

# Awareness regarding childhood asthma in Saudi Arabia

Saleh Al-Harbi, Adel S. Al-Harbi<sup>1</sup>, Abdullah Al-Khorayyef<sup>1</sup>, Mansour Al-Qwaiee<sup>1</sup>, Abdullah Al-Shamarani<sup>2</sup>, Wafa Al-Aslani<sup>3</sup>, Hayat Kamfar<sup>4</sup>, Osama Felemban<sup>4</sup>, Mohammed Barzanji<sup>5</sup>, Naser Al-Harbi<sup>6</sup>, Ruqaia Dhabab<sup>7</sup>, Mohammed Ahmed Al-Omari<sup>8</sup>, Abdullah Yousef<sup>8</sup>

Assistant Professor of Pediatrics, Consultant Pediatric Pulmonologist, Umm Al-Qura University, Mecca, <sup>1</sup>Department of Pediatric Pulmonary Medicine, Prince Sultan Military Medical City, Ministry of Defence, <sup>2</sup>Department of Pediatric, King Fahad Medical City, <sup>3</sup>Department of Pediatric, Children & Maternity Hospital, <sup>4</sup>Department of Pediatrics, King Saud University Hospital, <sup>5</sup>Department of Pediatric, King Abdulaziz Medical City, Riyadh, <sup>6</sup>Department of Pediatric, King Abdulaziz University Hospital, Jeddah, <sup>7</sup>Department of Pediatric, Dr. Soliman Fakeeh Hospital, Jeddah, <sup>8</sup>Department of Pediatric, King Fahad University Hospital, Dammam, KSA

## Address for correspondence:

Dr. Saleh Al-Harbi,  
Dr. Suleiman Fakeeh  
Hospital, Jeddah,  
Saudi Arabia.  
E-mail: sah508@gmail.com

Submission: 25-05-2015  
Accepted: 22-09-2015

## Access this article online

Quick Response Code:



Website:  
www.thoracicmedicine.org

DOI:  
10.4103/1817-1737.173194

## Abstract:

**OBJECTIVE:** Assessing the knowledge and awareness of the Saudi society about bronchial asthma in children.

**METHODS:** Structured questionnaires were randomly distributed to 1039 Saudi Arabians in May 2014 at Jeddah, Riyadh, and Dammam.

**RESULTS:** The awareness of bronchial asthma questions showed that 67% of total sample thought that it could be a fatal disease, and only 13.2% thought that there is a difference between bronchial asthma and chest allergies in children. 86.1% thought that the symptoms of bronchial asthma include dyspnea and nocturnal cough, and 45.7% thought that fever, a runny nose and throat inflammation are not symptoms. 60.2% thought that infectious respiratory diseases may increase bronchial asthma progression. In addition, 40% thought that the use of antibiotics doesn't help in diminishing bronchial asthma complications, and some thought that the patient can stop medication after an acute asthma attack. 34.1% thought that inhaled medication for asthma doesn't cause addiction. Very highly significant results are shown between bronchial asthma knowledge and age, the level of education, marital status, and if the individual knows a person who suffers from bronchial asthma ( $P < 0.001$ ). There are positive correlations between bronchial asthma knowledge and age, marital status, and level of education ( $r = 0.152, 0.150, 0.197$ ), respectively.

**CONCLUSION:** The study demonstrated that bronchial asthma knowledge in the Saudi Arabian population is insufficient, and efforts should be carried out to spread bronchial asthma management.

## Key words:

Awareness, bronchial asthma, children, Saudi Arabia

Bronchial asthma is a chronic inflammation of the airways that is characterized by airway obstruction, causing chronic difficulty in breathing. This respiratory dysfunction is symptomized with chest tightness, wheezing, and shortness of breath. There are numerous factors that can affect its etiology; emotion, genetics, nutrition, and environment.<sup>[1]</sup>

Bronchial asthma affects any group age. Based on the Global Initiative for Asthma report, it is estimated to be currently affecting 300 million individuals. When the disease is uncontrolled, it decreases the quality of life, restrains from certain activities, and may sometimes cause death. Hence, it is considered as a serious health problem worldwide. It is estimated that the prevalence of asthma globally to be between 1% and 18% in different countries' populations.<sup>[2-4]</sup>

As for Saudi Arabia, it is estimated that more than 2 million Saudis have asthma, and the percentages range from 8% to 25% in Saudi children. In 2004, the highest prevalence of asthma was reported by physicians in Saudi Arabia (25%).<sup>[5,6]</sup> Bronchial asthma is a serious

disease since it is very common disease in Saudi Arabia, and it doesn't only affect the individual physiologically, however it also affects the individual's quality of life, leading to missing days from school or work, emergency hospital visits, hospitalization, and caregivers and parents' time and effort.<sup>[7-10]</sup> Consecutively, it affects the whole community.

