

Knowledge, attitude and practices of PHC physicians in Aseer region regarding management of acute asthma

Hassan Ahmed Assiri¹, Yahia Matter Alkhaldi², Safar Abadi Alsaleem³,
Hassan Mohammad Alqarni¹

¹Abha Health Sector, General Directorate of Health Affairs, Aseer Region, ²Department of Research and Studies, GDHA, Aseer Region, ³Department of Family and Community Medicine, KKU, Abha, Kingdom of Saudi Arabia

ABSTRACT

Objectives: This study aims to explore knowledge, attitude and practices of physicians working at primary health care (PHC) in Abha, KSA, regarding assessment and management of acute bronchial asthma. **Subjects and Methods:** This is a cross-sectional study that was conducted among PHC physicians in Abha, Khamis Mushayt and Ahad Rufeida cities, Aseer region KSA in 2018. A questionnaire that was constructed by the investigators was used to assess the knowledge, attitude and practices of PHC physicians regarding the diagnosis and management of patients with acute asthma. The questionnaire was distributed under the supervision of the first investigator. Data management was carried out using SPSS version 23. **Results:** A total of 200 PHC physicians participated in this study. About two-thirds of them (63.5%) had good grade of knowledge regarding acute asthma management, whereas 44% had positive attitude toward acute asthma management. The main knowledge gaps were doses of drugs used in the management of acute severe asthma attack (36%), and diagnosis of acute severe asthma attack (51.5%). Physicians' main source of knowledge on asthma included textbooks (26%) and guidelines (61.5%). Physicians' practice grades were significantly higher among those with less experience in PHC ($p = 0.011$). Almost all PHC centers (PHCC) (98%) had oxygen and nebulizers, 72.5% had steroids, 71.5% had salbutamol, 50.5% had ipratropium and 41% had peak flow meter, whereas 73.5% had the Saudi Initiative for Asthma (SINA) guidelines. **Conclusion:** This study revealed that knowledge of PHC physicians regarding the management of bronchial asthma was suboptimal, their attitude is not completely positive, and their adherence to asthma management guidelines is quite low. Some PHCCs were lacking important drugs and equipment for management acute asthma that should be provided. Well-structured training of PHCC doctors on SINA is mandatory to upgrade their knowledge, promote their attitude and improve their skills.

Keywords: Acute asthma, Aseer region, attitude and practice, knowledge, primary health care, Saudi Arabia

Introduction

Bronchial asthma (BA) is one of the most common chronic health problems. It affects up to 300 million people worldwide, and it is estimated that an additional 100 million people will suffer from BA by 2025.^[1] BA is a chronic inflammatory airway disease in which the airway occasionally constricts in response to one

or more triggers such as exposure to environmental stimulants, allergens, cold air, exertion, or emotional stress and produce an inflammatory reaction with intermittent airways obstruction.^[2]

The prevalence of BA varies from one country to another and ranges from 1.1 to 9.9% in adults.^[3] In KSA, Al-Frayh *et al.* found that the magnitude of BA increased significantly from 8% in 1986 to 23% in 1995.^[4] Despite the high prevalence and severity of asthma, Verleden and De in Belgium, found that only 37.5% of the asthma patients seemed to be controlled and correctly treated.^[5]

Address for correspondence: Dr. Hassan Ahmed Assiri, Abha Health Sector, General Directorate of Health Affairs, Aseer Region, KSA.
E-mail: h-s-801@hotmail.com

Received: 11-07-2020

Revised: 17-09-2020

Accepted: 04-10-2020

Published: 31-05-2021

Access this article online

Quick Response Code:



Website:
www.jfmipc.com

DOI:
10.4103/jfmipc.jfmipc_1418_20

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Assiri HA, Alkhaldi YM, Alsaleem SA, Alqarni HM. Knowledge, attitude and practices of PHC physicians in Aseer region regarding management of acute asthma. J Family Med Prim Care 2021;10:1882-9.

