result of drug company representatives. The idea of “can manage follow-up and treatment” may have developed in the physicians as a result of follow-up visits performed by the patient to the physician who initiated treatment. The frequencies of prescriptions may have been found to be high in physicians who had the ideas of “can make a diagnosis of asthma, manage follow-up, and treatment” because they managed treatment for their patients; however, the literature contains publications that found that frequent prescription of asthma drugs was correlated with frequent drug company representative visits (7). In our study, it was observed that drug representative visits was ahead of education, which is usually considered the most important tool in terms of influencing physicians’ attitudes. The fact that drug company representatives have adopted a professional approach in the issue of using communication rationally and clear and catchy informing techniques with the intention of reaching and influencing a higher number of physicians, may explain the success in influencing physicians’ attitudes. We should address approaches that decrease the effect of drug representatives on physicians in terms of developing attitude, knowledge, and behavior.

In our study, the rate of physicians who stated that they could make a diagnosis of asthma was lower compared with the study conducted by Boyacı et al. (8), whereas the rate of physicians who stated that they could give treatment was similar (61.6% in our study and 60.3% in their study). The reason that the rate of physicians who stated that they could make a diagnosis of asthma was lower in our study (44.2%) compared with that of Boyacı et al. (8)

**Table 3. Family physicians’ rates of correct answers to questions related to knowledge**

	n	%
Theoretical questions		
History	121	70.3
Physical examination	129	75
Differential diagnosis	97	56
Pathogenesis	136	79.1
Trigger	42	24.4
Asthma control level	54	31.4
Pharmacotherapy	94	54.7
Protection (in-house allergen)	109	63.4
Protection (recommendations for individuals who are at risk)	76	44.2
Use of inhaler device	125	73.8
Case 1 (>5 years+asthma attack)		
Systemic steroid	130	75.6
It is incorrect to give inhaler B-agonist 3 times with 20-minute intervals	62	36
It is incorrect to give inhaler ipratropium bromure 3 times with 20-minute intervals	123	71.5
Triggering factors and the technique of use of inhaler should be interrogated	148	86
It is not necessary to evaluate the lungs with chest radiography	77	44.8
Antibiotics should not be administered	163	94.8
Mucolytics should not be administered	136	79.1
If not initiated before, inhaler is initiated	123	71.5
It is not appropriate to prefer leukotriene receptor antagonist as the first-line prophylaxis	124	72.1
Long-acting B-agonist is not preferred alone for prophylaxis	107	62.2
Leukotriene receptor antagonist may be added to inhaler treatment	97	56.4
If the patient is still receiving prophylactic treatment, one step is skipped for 2-4 weeks	95	55.2
Case 2 (<5 years)		
Daily low-dose inhaler drug is initiated for prophylaxis	93	54.1
Daily leukotriene receptor antagonist is initiated for prophylaxis	71	41.3
Short-acting B agonist is continued ‘in case of need’	133	77.3
It is not appropriate to initiate prophylaxis with low-dose inhaler +long-acting B agonist	95	55.2

**Table 4. Distribution of the responses given to attitude questions by drug company representative visit**

	Yes	No	P
Can make a diagnosis			
I agree	51	25	<b>&lt;0.001</b>
I do not agree + I am indecisive	38	58	
Can manage follow-up and treatment			
I agree	63	44	<b>0.016</b>
I do not agree + I am indecisive	26	39	

(75.4%) may be that family physicians’ thought that pulmonary functions should be evaluated in the diagnosis of asthma. Although measurement of pulmonary functions is important in patients with asthma, an inability to perform pulmonary function tests is not an obstacle to make a diagnosis of asthma with history and clinical signs under FHC conditions. However, when suspicion arises in the diagnosis, expert opinion may be required (1). The reasons for the finding that there was no difference between physicians who did and did not agree with the idea “can make a diagnosis of asthma” in terms of theoretical/clinical knowledge in our study and the fact that one-third of the physicians who believed that they could make a diagnosis of asthma frequently referred their patients, may be legal concerns as well as the difficulty of making a diagnosis of asthma in children.