Patient awareness and education are of importance in prevention and control of acute exacerbations

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**How to cite this article:** Al-Harbi S, Al-Harbi AS, Al-Khorayyef A, Al-Qwaiee M, Al-Shamarani A, Al-Aslani W, *et al.* Awareness regarding childhood asthma in Saudi Arabia. *Ann Thorac Med* 2016;11:60-5.

and complications of bronchial asthma. It was reported that satisfactory treatment of asthma relies on the correct evaluation and intervention by the physician or the parent, in a timely manner with the patient. During the last two decades, there was a significant improvement in the knowledge about asthma concerning both pathophysiology and technology. Hence, controlling bronchial asthma nowadays is possible. The understanding of bronchial asthma and its management of the asthmatic children is of importance since it has been seen that patient education increases compliance in chronic diseases. There are self-management awareness programs for asthma in children in order to "to improve healthcare practices, reduce morbidity, and lower the cost of care."<sup>[11-13]</sup>

## Methods

A structured questionnaire consisting of three sections; demography, questions about asthma, and question concerning self-education about the disease.

The individuals' demography consisted of age, sex, marital status, number of children if any, education, place of residence, job, if the person suffers from asthma, and whether they have children who suffer from bronchial asthma or know someone who suffers from asthma. Followed by 30 questions about asthma awareness covering various aspects, and then a section about self-education about asthma and the sources of the information they know about asthma.

This survey was performed using a Structured Asthma Knowledge Questionnaire in their native language (Arabic) that was answered through face to face interviews with 1039 randomly selected Saudi Arabians in May 2014 at Jeddah, Riyadh, and Dammam. The data was collected, translated, entered to a database and analyzed.

All questionnaire answers were entered into a database. Afterward, using SPSS Version 20.00 the statistical analysis was computed. ANOVA, analysis of variance was used when there were more than two data entities. *t*-test was used to determine the significance, for the categorical data, and Pearson's correlation coefficient "*r*" was used to determine the correlations between the variable of continuous data, to measure the direction and strength of correlation between variables. In general, the higher the correlation coefficient is, the stronger the relationship between the two variables. Variables can be correlated either positively or negatively. To indicate the direction of the correlation, we use a positive sign (+) in front of the correlation coefficient for positive correlations or a negative sign (-) for negative correlations. The significant dependent variable was calculated by linear logistic regression. As for the level of significance, (*P*-value) was taken as <0.05 with confidence interval (CI) of 95%. The mean score for the bronchial asthma awareness questions was calculated through giving the correct answer a score of 1, and if the answer was incorrect or the individual didn't know then a score of 0 was given.

## Results

### Demography

The study was conducted with 1039 individuals from all over Saudi Arabia; Riyadh, Damam, Jeddah, Al-Khobar, and other

areas such as Mecca, Medina. The sample population was taken from various individuals from various backgrounds and educational levels. Examples of the samples' occupations include teachers, clerks, students, housewives, marketing, and finance jobs, and other jobs. As for the educational level; more than half of the sample were university graduates. There were 391 males (38% of total sample) and 643 females (62% of total sample). There was no specific age range but, nearly 50% were between the ages of 18 and 30. In the sample, 369 (36% of total sample) were single, and 655 (64%) were married. The mean number of children for married individuals was 3.08, ranging from 1 child up to 15 children. Concerning the disease itself; 21.8% of the sample were asthmatic, 21.8% had children who have bronchial asthma, and 64.8% had either a family member or friend who suffers from asthma, as seen in Table 1.

### The awareness of bronchial asthma questions

Regarding the knowledge about asthma; 67% of total sample thought that it could be a fatal disease, 90.1% thought that it is a chronic disease with acute exacerbations on exposure to allergens, 79.7% understand that genetic, hereditary, and environmental factors play a role in the progression of bronchial asthma and only 13.2% thought that there is a difference between asthma and chest allergies in children.