In Saudi Arabia, Al-Dawood found that the rate of hospital emergency visit was 65% while hospital admission was 12% among children.^[6]

The Saudi Initiative for Asthma (SINA) has been performed excellent efforts to improve the quality of BA care at all levels including primary health care center (PHCC). They issued and updated national asthma guideline and make it accessible to use in different formats.^[7] Despite this valuable effort, the gaps between theory and practice is still expected to be huge as reflected with a high percentage of uncontrolled BA and their frequent visit to ER departments in hospitals.^[6]

Primary care center and their health care professionals are the first lines to manage acute BA; however the data about knowledge, attitude, practice and essential drugs, equipment availability were not adequately explored in this regard.

This study aims to explore knowledge, attitude and practices of physicians working at PHC in Aseer region regarding assessment and management of acute asthma.

Subjects and Methods

This cross-sectional study was conducted in the three main cities of Aseer Region: Abha, Khamis Mushayt and Ahad Rufeida during 2018. All physicians at PHCCs within these cities were constituted the study population and were invited to participate in this study. The expected number of physicians who should participate in the study was around 240 PHC physicians.

Based on the thorough review of relevant literature, a questionnaire has been designed by the researchers.^[7-14] The questionnaire consisted of the following sections:

1. **Personal characteristics:** Age, gender, nationality, qualification, position, experience in PHC, experience with asthma management.
2. **Knowledge:** Participants' level of knowledge about diagnosis and management of acute asthma was assessed by relevant questions derived from the SINA Guidelines,^[7] which comprises eight questions (True/False) type and six multiple choice types. Each question was given a score of (1) for a correct response, or a score of (0) for an incorrect response or if the participant does not know the answer. Participants' knowledge grades were classified as follows: "Very knowledgeable" ($\geq 85\%$), "Knowledgeable" (70-84%), or "Poor" ($< 70\%$).
3. **Attitude:** Participants' attitude was assessed by asking 15 questions. It was assessed by Likert scale of three points (i.e., Agree, Neutral, or Disagree). An attitude was considered positive when the participant's total score was more than 20 points, negative if participant's total score was less than 15 points, or neutral if the total score was 15-20 points.
4. **Practices:** Participants' practices about diagnosis and management of acute asthma were assessed by 12

relevant activities. Each statement was assessed as following: (4 = always, 3 = often, 2 = sometimes, 1 = rare, and zero = never). Practice regarding management of acute asthma was considered as "Good practice" if the total score was $\geq 75\%$ and poor if less than 74.9%. Prior to start of data collection, the study tool was tested through a pilot study. This pilot study was applied to 15 physicians (who were not included into the main study) to test the validity and clarity of the questionnaire. To test the validity of the questionnaire, two consultants (family medicine consultant and Chest Diseases consultant) were invited to read the questionnaire and submit their comments and suggestions which were considered in the final version of the questionnaire. The ethical approval was obtained from the research ethical committee, College of Medicine, King Khalid University-Abha, KSA, under the number of REC# 2018-01-08 on 8/1/2018G. The consents of participants were obtained before distributing the questionnaire.

The questionnaire was distributed and collected by the investigator in arrangement with technical supervisors of the three health sectors during the study period (2017-2018).

The Statistical Package for Social Sciences (SPSS version 23.0) was used for data entry and analysis. Descriptive statistics (i.e., frequency, percentage, mean and standard deviation) was calculated and the appropriate test of significance (e.g., χ^2) was applied. A statistically significant level was considered when $P < 0.05$.

Results

A total of 200 out of 240 PHCC doctors participated in this study giving a response rate of (83%). Table 1 depicts the personal characteristics of PHC physicians, 64.5% of physicians aged 30-35 years. More than half of the PHC physicians (57.5%) were males, and 45.5% were Saudi. About two-thirds of the physicians (60%) had less than 5 years' experience in PHC. More than half of the physicians (53%) had a diploma or master degree, 44.5% had MBBS degree, while 2.5% had Doctorate or Fellowship degree. General practitioners constituted 47.5% of physicians, while specialists and consultants constituted 52.5%. About two-thirds of the physicians (60%) received training on asthma management. Physicians' main source of knowledge on asthma included textbooks (26%), clinical guidelines (61.5%), and workshops (11.5%).

