

Physicians' Knowledge and Practices Regarding Asthma: A Cross-Sectional Study in Saudi Arabia

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Objective: This study aimed to explore the characteristics of knowledge and practice of physicians towards asthma in Saudi Arabia.

Methods: An online cross-sectional study was conducted in Saudi Arabia between 28 August and 10 November 2021. Convenience sampling technique was applied in this study through social media websites. Previously developed 10-items questionnaire was used to assess the knowledge about asthma among the participating physicians. Descriptive statistics were used to describe the participants' demographic characteristics. Binary logistic regression analysis was conducted to identify factors associated with being adherent to asthma practices guidelines.

Results: Overall, participants' knowledge was moderate. The average percentage of physicians who reported practicing asthma management based on recommended guidelines 63.7%. Younger age (30–34 years) and having a work experience of (6–10 years) were significant predictors of being adherent to asthma practices guidelines (OR: 1.96 (95% CI: 1.21–3.17) ($p=0.006$) and OR: 1.67 (95% CI 1.05–2.67) ($p=0.031$), receptively).

Conclusion: This study showed that the percentage of physicians who reported practicing asthma management based on recommended guidelines in Saudi Arabia are moderate. Future studies to investigate factors associated with improvement in knowledge about asthma and adherence to guidelines are needed.

Keywords: practice, physicians, knowledge, Saudi Arabia, healthcare professionals, asthma

Introduction

Asthma is one of the most common causes for primary care visits in the world and in Saudi Arabia.¹ According to the World Health Organization (WHO), asthma is a long-term condition affecting children and adults. The air passages in the lungs become narrow due to inflammation and tightening of the muscles around the small airways.² The disease which is an obstructive inflammatory disease in its nature is characterised by hypersensitivity and hypersensitivity reactions of the immune system towards the small bronchi in the lungs.³ Asthma can vary from mild to more severe form and complicated attacks.³

According to the WHO, there are more than 262 million of patients with asthma worldwide in 2019.⁴ In the United States, the CDC reported that the prevalence of asthma in the US is around 7.9% in 2019.⁵ In Saudi Arabia, according to a national household survey, the prevalence of asthma was around 4.0%.⁶ However, other studies reported that the prevalence of asthma is around 11%,⁷ including a systematic review and a meta-analysis that reported that the prevalence of asthma is around 14%.⁸

Asthma can be associated with major complications and high rates of morbidity and mortality including ICU admission.^{9–11} The quality of life of patients with asthma can vary according to the frequency and severity of the symptoms.¹² Therefore, accurate diagnosis and effective management of asthma plays an important role in the quality of life of patients with asthma.

The diagnosis and management of asthma is well established worldwide, and many countries have issued national guidelines for the management and diagnosis of asthma.^{13–16} These guidelines usually include recommendations and

evidence-based medicine information for the diagnosis and management of asthma. However, some studies worldwide have also shown that malpractice and non-adherence to guidelines also exist, leading to a variation in the management, and in the long-term outcomes of patients with asthma.^{17–19} In addition, the cost of the management of patients with asthma is also affected by this variation in the practice.

Multiple studies worldwide have assessed the knowledge and practice of physician towards asthma including the adherence of physicians to the guidelines.^{20–22} However, in Saudi Arabia little is known about the knowledge and practice of physicians towards asthma and the adherence of medical practitioners to the national and international asthma guidelines. Therefore, the aim of this study is to explore the characteristics of knowledge and practice of physicians towards asthma in Saudi Arabia.

Method

Study Design and Study Population

An online cross-sectional study was conducted in Saudi Arabia between 28 August and 10 November 2021 to explore the characteristics of asthma knowledge and practice of physicians concerned in Saudi Arabia.

Sampling Strategy

Convenience sampling technique was applied to invite the physicians in this study. They were invited through social media websites (Twitter, Facebook, and WhatsApp). Practicing physicians who are currently practicing medicine in Saudi Arabia and managing asthmatic patients in their clinics were invited to participate in the study. The study's aim, objectives, and inclusion criteria were clearly mentioned in the cover letter of the survey. It was clearly mentioned that participation is voluntary, and by completing the questionnaire, this will be considered as written informed consent.