Concerning the symptoms of asthma; 86.1% of total sample thought that they include a dyspnea and nocturnal cough and in severe conditions the symptoms include aggression, altered consciousness and children's inability to talk in sentences or to lie on their back. However, only 45.7% thought that fever, a runny nose and throat inflammation are not symptoms for asthma.

60.2% thought that infectious respiratory diseases increase the chances of asthma progression and about 87% thought that direct or indirect exposure to cigarette smoke, perfumes, incense, or paint fumes could lead to asthma progression, 56% thought that the exposure to sudden changes in environment (dust or cold weather) increase the progression of asthma. Only 22.8% answered that eating fish at an early age helps. In slowing down, the progress of bronchial asthma and only 25.7% thought that asthmatic children should not avoid certain foods, such as fish, eggs, and bananas. 50.1% thought that an asthmatic child should not avoid sports activities and physical education classes.

Concerning patient's health care; around 90% of the sample acknowledged that an asthmatic patient should constantly follow-up with a physician who should inform him or her about the symptoms of asthma and how to handle them by avoiding triggers, in accordance with a preset plan. They also agreed that the patient should be educated about how to manage an acute bronchial asthma attack.

40.8% of parents think that "the frequent use of antibiotics helps in diminishing the complications of asthma" and 34.8% of parents thought that "the patient can stop taking medication after an acute asthma attack," which is true in the case of systemic steroids and short-acting beta-agonist. 65.1% thought that asthma in children younger than 6 years of age needs treatment. 73.1% of the sample agreed that one patient's asthma medication shouldn't be used by another asthmatic, without referral to a doctor. Less than 30% thought that;

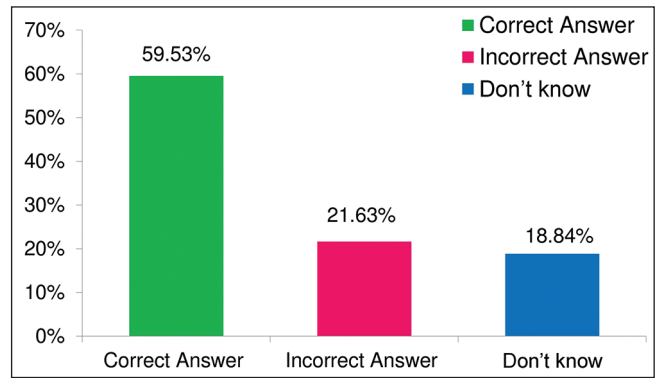
**Table 1: Demography**

Demography	n (%)
Sex	
Male	391 (37.8)
Female	643 (62.2)
Age (years)	
<18	100 (9.9)
18-30	505 (49.8)
30-50	351 (34.6)
>50	58 (5.7)
Marital status	
Single	369 (36.0)
Married	655 (64.0)
The number of children if any	
Mean±SD	3.08±1.8
Minimum–maximum	1-15
Place of residence	
Riyadh	451 (67.2)
Dammam	63 (9.4)
Jeddah	51 (7.6)
Al-Khobar	38 (5.7)
Others	68 (10.1)
Job	
Teacher	132 (17.9)
Clerk	124 (16.8)
Student	118 (16.0)
Housewife	117 (15.9)
Marketing and finance	76 (10.3)
Others	169 (23.0)
Level of education	
Less than a high school	107 (10.6)
High school	220 (21.8)
Universal	582 (57.7)
Graduate	99 (9.8)
Do you suffer from bronchial asthma?	
Yes	204 (21.8)
No	731 (78.2)
Does anyone of your children suffer from asthma?	
Yes	204 (21.8)
No	731 (78.2)
Does anyone of family member or friend suffer from asthma?	
Yes	652 (64.8)
No	354 (35.2)

SD = Standard deviation

asthma's prophylactic treatment doesn't cause a dangerous side effect if used without an acute asthma attack, that there is a need for using a spacer if the patient is older than 5 years of age and that an asthmatic patient can be treated with a general practitioner Without referral to a pulmonology clinic, since it is a common disease. 34.1% of the sample answered that the inhaled medication for asthma doesn't cause addiction. Figure 1 shows the overall asthma awareness.