Table 2 summarizes the knowledge of participants regarding BA. The main points of knowledge gaps regarding acute BA management: doses of drugs (36%), diagnosis (51.5%), initial steps in the management asthmatic children (52.5%), signs of acute severe asthma (56%) and the appreciation of appropriate time to respond after initial treatment (57%).

Table 3 depicts the attitudes of participants. All participants agreed that BA greatly affects patients' quality of life, and the majority

agreed that the diagnosis of BA is their responsibility (96.5%). On the other hand, most participants disagreed that the patient should refer a case of suspected BA to a chest specialist (85.5%) and that providing health education for caregivers of patients with asthma is a difficult task (83%).

Table 1: Personal characteristics of PHC physicians in Aseer region, KSA

Personal characteristics (n=200)	No.	%
Age groups		
<30 years	66	33.0
30-35 years	129	64.5
>35 years	5	2.5
Gender		
Male	115	57.5
Female	85	42.5
Nationality		
Saudi	91	45.5
Non-Saudi	109	54.5
Experience in primary care		
<5 years	120	60.0
5+years	80	40.0
Qualifications		
MBBS	89	44.5
Diploma/Master	106	53.0
Doctorate/Fellowship	5	2.5
Position		
General practitioner	91	45.5
Specialist consultant	104	52.0
Receiving training on asthma management	120	60.0
Main source for knowledge on asthma		
Textbook	52	26.0
Guidelines	123	61.5
Workshops	23	11.5
Others	2	1.0

Table 4 shows that the most frequent activities practiced by PHC doctor for management of acute asthma are counseling smoker for smoking cessation, and educating patients about symptoms and signs suggesting worsening of asthma control, whereas the least practiced activity was providing inhaled corticosteroid as initial treatment during asthma exacerbation.

Table 5 shows the association between knowledge of participants and their characteristics regarding acute asthma management. It was found that those aged 30-35 years had a higher score compared to those aged above 35 years ($P= 0.013$). The knowledge grades were better among males compared to females 28% versus 17% ($P = 0.029$). Knowledge grades regarding asthma management were significantly better among non-Saudi physicians ($P < 0.001$) and those with high qualifications compared with those holding MBBS (69% vs. 19%; $P = 0.001$). However, physicians' knowledge grades did not differ significantly according to their years of experience in primary care or receiving training on asthma management.

Tables 6 and 7 show the association between the attitude/practices of participants and their characteristics regarding acute asthma management. It is obvious there were no significant associations except for those with less experience in PHC had significantly better practice ($p = 0.011$).

Table 8 shows that almost all PHCCs (98%) have oxygen and nebulizers, 72.5% have steroids, 71.5% have salbutamol, 50.5% have Ipratropium and 41% have peak flow meter; whereas 73.5% have the SINA guidelines.

Discussion

In the Kingdom of Saudi Arabia, most asthmatic patients are managed at primary care centers by primary care

Table 2: Knowledge of acute asthma among PHC physicians in Aseer region, KSA

Statements	Correct responses No. (%)
To know the signs of acute severe asthma attack	110 (56%)
To diagnose acute severe asthma attack	103 (51.5%)
To know the initial steps in the treatment of acute severe asthma attack	167 (83.5%)
To appreciate the appropriate time to respond after initial treatment	114 (57%)
To know the correct doses of drugs used in management of acute severe asthma attack	72 (36%)
To take the appropriate decision after multiple sets in the management acute severe asthma attack	144 (72%)
To know when further workup is needed in the management acute severe asthma attack	175 (87.5%)
To know the signs of life-threatening asthma	121 (60.5%)
To know the instructions to be given to the patient upon discharge	182 (91%)
To assess the severity of acute asthma in children using PRAM tool	137 (68.5%)
To interpret PRAM tool correctly	166 (83%)
To know the initial steps in the management of acute asthma children according to PRAM score	105 (52.5%)
To know when to reassess the child with acute asthma attack	153 (67.5%)
To know the appropriate next step based on PRAM score after initial treatment	183 (91.5%)
Overall grade	
Very good	29 (14.5%)
Good	127 (63.5%)
Poor	44 (22%)