It was observed that nearly all family physicians who believed that patients with asthma could be followed up and treated in FHCs, interrogated the level of control of asthma, reminded their patients about precautions for protection against triggers and techniques of the use of inhaler drugs. However, it was contradictory that the rates of correct responses to theoretical questions related to these issues were low. In one study, it was reported that physicians also used methods that were not recommended by the Global Initiative for Asthma (GINA) guideline for the evaluation of the status of asthma control (9). The question with the least correct responses was the question that interrogated asthma control parameters. The rates of correct definition of asthma control were reported to range between 86–94% by Ko et al. (10) in a study including general practitioners, pediatricians, and other specialists in Hong Kong. The reason that this rate was found to be lower in our study may be the fact that the majority of participants were general practitioner family physicians who were not family medicine specialists. In another review, it was reported that only one-third of asthma patients were being followed up by a physician whose area of expertise was asthma (11). Considering that respiratory diseases constitute approximately one-third of patients presenting to primary healthcare institutions,

**Table 5. Results with statistically significant difference in the participants' responses to questions by their titles**

	General practitioner family physician		Family medicine specialist /Residents		P
Treatment for mild asthma attack can be given in family health centers					
I do not agree + I am indecisive	15	10.4%	8	28.5%	<b>0.010</b>
I agree	129	89.6%	20	71.5%	
I interrogate if asthma is under control in patients with asthma					
Always-Frequently	136	94.4%	23	82.1%	<b>0.024</b>
Sometimes-Rarely	8	5.6%	5	17.9%	
I remind my patients about precautions for protection from triggers and about techniques for use of inhaler drugs					
Always-Frequently	120	83.3%	17	60.8%	<b>0.007</b>
Sometimes-Rarely	24	16.7%	11	39.2%	
Number of correct answers given to questions related to clinical cases					
Median		10		11	<b>0.007</b>
First quarter-third quarter		9–11		10–13	

increasing family physicians' level of knowledge to evaluate asthma control is very important in our country (12).

The fact that the question related to pathogenesis among theoretical questions was responded to correctly with a rate of 79% and inhaler was preferred with a high rate (71.5%) for prophylaxis showed that it was adopted that asthma was a chronic inflammatory condition. The rate of 79% is considerably higher compared with previous literature (33.7%) (13). It was thought that this result might be related with the increase in awareness of asthma over time. In the clinical questions related to the patient with uncontrolled mild persistent asthma, physicians preferred inhaler for prophylaxis with a rate of 71.5%. This rate is similar to the results obtained in the study conducted by Özkurt et al. (14). For the infant with wheezing triggered by viral infection, 54.1% of the family physicians preferred to initiate an inhaler and 41.3% preferred to initiate leukotriene receptor antagonist for prophylaxis. It was thought that the change in preference for prophylaxis by the participants' age group was related to the prominence of the preference of leukotriene receptor antagonist in patients with episodic wheezing (15).

The fact that family medicine specialists and residents received academic training may explain the higher number of correct answers given to questions related to knowledge. The fact that information used becomes permanent, may explain the difference in the number of correct answers only in questions related to clinical cases. More

communication with pediatricians whose numbers are higher in central districts and the organization of scientific meetings in central districts may be the reason for the higher number of correct answers given to questions related to clinical cases by family physicians working in central districts. The fact that physicians who stated that they kept posters/brochures at the FHCs had a lower number of correct responses to questions related to clinical cases showed that efforts directed to raise the awareness of patients in the issue of asthma did not create this action, even in physicians.

General practitioner family physicians agree with the thought that treatment for asthma attacks can be given in FHCs with a higher rate, interrogate the status of asthma control more frequently, and remind their patients about protection against triggers and about the techniques for use of inhaler drugs more frequently compared with specialists and residents. However, the number of correct answers to clinical case questions was lower for general practitioner family physicians (Table 5). This shows that academic education is effective in increasing the level of knowledge, but inadequate in developing attitudes-behaviors. The idea that attack treatment should not be given in FHCs may arise from the concern of family physicians who take the situation seriously about not being able to spend the required time for patients. Specialists and residents may have abandoned informing patients or may have not been informed adequately in this issue during their education because they witness

the chronic recurring nature of asthma and patient non-compliance with a higher frequency in hospitals where they are trained. The literature contains publications reporting that guideline information related to asthma are not being used mostly because of the idea that they will not be helpful for clinical improvement (16). In another study, it was reported that control of asthma was independently correlated with accurate applications of physicians (17). Family health centers may be a mediator for improving the course of asthma, which is a chronic disease characterized by exacerbations, by sparing time for patient education.