Study Assessment Tools

The Arabic version of a previously developed 10-items questionnaire by Adeniyi et al was used to assess the knowledge about asthma among the participating physicians.^{23,24} Knowledge questions were utilized using yes/no format (where yes indicates the right answer). Question numbers 1, 3, and 4 were negatively worded; therefore, when we calculate the percentage of participants who answered these items correctly, we subtract this percentage from 100%.

Physicians' asthma practices were assessed using Physicians' Practice Assessment Questionnaire (PPAQ) (14-items questionnaire).²⁵ This questionnaire was developed to explore to which extent physicians implement asthma management guidelines.²⁶ This questionnaire explores various characteristics of physicians practice including diagnosis, assessment, management, and follow-up. Participants response was recorded using continuous scale that range between 0% and 100% to indicate to which extent they apply each specific asthma management practice. Besides, participants were asked about their demographics (age, gender, work experience, and speciality) and practice characteristics (average number of patients seen at their clinic per day and the average number of asthmatic patients seen per day).

Statistical Analysis

Descriptive statistics were used to describe the participants' demographic characteristics. Data were reported as mean \pm standard deviation (SD). Categorical data were reported as percentages (frequencies). Binary logistic regression analysis was conducted to identify factors associated with being adherent to asthma practices guidelines. Adherent practice was defined as an average percentage of following asthma practices of 63.7% and above (which is the mean value), which was the cut-off for the logistic regression. A confidence interval of 95% ($p < 0.05$) was applied to represent the statistical significance of the results, and the level of significance was assigned as 5%. Data were analysed using SPSS software, version 27.

Ethical Statement

This study was approved by the faculty of Medicine at University of Umm Alqura, Mecca, Saudi Arabia.

Results

Characteristics of the Study Participants

Table 1 describes the characteristics of the participating physicians at this study. A total of 350 physicians were involved in the study of which around the half (53.2%) were aged below 34 years. More than half of them (56.0%) were males. A total of 43.4% of them had an experience of 5 years or less. Around one-third (36.0%) the participating physicians

Table 1 Characteristics for the Study Participants (N= 350)

Variable	Frequency (%)
Age (categories)	
25–29 years	85 (24.3)
30–34 years	101 (28.9)
35–39 years	60 (17.1)
40–44 years	41 (11.7)
45–49 years	28 (8.0)
50 years and above	35 (10.0)
Gender	
Male	196 (56.0)
Work experience (years)	
<5	152 (43.4)
6–10	107 (30.6)
11–15	46 (13.1)
16–20	28 (8.0)
>20	17 (4.9)
Average number of patients seen per day	
<10	126 (36.0)
11–20	140 (40.0)
21–30	51 (14.6)
>30	33 (9.4)
Average number of asthmatic patients seen per day	
1–5	180 (51.4)
6–10	131 (37.4)
11–20	29 (8.3)
>20	10 (2.9)

(Continued)

Table 1 (Continued).

Variable	Frequency (%)
Speciality	
Pulmonologist	106 (30.3)
General practitioner	43 (12.3)
Internal medicine specialist	38 (10.9)
Family medicine specialist	28 (8.0)
Paediatrician	21 (6.0)
Emergency physician	21 (6.0)
Other speciality	93 (26.6)

reported that the average number of patients seen at their clinic is 1–10 patients per day. Around half (51.4%) the participating physicians reported that the average number of asthmatic patients seen at their clinic per day is one to five patients. Around one-third (30.3%) of the study participants were pulmonologists.

Knowledge About Asthma

Table 2 describes characteristics of participants' knowledge about asthma. Participants' knowledge about asthma was assessed using 10 items. Overall, participants' knowledge was moderate. The average percentage of correct answers for all subscales that explored asthma knowledge was 58.3%. The lowest percentage was for sign of asthma attack subscale with 50.9%. The highest percentage was for disease characteristics scale with 70.8%.

Characteristics of Asthma Practices Among the Study Participants

Figure 1 describes characteristics of asthma practices among the study participants. The average percentage of physicians who reported practicing asthma management based on recommended guidelines 63.7% ($\pm 5.7\%$). More than half of the study participants (54.9%) achieved a percentage of 63.7% or above. The most commonly reported practice was scheduling regular follow-up appointments for the patient, which was reported by 73.6%. The lowest percentage was for confirming diagnosis by pulmonary function tests (either spirometry and bronchodilator reversibility or broncho-provocation) which was reported by 52.6%.