PRAM: Pediatric Respiratory Assessment Measure

Table 3: Attitude of PHC physicians in Aseer region, KSA regarding acute asthma, KSA, 2017

Statements	Agree No. (%)	Undecided No. (%)	Disagree No. (%)
Bronchial asthma greatly affects the patients' quality of life	200 (100%)	200 (0%)	200 (0%)
Diagnosis of bronchial asthma is the responsibility of PHC physicians	193 (96.5%)	4 (2%)	3 (1.5%)
The guidelines for management of bronchial asthma are difficult to follow	143 (71%)	29 (14.5%)	28 (14%)
Pulmonary function tests for asthmatic cases are difficult to perform	18 (64.5%)	53 (26.5%)	129 (9%)
It is better for the patient to refer a case of suspected bronchial asthma to a chest specialist	13 (6.5%)	16 (8%)	171 (85.5%)
I am confident that I can manage all cases of asthma	158 (79%)	23 (11.5%)	19 (9.5%)
PHC physicians are not qualified to properly manage cases of acute bronchial asthma	92 (46%)	93 (46.5%)	14 (7%)
PHC centers are not properly equipped for management of cases of acute bronchial asthma	47 (23.5%)	107 (53.5%)	46 (23%)
Follow-up of patients with acute bronchial asthma should not be performed at a PHC center	160 (80%)	17 (8.5%)	23 (11.5%)
Sometimes providing health education for caregivers of patients with asthma is a difficult task	25 (12.5%)	99 (49.5%)	76 (83%)
Management of acute asthma is frustrating for PHC physicians	92 (46%)	95 (47.5%)	13 (6.5%)
I feel confident to perform and interpret PFM for patient with acute asthma	169 (84.5%)	27 (13.5%)	4 (2%)
I am confident to manage acute asthma to extent that few patients need to be referred to ER	180 (90%)	20 (10%)	0 (0%)
Most PHC physicians are not equipped properly with the necessary drugs, equipment, etc., to manage and control acute asthma	67 (33.5%)	92 (46%)	41 (33.5%)
I think that our team in PHC is not qualified to manage acute asthma	118 (59%)	73 (36.5%)	9 (4.5%)
Allover attitude	88 (44%)	44 (22%)	68 (34%)

Table 4: Practice of PHC physicians regarding management of acute asthma in Aseer region, KSA KSA, 2017

Statements	Always No. (%)	Often No. (%)	Sometimes No. (%)	Rarely No. (%)	Never No. (%)
Using Asthma Control Test to assess the control of patient	23 (11.5%)	139 (69.5%)	30 (15%)	3 (1.5%)	5 (2.5%)
Using peak flow meter to monitor patient when come to PHC	40 (20%)	111 (55.5%)	34 (17%)	5 (2.5%)	10 (5%)
Educating patient about symptoms and signs suggesting worsening of asthma control	115 (57.5%)	72 (36%)	11 (5.5%)	11 (5.5%)	2 (1%)
Using written selfmanagement plan with patient	64 (32%)	96 (48%)	32 (16%)	6 (3%)	2 (1%)
Counseling smoker for smoking cessation	137 (68.5%)	50 (25%)	10 (5%)	2 (1%)	1 (0.5%)
Giving inhaled corticosteroid as initial treatment during asthma exacerbation	14 (7%)	17 (8.5%)	40 (20%)	76 (38%)	53 (26.5%)
Checking patient's adherence to medication	100 (23.5%)	47 (52%)	4 (23.5%)	47 (23.5%)	2 (1%)
Teaching patient the proper inhaler technique?	118 (27.5%)	26 (59%)	55 (13%)	26 (13%)	1 (0.5%)
Using peak flow meter to assess acute asthma	29 (14.5)	89 (44.5%)	66 (33%)	7 (3.5%)	9 (4.5%)
Managing moderate acute asthma in PHCC	30 (15%)	84 (42%)	80 (40%)	5 (2.5%)	1 (0.5%)
Prescribing oral steroid for patients presenting with moderate asthma exacerbation	11 (5.5%)	11 (5.5%)	42 (21%)	118 (59%)	18 (9%)
Following up patient after exacerbation	26 (13%)	110 (55%)	52 (26%)	9 (4.5%)	3 (1.5%)
Overall practice					
Good			107 (53.5%)		
Poor			93 (46.5%)		

physicians. Knowledge of primary care physicians about the diagnosis and management of BA is essential for better patient care.^[9]

The present study aimed to explore knowledge, attitude and practices of PHC physicians in Aseer region regarding the assessment and management of acute asthma.