It was found that the physicians whose number of working years was higher reminded their patients about inhaler drugs and triggers more frequently. It was observed that physicians who graduated recently addressed issues related to patient education with a lower rate because of inadequate awareness in medical faculties. It was observed that the thought of “family physicians can make a diagnosis of asthma” was also accepted by physicians with advanced age who had graduated long time ago. This may be related with physicians’ efforts to develop approaches for the patients they confront frequently in time with increased experience.

It was observed that male physicians thought that they could make a diagnosis of asthma and female physicians reminded their patients about the use of inhaler drugs and triggers with a higher frequency. It was thought that female physicians’ mentality, which prioritizes the patient, was effective for the development of this behavior in our study, as emphasized in a study conducted in The Netherlands (18).

Physicians working in peripheral districts thought that treatment for asthma attacks could be given in FHCs. Giving treatment for asthma attacks is almost inevitable for family physicians who work in peripheral districts where reaching secondary-tertiary care health services or pediatricians is more difficult. However, the low number of correct answers to clinical case questions shows that these physicians’ attitudes in terms of their approach to cases of asthma should be improved.

## Conclusion

In this study, a deficiency was observed in the basic knowledge and practical applications related to asthma. It was observed that family physicians’ attitudes related to asthma did not always overlap with their behaviors. No significant correlation was found in the evaluation of the relations between attitudes, behaviors, and knowl-

edge levels between themselves. Family physicians’ sociodemographic characteristics should be considered while planning the content of training directed to family physicians. Studies that improve attitudes-behaviors and case-based studies will be more helpful. Family physicians should be encouraged to make a diagnosis of asthma and to follow-up and treat patients with asthma.

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**Ethics Committee Approval:** The study protocol was approved by Sakarya University, Faculty of Medicine, Ethics Committee (Number: 71522473/050.01.04/20, Date: 26.01.2018).

**Informed Consent:** Informed consent was obtained from all participants.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept - Ö.Ö.; Design - Ö.Ö., N.N.U.; Supervision - Ö.Ö.; Funding - N.N.U.; Materials - N.N.U.; Data Collection and/or Processing - N.N.U.; Analysis and/or Interpretation - Ö.Ö.; Literature Review - Ö.Ö., N.N.U.; Writing - Ö.Ö., N.N.U.; Critical Review - Ö.Ö.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declared that this study has received no financial support.

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**Etik Kurul Onayı:** Araştırma protokolü, Sakarya Üniversitesi Tıp Fakültesi Etik Kurul’u tarafından onaylandı (Sayı: 71522473/050.01.04/20, Tarih: 26.01.2018).

**Hasta Onamı:** Bütün katılımcılardan bilgilendirilmiş onam alındı.

**Hakem Değerlendirmesi:** Dış bağımsız.

**Yazar Katkıları:** Fikir - Ö.Ö.; Tasarım - Ö.Ö., N.N.U.; Denetleme - Ö.Ö.; Veri Toplanması ve/veya İşlenmesi - N.N.U.; Analiz ve/veya Yorum - Ö.Ö.; Literatür Taraması - Ö.Ö., N.N.U.; Yazıyı Yazan - Ö.Ö., N.N.U.; Eleştirel İnceleme - Ö.Ö.