Adherence to Asthma Practices Guidelines

In order to identify participants' characteristics that are associated with being adherent to asthma practices guidelines, binary logistic regression was applied (**Table 3**). Younger age (30–34 years) and having a work experience of (6–10 years) were significant predictors of being adherent to asthma practices guidelines (OR: 1.96 (95% CI: 1.21–3.17) ($p=0.006$) and OR: 1.67 (95% CI 1.05–2.67) ($p=0.031$), receptively). On the other hand, older age (50 years and above) and longer work experience (16–20 years) were significant predictors of being non-adherent to asthma practices guidelines (OR: 0.29 (95% CI 0.14–0.63) ($p=0.002$) and OR: 0.36 (95% CI: 0.16–0.82) ($p=0.015$), respectively).

Discussion

This study aimed to explore the characteristics of knowledge and practice of physicians towards asthma in Saudi Arabia. Our findings showed that the overall level of asthma knowledge is moderate 58.3%. The lowest percentage was for sign of asthma attack with only 50.9%, while the highest percentage was for disease characteristics scale with 70.8%. Similar findings were reported by a study in West Nigeria, where only 61% of the study participants reported correct answers about the signs of asthma attack.²³ Previous studies reported a good knowledge of physicians about the characteristics of

Table 2 Asthma Knowledge Characteristics for the Study Participants

No.	Knowledge Scale	Percentage of Participants Answered (Yes)
	Disease characteristics	
1	Asthma is not a chronic inflammatory disorder of the airways	26.6% (73.4%) [§]
2	Symptoms of asthma occur or worsen at night, awakening the patient	82.0%
3	Symptoms of asthma does not have a seasonal pattern	52.6% (47.4%) [§]
4	Family history is not relevant	24.3% (75.7%) [§]
5	Asthmatic chronically inflamed airways are usually hyper responsive	75.7%
	Average percentage	70.8%
6	Asthma symptoms: (more than one answer is possible)	
	Cough (worse particularly at night)	70.0%
	Recurrent wheeze	46.6%
	Recurrent difficulty with breathing	70.3%
	Recurrent chest tightness is possible	63.4%
	Average percentage	62.6%
7	Asthma trigger: (more than one answer is possible)	
	Animal fur	60.9%
	Aerosol	59.4%
	Changes in temperature	63.7%
	Domestic dust	70.6%
	Drugs	36.6%
	Exercise chemicals	66.3%
	Pollen	36.3%
	Respiratory (viral) infections	68.6%
	Smoke	69.7%
	Strong emotional expression	32.9%
	Average percentage	56.5%
8	Asthma diagnostic procedure: (more than one answer is possible)	
	Spirometer	70.3%
	Peak flow meter	49.7%
	Chest radiography	35.4%
	Average percentage	51.8%

(Continued)

Table 2 (Continued).

No.	Knowledge Scale	Percentage of Participants Answered (Yes)
9	Sign of asthma attack: (more than one answer is possible)	
	Cyanosis	65.1%
	Fast pulse rate	65.7%
	Duration of attack	22.0%
	Average percentage:	50.9%
10	Drugs for the management of asthma: (more than one answer is possible)	
	Oral prednisolone	60.0%
	Salbutamol	68.0%
	Adrenaline	50.9%
	Cromolyn	47.7%
	Antibiotics	52.0%
	Intravenous hydrocortisone	57.1%
	Intravenous aminophylline	46.9%
	Ipratropium bromide	62.6%
	Intranasal oxygen	69.4%
	Average percentage	57.2%

Notes: [§]Negatively worded items, the correct answer for them is no. Therefore, when we calculate the percentage of participants who answered these items correctly, we subtract this percentage from 100%.

asthma, this was also in line with the results reported in our study as it showed that around 70% of the study sample had a good knowledge about asthma characteristics.^{21,23}

Our study results also showed that around half of the study participants had a good knowledge about the triggers associated with asthma. These results are lower than those reported in previous studies in Jordan and southwest Nigeria.^{21,23} Investigating the risk factors of asthma can be challenging, and in many cases patients are likely to be referred to specialised doctors and this could be the reason for the low percentage about the knowledge of asthma triggers, especially knowing that only 30% of the study sample were pulmonologists, while the majority of the study participants were from different specialities.