Findings of the present study revealed that the perception of participant PHC physicians is suboptimal, with about one-fourth of them having poor knowledge grade, about one-third had a

negative attitude toward asthma management, while almost half of participants were non-adherent to the SINA guidelines when managing acute asthma at PHCC.

In the previous study conducted by Abudahish and Bella, they reported low knowledge scores among PHC physicians in Aseer Region many years ago.^[9] In Al-Khobar City, KSA, Yousef *et al.* reported that 41% of PHC physicians had poor knowledge regarding BA, while Taha *et al.* in Dammam, Saudi Arabia, reported that about half of primary care personnel showed poor knowledge regarding BA.^[8,10]

Table 5: Physicians' knowledge grades regarding acute asthma management according to their personal characteristics, KSA, 2017

Personal Characteristics	Poor		Good		Very Good		P*
	No.	%	No.	%	No.	%	
Age groups							
<30 years	23	34.8	37	56.1	6	9.1	
30-35 years	19	14.7	87	67.4	23	17.8	
>35 years	2	40.0	3	60.0	0	0.0	0.013
Gender							
Male	20	17.4	82	71.3	13	11.3	
Female	24	28.2	45	52.9	16	18.8	0.029
Nationality							
Saudi	33	36.3	51	56.0	7	7.7	
Non-Saudi	11	10.1	76	69.7	22	20.2	<0.001
Experience in primary care							
<5 years	30	25.0	72	60.0	18	15.0	
5 + years	14	17.5	55	68.8	11	13.8	0.395
Qualifications							
MBBS	31	34.8	50	56.2	8	9.0	
Diploma/Master	11	10.4	74	69.8	21	19.8	
Doctorate/Fellowship	2	40.0	3	60.0	0	0.0	0.001
Position							
General practitioner	30	33	52	57.1	9	9.9	
Specialist	12	11.5	72	69.2	20	19.2	0.001
Consultant	2	40.0	3	60.0	0	0	
Receiving training on asthma Management							
Yes	23	19.2	78	65.0	19	15.8	
No	21	26.3	49	61.3	10	12.5	0.456
Knowledge main source							
Textbook	10	19.2	37	71.2	5	9.6	
Guidelines	31	25.2	75	61.0	17	13.8	
Workshops	2	8.7	14	60.9	7	30.4	
Others	1	50.0	1	50.0	0	0.0	0.162

*Chi-square test

In Kuwait State, Almutawa *et al.* reported a poor adherence among primary care physicians to the National Asthma Management Guidelines as only 37.2% of them strictly adhering to it.^[11] Poor compliance with asthma guidelines was also reported by many other studies in different counties.^[13-15]

The lack of knowledge and poor practice of primary care physicians regarding management of BA may be explained by the finding that only 60% of primary care physicians attended training courses on asthma management. However, those who attended the training courses did not have significantly better knowledge, attitude or practice compared to those who attended the training courses, indicating that "casual" training or awareness through brief training courses may not be effective.

In a study conducted by Taha *et al.*, it was reported that most PHC personnel in PHCCs in Dammam City, KSA (78.4%) did not receive any training about BA.^[8]

Grunfeld *et al.* argued that well-trained physicians are usually more likely to have a good impact to assess and manage asthmatic patients, whereas Al-Kanderi *et al.* stated that the lack of training is

one of the main barriers for providing medical care to asthmatics. They added that guidelines for the management of BA can be readily accepted if they are combined with task-based training.^[15,16]