**Çıkar Çatışması:** Yazarlar çıkar çatışması bildirmemişlerdir.

**Mali Destek:** Yazarlar bu çalışma için mali destek almalarını beyan etmişlerdir.

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**Appendix 1****Childhood Asthma Questionnaire**

*Please choose the statement that best describes your opinion.*

**1-Family physicians can make a diagnosis of asthma under FHC conditions in patients aged below 18 years.**

a-I do not agree    b-I am indecisive    c-I agree

**2-Family physicians can manage follow-up and maintenance treatment under FHC conditions in patients aged below 18 years.**

a-I do not agree    b-I am indecisive    c-I agree

**3-Family physicians can administer treatment for mild asthma attack in FHCs.**

a-I do not agree    b-I am indecisive    c-I agree

**4-I refer asthma patients aged below 18 years presenting to FHC to upper level healthcare institutions.**

a-Always    b-Frequently    c-Sometimes    d-Rarely    e-Never

**5-I interrogate if the disease is under control in patients with asthma**

a-Always    b-Frequently    c-Sometimes    d-Rarely    e-Never

**6-I remind patients with asthma about precautions to protect against triggers and techniques for use of inhaler drugs.**

a-Always    b-Frequently    c-Sometimes    d-Rarely    e-Never

**7-Your age**

a-<30    b-31-40    c-41-50    d->50

**8-Your sex**

a-Female    b-Male

**9-Time passed since graduation from medical faculty**

a-0-10 years    b-10-20 years    c->20 years

**10-Title**

a-General practitioner

b-Family medicine specialist

c-Contracted family medicine residents

**11-In which district do you work?**

a-Adapazarı

b-Serdivan

c-Akyazı

d-Erenler

e-Hendek

f-Karasu

g-Geyve

h-Arifiye

i-Sapanca

j-Pamukova

k-Ferizli

l-Kaynarca

m-Kocaali

n-Söğütlü

o-Karapürçek

p-Taraklı

**12-Do you give mobile healthcare service?**

a-No    b-Yes

**13-About how many patients aged below 18 years with a diagnosis of asthma do you have in your register?**

a-1-10    b-11-20    c->20

**14-What was your frequency of seeing asthma patients aged below 18 years in the last one year?**

a-At least once a week

b-Once a month

c-2-3 times monthly

d-A few times or less yearly

**15- What was your frequency of prescribing asthma medicine for patients aged below 18 years in the last 1 year?**

a-At least once a week

b-Once a month

c-2-3 times monthly

d-A few times or less yearly

**16- Are there any patients with asthma in your surroundings or among your relatives?**

a-No                      b-Yes

**17- Have you read any scientific articles related to asthma or attended any meetings about asthma in the last 1 year?**

a-No                      b-Yes

**18- Have drug company representatives visited you regarding asthma medications in the last 1 year?**

a-No                      b-Yes

**19- Have you attended any activities or in-service training organized by the Ministry of Health or its organizational structure?**

a-No                      b-Yes

**20- Have you kept any educational, informative posters/brochures about asthma in FHC in any period while working?**

a-No                      b-Yes

**21- Which of the following is not a characteristics of cough observed in asthma?**

a-Persistent, recurring

b-Frequently occurs at night or towards morning

c-Not related with exertion

d-May recur when exposed to cold

**22- Which of the following is not expected to trigger symptoms in a child with asthma?**

a-Parasitic infestation/infection

b-Stress

c-Smoke

d-Exposure to allergen

**23- Which of the following is involved in the pathogenesis of asthma?**

a-Chlorure channel defect in cellular membrane

b-Mutation in the surfactant A gene

c-Panacinar emphysema

d-Bronchial smooth muscle hypertrophy and bronchospasm

**24- Which of the following should not be considered in the differential diagnosis of asthma?**

a-Gastroesophageal reflux disease

b-Foreign body aspiration

c-Bronchopulmonary dysplasia

d-Pleural effusion

**25- Which is an expected physical examination finding in a patient with mild persistent asthma presenting outside asthma attack?**