The average score of the knowledge of physicians about drugs used in the management of asthma was around 57.2%. Similarly, the knowledge of physicians of asthma diagnostic procedure was around 51.8%. Given the nature of the disease and the high prevalence of asthma worldwide, this percentage of knowledge can be considered low. Previous studies in Jordan and Russia and Ukraine reported higher percentage of knowledge of physicians about the diagnostic tests and treatment of asthma.^{21,27}

Several initiatives have been conducted to improve the care of patients with asthma worldwide, this included the establishment of several guidelines internationally and nationally, the Global Initiative for Asthma (GINA) guidelines had been developed.²⁷ In addition, Saudi Arabia issued national guidelines for the practice and management of asthma, these guidelines help physicians in the diagnosis and treatment of patients with asthma.²⁸ Despite these

Table 3 Logistic Regression Analysis to Identify Factors Affecting Asthma Practices Guidelines

Variable	Odds Ratio (95% CI)	p-value
Age (categories)		
25–29 years (Reference group)	1.00	
30–34 years	1.96 (1.21–3.17)**	0.006
35–39 years	0.73 (0.42–1.27)	0.266
40–44 years	0.95 (0.49–1.82)	0.870
45–49 years	0.59 (0.27–1.29)	0.187
50 years and above	0.29 (0.14–0.63)**	0.002
Gender		
Male (Reference group)	1.00	
Female	1.07 (0.70–1.64)	0.742
Work experience (years)		
<5 (Reference group)	1.00	
6–10	1.67 (1.05–2.67)*	0.031
11–15	0.65 (0.35–1.22)	0.180
16–20	0.36 (0.16–0.82)*	0.015
>20	0.72 (0.27–1.91)	0.509
Average number of patients seen per day		
<10 (Reference group)	1.00	
11–20	1.06 (0.67–1.63)	0.792
21–30	0.63 (0.35–1.15)	0.132
>30	0.75 (0.37–1.55)	0.441
Average number of asthmatic patients seen per day		
1–5 (Reference group)	1.00	
6–10	0.72 (0.47–1.10)	0.133
11–20	1.50 (0.97–2.33)	0.072
>20	0.87 (0.41–1.87)	0.723

Notes: *p < 0.05, **p < 0.01.

recommendations. The results shown in our study are worrisome and must be investigated, as the lack of knowledge of specific guidelines-related therapy recommendations may be associated with poor clinical outcomes.

In the study, the average percentage of physicians who reported practicing asthma management based on recommended guidelines 63.7% ($\pm 5.7\%$). A previous study in Spain that investigated the adherence of physicians to asthma guidelines reported a low percentage (26%) of adherence to the guidelines.²⁹ However, another study that was conducted