Compliance with clinical guidelines could be affected by many reasons. Almutawa *et al.* found that, although primary care physicians were aware of the existence of asthma guidelines, it seems that casual awareness may not guarantee familiarity with the guidelines.^[11] Other studies reported many reasons that included the poor understanding for estimating severity of asthma, underutilization of inhaled corticosteroids, difficult implementation, difficult dissemination, and shortage of staff at PHCC.^[16-19]

In Karachi, Pakistan, Bhulani *et al.* reported that only one-fourth of general practitioners had adequate knowledge about concepts of asthma while only 10.4% had adequate practice in asthma management.^[20]

In the current study, we found that those with high qualifications were having better knowledge about management of acute asthma and such findings are expected. Bhulani *et al.* reported that knowledge and practice scores were significantly associated

Table 6: Physicians' attitude toward acute asthma management according to their personal characteristics, KSA, 2017

Personal Characteristics	Negative		Neutral		Positive		P
	No.	%	No.	%	No.	%	
Age groups							
<30 years	21	31.8	16	24.2	29	43.9	
30-35 years	45	34.9	27	20.9	57	44.2	
>35 years	2	40.0	1	20.0	2	40.0	0.981
Gender							
Male	35	30.4	22	19.1	58	50.4	
Female	33	38.8	22	25.9	30	35.3	0.102
Nationality							
Saudi	29	31.9	21	23.1	41	45.1	
Non-Saudi	39	35.8	23	21.1	47	43.1	0.838
Experience in primary care							
<5 years	39	32.5	30	25.0	51	42.5	
5+years	29	36.3	14	17.5	37	46.3	0.454
Qualifications							
MBBS	28	31.5	22	24.7	39	43.8	
Diploma/Master	38	35.8	22	20.8	46	43.4	
Doctorate/Fellowship	2	40.0	0	0.0	3	60.0	0.717
Position							
General practitioner	30	31.9	15	16.0	49	52.1	
Specialist	36	34.2	23	24	39	37.1	0.067
Consultant	2	40	3	60	0	0	
Receiving training on asthma Management							
Yes	41	34.5	26	21.8	52	43.7	
No	27	33.8	17	21.3	36	45.0	0.984
Knowledge main source							
Textbook	8	15.4	23	44.2	21	40.4	
Guidelines	25	20.5	40	32.8	57	46.7	
Workshops	8	34.8	5	21.7	10	43.5	
Others	2	100.0	0	0.0	0	0.0	0.066

with primary care physicians' qualifications, which proved to be significant predictors for their adherence to asthma guidelines.^[20]

Findings of the present study revealed that oxygen and nebulizers were available in almost all PHCCs. To a lesser extent, steroids, salbutamol, and ipratropium are present in most centers.

In Kuwait, Al-Kanderi *et al.* reported the lack of essential medications of asthma in PHCCs, while Almutawa *et al.* reported that only 17.2% of physicians admitted that they are aware about the availability of spirometers at their primary care centers.^[16,11]

Despite the importance of peak flow-meter in management of acute asthma, we found that only 41% of PHCCs were provided with this diagnostic tool. Such shortage should be managed in all PHCCs and all doctors to be trained how to use and interpret it appropriately as suggested by Rabe *et al.*^[21] In this regard, Nguyena *et al.* noted that the availability of spirometers/peak flow meters is usually lacking at primary care centers, especially in developing countries.^[22]

Table 7: Physicians' practice grades regarding acute asthma management according to their personal characteristics, KSA, 2017

Personal characteristics	Poor (n=93)		Good (n=107)		P
	No.	%	No.	%	
Age groups					
<30 years	29	43.9	37	56.1	
30-35 years	64	49.6	65	50.4	
>35 years	0	0.0	5	100.0	0.081
Gender					
Male	57	49.6	58	50.4	
Female	36	42.4	49	57.6	0.312
Nationality					
Saudi	42	46.2	49	53.8	
Non-Saudi	51	46.8	58	53.2	0.929
Experience in primary care					
<5 years	47	39.2	73	60.8	
5+years	46	57.5	34	42.5	0.011
Qualifications					
MBBS	42	47.2	47	52.8	
Diploma/Master	51	48.1	55	51.9	
Doctorate/Fellowship	0	0.0	5	100.0	0.107
Position					
General practitioner	50	52.6	45	47.4	
Specialist	43	41.0	62	59.0	0.098
Consultant	2	40	3	60	
Receiving training on asthma management					
Yes	56	46.7	64	53.3	
No	37	46.3	43	53.8	0.954
Knowledge main source					
Textbook	24	46.2	28	53.8	
Guidelines	62	50.4	61	49.6	
Workshops	7	30.4	16	69.6	
Others	0	0.0	2	100.0	0.181