a-Unilateral wheezing

b-Clubbing

c-Normal physical examination

d-Cyanosis

**26- Which is not one of the clinical parameters used in the evaluation of asthma control?**

a-Daytime symptoms

b-Nighttime symptoms

c-Limitation of activity

d-Frequency of use of inhaled corticosteroid

**27- Which is not a low-dose corticosteroid for children aged between 6 and 11 years?**

a-Ciclesonide inhaler 80mcg

b-Budesonide nebulizer 500-1000 mcg

c-Fluticasone propionate dry powder inhaler 100-250 mcg

d-Budesonide dry powder inhaler 200 mcg

**28- Which is not a recommendation to give for indoors allergens?**

a-Removing pets

b-Washing mattress covers pillowcases at 50-60 degrees

c-Using rigid, erasable floor instead of carpet

d-Keeping room humidified consistently

**29-Which is incorrect about inhaler drug use technique?**

- a-The patient should squeeze metered dose inhaler just before deep inspiration  
 b-The patients should hold their minimum breath following squeezing metered dose inhaler.  
 c-The patients do not need to repeat the procedure for additional doses, if they are using metered dose inhaler with mediator tube, they can squeeze for two times at one sitting.  
 d-The patient should shake metered dose inhaler thoroughly before squeezing.

**30- Which recommendation is not appropriate to give to families of patients who carry risk in terms of development of persistent asthma?**

- a-Protection from smoking and smoke during pregnancy and especially in the first year of the baby  
 b-Preferring paracetamol as antipyretic in the first year of life  
 c-Preferring breastfeeding and vaginal delivery  
 d-Avoiding wide spectrum antibiotics in the first year of the baby

**31-A 12-year-old female patient with a diagnosis of asthma presents with respiratory distress. Physical examination reveals suprasternal retractions on inspection, the lungs are aerated equally, and diffuse sibilant rhonchus is heard on auscultation.**

**Spo2: 95%, respiratory rate: 25/min, body temperature: 36.7°C, apical heart beat: 110/min.**

**In the history, she states that she wakes up at night with dyspnea 3 times monthly.**

**Which of the applications are correct following asthma attack treatment and clinical improvement?**

- a-Systemic steroid  
 Correct ( )      Incorrect (x)  
 b-Inhaler  $\beta_2$ -agonist, 3 times with 20-minute intervals  
 Correct ( )      Incorrect (x)  
 c-Inhaler ipratropium bromide, 3 times with 20-minute intervals  
 Correct ( )      Incorrect (x)  
 d-Triggering factor and inhaler usage technique are interrogated  
 Correct (x)      Incorrect ( )  
 e- The lung is assessed with posteroanterior chest radiography  
 Correct ( )      Incorrect (x)  
 f- Antibiotic is prescribed  
 Correct ( )      Incorrect (x)  
 g- Mucolytic is prescribed  
 Correct ( )      Incorrect (x)  
 h-Inhaled corticosteroid is initiated, if not initiated before  
 Correct (x)      Incorrect ( )  
 i- Long-acting  $\beta_2$ -agonist alone may be preferred as prophylaxis.  
 Correct ( )      Incorrect (x)  
 j- Leukotriene receptor antagonist is preferred as first-line prophylaxis.  
 Correct ( )      Incorrect (x)  
 k- Leukotriene receptor antagonist may be added to inhaled corticosteroid treatment  
 Correct (x)      Incorrect ( )  
 l- If the patient is currently receiving prophylactic treatment, one step is skipped for 2-4 weeks  
 Correct (x)      Incorrect ( )

**32-A 2.5-year-old male patient presents at the age of 6 months with a history of having 2-3 previous wheezing episodes. He was hospitalized during one of the wheezing episodes. There is no history of atopy or allergy in his personal and familial history. It is thought that wheezing episodes are triggered by viral upper respiratory infection. They family were given a nebulizer to be used at home and salbutamol was prescribed to be used “when needed”. The mother states that he had had wheezing and cough 2-3 times in the previous month and she used salbutamol. Which applications are correct while planning treatment at this stage?**

- a-Daily low-dose inhaled corticosteroid is initiated as prophylaxis  
 Correct (x)      Incorrect ( )  
 b-Daily leukotriene receptor antagonist is initiated as prophylaxis  
 Correct (x)      Incorrect ( )  
 c-Short-acting B agonist is continued to be used “as needed”  
 Correct (x)      Incorrect ( )  
 d-Prophylaxis is initiated with low-dose inhaled corticosteroid+long-acting B agonist and treatment is evaluated by clinical status  
 Correct ( )      Incorrect ( x)