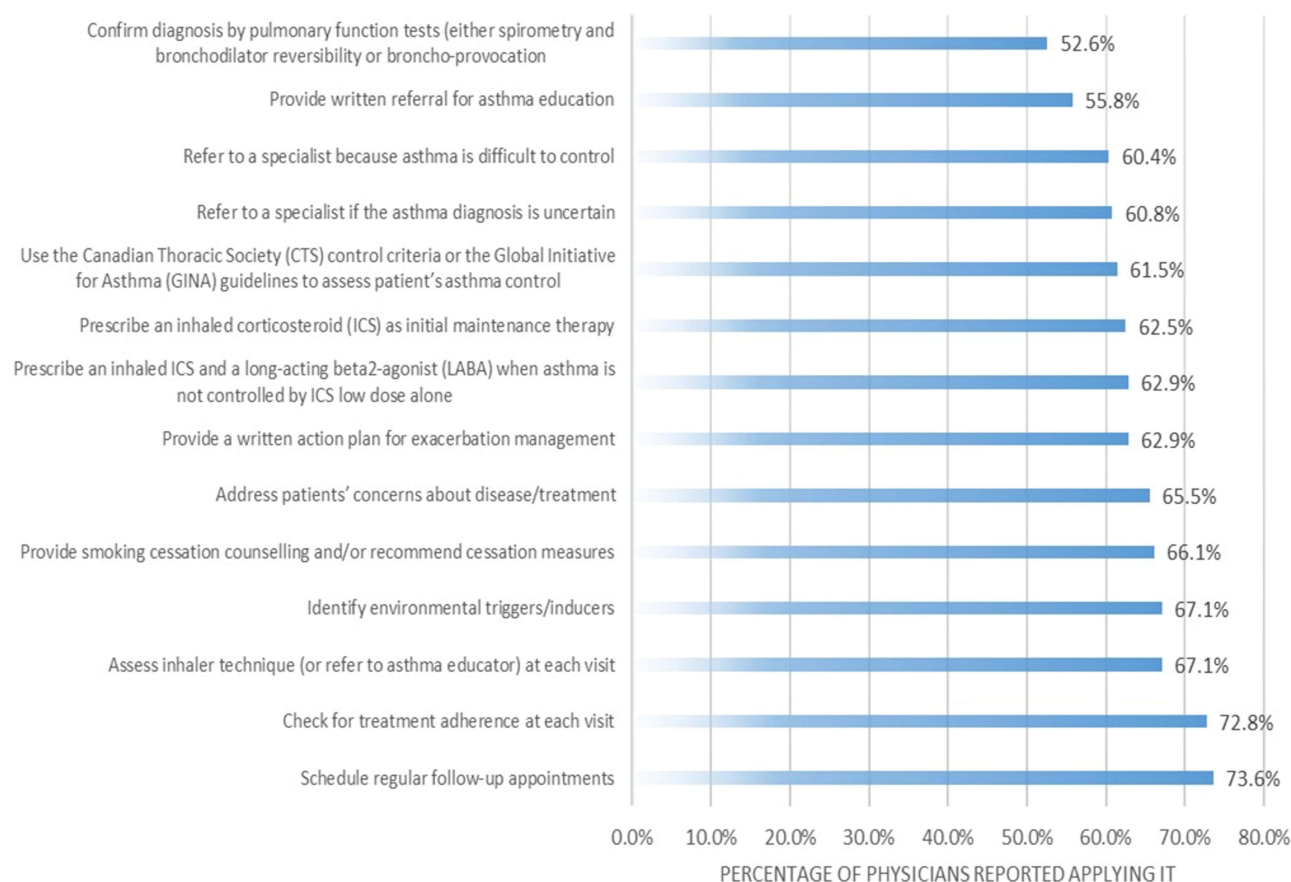


Figure I Characteristics of asthma practices among the study participants.

in Jordan reported nearly similar results to our study. The variation in adherence of asthma guidelines across countries may arise from the fact that each country has its own strategies and protocols for the management of diseases. Some countries has organizational barriers, and in many cases, the reason could be attributed to factors such as in addition attitude and beliefs of the physician.³⁰

In the binary logistic regression, it was shown that younger age (30–34 years) and having a work experience of (6–10 years) were significant predictors of being adherent to asthma practices guidelines (OR: 1.96 (95% CI: 1.21–3.17) ($p=0.006$) and OR: 1.67 (95% CI 1.05–2.67) ($p=0.031$), receptively). Young clinicians tend to adhere much better to practice guidelines, this was also shown in a previous study that showed that early or mid-career clinicians reported higher agreement than late-career clinicians in adherence to the guidelines.³¹

Saudi Arabia has several training programs for doctors and health care professionals, these programs are aimed to improve the training and the practice of health care provider; however, the results shown in our study reveal the need investigates the causes of this poor knowledge of a common health issue that is mainly seen on daily basis in the practice. Perhaps applying new approaches that involve tutorials, courses, and clinical audits may help improve the quality of care provided for patients with asthma.³²

To the best of our knowledge, this is the first study in Saudi Arabia that investigated physicians' knowledge and practices regarding asthma management. This study used a validate web-based online survey; however, this study has some limitations. First, the study design being a cross-sectional survey design limited our ability to identify causality between the study variables and the outcome. Second, the study survey was distributed online, and therefore, we might have missed to include some of the targeted population; however, as this survey and the data collected were during the COVID-19 pandemic, an online survey was preferred to avoid the possibility of getting infected by COVID-19.

Conclusion

This study showed that the knowledge of physicians about asthma and the percentage of physicians who reported practicing asthma management based on recommended guidelines in Saudi Arabia are moderate. Future studies to investigate factors associated with improvement in knowledge about asthma and adherence to guidelines are needed.

Ethical Statement and Institutional Review of Board Statement

This study was approved by the faculty of Medicine at University of Umm Alqura, Mecca, Saudi Arabia. This study was performed in accordance with the principles stated in the Declaration of Helsinki.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Disclosure

The author declares no competing interests in this work.

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