The present study showed that although 44% of PHC physicians had a positive attitude regarding management of BA, yet practice of 40% of physicians regarding adherence to practice guidelines was quite poor.

This finding is in accordance with that reported by Almutawa *et al.* who stated that, although PHC physicians had a positive attitude toward the outcome of adherence to asthma guidelines yet, they had a low actual adherence rate, low knowledge and practice scores.^[11]

Some studies emphasized that the role of the primary care service regarding BA management demands that primary care physicians should be adequately equipped with positive attitude, sound knowledge, and adequate practices.^[8,16,23]

Results of this study revealed that poor knowledge about BA management was significantly more among physicians who are females, Saudi and general practitioners. However, physicians' attitude did not differ significantly according to their personal characteristics, while those with more experience in PHC had significantly poor practice.

Table 8: Availability of material and medications related to asthma management at PHCCs, KSA, 2017

Material	No.	%
Oxygen	196	98.0
Nebulizer	196	98.0
Steroids injection	145	72.5
Salbutamol solution	143	71.5
Ipratropium bromide	101	50.5
Peak Flow Meter	82	41.0
SINA	147	73.5

These findings are partially by those of Taha *et al.* in Dammam, Saudi Arabia, who reported that being a male, with less years of experience in PHC were statistically significant and associated with good knowledge level.^[8]

The lower knowledge grade among Saudi PHC physicians regarding the management of acute BA may be explained by the fact that non-Saudi physicians are usually properly selected as the best of those who apply for a position to work in Saudi Arabia. Nevertheless, this “selection” process does not apply to Saudi PHC physicians.

Moreover, the observed better knowledge among specialists/consultants than general practitioners in addition to the lower practice among those with more experience in PHC may indicate that senior physicians at PHC centers do not play their role in transmitting the knowledge and experience to their junior colleagues.

Based on the findings of the present study, the investigators emphasize on the following practical recommendations:

- Proper training of all PHC physicians on management of BA.
- Provision of the necessary medications and peak flow-meters to all PHCCs.
- Senior physicians at PHCCs should be encouraged to train their junior colleagues regarding the management of acute BA.
- Further studies are needed to explore the barriers that can face primary care physicians' adherence to primary care physicians' management of asthma guidelines.
- Frequent audit of asthma care in PHCC is strongly recommended.

Conclusion

This study revealed that knowledge, attitude, and practice of PHCC doctors in Aseer region regarding management acute asthma are suboptimal, there was a shortage of essential drugs and equipment which should be provided, training of all doctors are mandatory with a regular evaluation regarding its impact on asthma care.

Declaration of patient consent

The authors certify that they have obtained all appropriate participant consent forms. In the form, the participants has/

have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The participants understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention. Chapter 1: Definition and overview, 2006; p. 4.
2. Zhao J, Takamura M, Yamaoka A, Odajima Y, Iikura Y. Altered eosinophil levels as a result of viral infection in asthma exacerbation in childhood. *J Pediatr Allergy Immunol* 2002;13:47-50.
3. Holgate ST, Price D, Valovirta E. Asthma out of control? A structured review of recent patient surveys. *BMC Pulm Med* 2006;6(Suppl 1):S2.
4. Al-Frayh AR, Shakoor Z, Gad El Rab MO, Hasnain SM. Increased prevalence of asthma in Saudi Arabia. *Ann Allergy Asthma Immunol* 2001;86:292-6.
5. Verleden GM, De VP. Assessment of asthma severity and treatment by GPs in Belgium: An Asthma Drug Utilization Research (ADUR) study. *Respir Med* 2002;96:170-7.
6. Al-Dawood KM. Risk factors associated with hospital emergency visits among asthmatic schoolboys in Saudi Arabia. *East Mediterr Health J* 2002;8:31-41.
7. Al-Moamary MS, Alhaider SA, Idrees MM, Al Ghobain MO, Zeitouni MO, Al-Harbi AS, *et al.* The Saudi Initiative for Asthma-2016 update: Guidelines for the diagnosis and management of asthma in adults and children. *Ann Thorac Med* 2016;11:3-42.
8. Taha AZ, Sabra AA, Al Hamed JH. Knowledge about childhood bronchial asthma among primary health care personnel in eastern Saudi Arabia. *Int J Med Public Health* 2014;4:222-6.
9. Abudahish A, Bella H. Adherence of primary care physicians in Aseer region, Saudi Arabia to the National protocol for the management of asthma. *East Mediterr Health J* 2010;16:171-5.
10. Yousef HA, Koura M, Yousef AA. Knowledge about bronchial asthma management in primary health care physicians in AlKhobar City, Saudi Arabia. *J Family Community Med* 2015;22:1-7.
11. Almutawa FN, Al-Mutairy G, Al-Arada N, Kamel MI. Perception of primary care physicians about guidelines of bronchial asthma. *Alexandria J Med* 2014;50:17-24.
12. Scribano PV, Lerer T, Kennedy D, Cloutier M. Provider adherence to a clinical practice guideline for acute asthma in a pediatric emergency department. *Acad Emerg Med* 2001;8:1147-52.
13. Sun YH, Eun BW, Sim SY, Cho KH, Ryoo E, Cho DY, *et al.* Poor adherence and reasons for non-adherence to the asthma guidelines among pediatricians in Korea. *Asian Pac J Allergy Immunol* 2010;28:147-54.
14. Rovithis E, Lionis C, Schiza SE, Bouros D, Karokis A,

- Vlachonikolis I, *et al.* Assessing the knowledge of bronchial asthma among primary health care physicians in Crete: A pre- and post-test following an educational course. *BMC Med Educ* 2001;1:2-6.
15. Grunfeld A, Beveridge RC, Berkowitz J, FitzGerald JM. Management of acute asthma in Canada: An assessment of emergency physician behavior. *J Emerg Med* 1997;15:547-56.
 16. Al-Kanderi BM, Al-Muhailej FA, Al-Khalaf T. Evaluation of asthma clinics in primary care in Kuwait. *Eur J Gen Med* 2006;3:159-66.
 17. Finkelstein JA, Lozano P, Shulruff R, Inui TS, Soumerai SB, Ng M, *et al.* Self-reported physician practices for children with asthma: Are national guidelines followed? *Pediatrics* 2000;106:886-96.
 18. Ait-Khaled N, Enarson DA, Bencharif N, Boulahdib F, Camara E, Dagli E, *et al.* Implementation of asthma guidelines in health centres of several developing countries. *Int J Tuberc Lung Dis* 2006;10:104-9.
 19. Graff L, Stevens C, Spaite D, Foody JA. Measuring and improving quality in emergency medicine. *Acad Emerg Med* 2002;9:1091-107.
 20. Bhulani N, Lalani S, Ahmed A, Jan Y, Faheem U, Khan A, *et al.* Knowledge of asthma management by general practitioners in Karachi, Pakistan: Comparison with international guidelines. *Prim Care Respir J* 2011;20:448-51.
 21. Rabe KF, Vermeire PA, Soriano JB, Maier WC. Clinical management of asthma in 1999: The Asthma Insights and Reality in Europe (AIRE) study. *Eur Respir J* 2000;16:802-7.
 22. Nguyena VN, Chavannesb N, Le LT, Priced D. The Asthma Control Test (ACT) as an alternative tool to Global Initiative for Asthma (GINA) guideline criteria for assessing asthma control in Vietnamese outpatients. *Prim Care Respir J* 2012;21:85-9.
 23. Uluç NN, Özdemir Ö. The attitude, knowledge, and behavior of family physicians about childhood asthma in Sakarya province. *Turk Pediatri Ars* 2019;54:225-37.