Regarding "educative and awareness programs for asthma;" 84.5% of the sample states that for better treatment of bronchial asthma, specialized centers are required to provide education and awareness to the patients and the community. 81.9%

**Figure 1:** Asthma awareness in population

see that there is a need for including scientific content about asthma in school and 90.6% see that there is a need for creating educative programs for schools, aiming to increase awareness about bronchial asthma, since 75.4% agree that bronchial asthma could lead to increased school absenteeism, as seen in Table 2.

#### Mean score and significance for bronchial asthma knowledge

Asthma knowledge is very highly significant with age ( $P < 0.001$ , CI [-0.60, 1.41]), illustrating that the higher the age group the higher the awareness score; for ages <18 years and for ages >50 years the score is 15.01 and 17.79, respectively. It is also very highly significant with marital status ( $P < 0.001$ , CI [0.91, 2.14]), it is seen that married individuals have a higher awareness score than single individuals; 17.52 and 16.00, respectively ( $P < 0.001$ , CI [0.91, 2.14]).

However, there is no statistical significance between gender (male or female) and awareness of asthma ( $P = 0.052$ , CI [-0.01, 1.22]), and a mean score for asthma knowledge of 16.60 and 17.21 for males and females, respectively, was noted. There is also no statistical significance between the number of children the individuals have and their knowledge about asthma ( $P = 0.511$ , CI [-0.34, 0.67]), where their mean score ranged from 17.52 to 17.99, as the number of children increased.

On the other hand, asthma knowledge is very highly significant with the level of education ( $P < 0.001$ , CI [0.83, 1.57]). It is seen that the higher the level of education the higher the awareness score; for less than high school and for graduates the score is 15.45 and 18.83, respectively.

In addition, as for the individuals who have children suffering from asthma, a very highly statistical significance is shown ( $P < 0.001$ , CI [-2.19, 0.72]), where the awareness score is 17.62 and 16.92 for individuals with asthmatic children and individuals with no asthmatic children, respectively. However, there is no statistical significance between individuals who suffer from asthma and asthma knowledge ( $P = 0.108$ , CI [-1.54, 0.15]), with a mean knowledge score of 17.62 and 16.92 for individuals who suffer from asthma and individuals who don't, respectively.

Moreover, there is no statistical significance between individuals who know someone who suffers from asthma and

**Table 2: Asthma awareness questions**

Questions	Correct answer	Correct answer n (%)	Incorrect answer n (%)	Don't know n (%)
Asthma is a chronic disease with acute exacerbations on exposure to allergens	Yes	917 (90.1)	39 (3.8)	62 (6.1)
Genetic, hereditary and environmental factors play a role in the progression of asthma	Yes	813 (79.7)	112 (11)	95 (9.3)
There is a difference between asthma and chest allergies in children	No	134 (13.2)	704 (69.6)	174 (17.2)
Asthma can be a fatal disease	Yes	674 (67)	191 (19)	141 (14)
Symptoms of asthma include dyspnea and nocturnal cough	Yes	865 (86.1)	62 (6.2)	78 (7.8)
Symptoms of asthma include fever, runny nose and throat inflammation	No	454 (45.7)	294 (29.6)	245 (24.7)
Asthma's severe symptoms include children's inability to talk in sentences or to lie on their back, aggression, and altered consciousness	Yes	525 (52.4)	179 (17.9)	298 (29.7)
The frequent use of antibiotics helps in diminishing the complications of asthma	No	413 (40.8)	291 (28.7)	309 (30.5)
Eating fish at an early age helps in slowing down progress of asthma	Yes	228 (22.8)	217 (21.7)	557 (55.6)
Infectious respiratory diseases increase the chances of asthma progression	Yes	597 (60.2)	121 (12.2)	274 (27.6)
Exposures to sudden changes in environment (dust or cold weather) affect the progression of asthma	Yes	568 (56)	372 (36.7)	75 (7.4)
Direct or indirect exposure to cigarette smoke could lead to acute attacks of asthma	Yes	894 (87.1)	75 (7.3)	57 (5.6)
Exposure to perfumes, incense or paint fumes could lead to acute asthma attacks	Yes	897 (87.2)	55 (5.3)	77 (7.5)
An asthmatic patient should constantly follow-up with a physician for better results	Yes	914 (92.7)	27 (2.7)	45 (4.6)
An asthmatic child should avoid sports activities and physical education classes	No	493 (50.1)	323 (32.8)	169 (17.2)
Asthmatic children should avoid certain foods, such as fish, eggs, and bananas	No	246 (25.7)	338 (35.2)	375 (39.1)
The patient's physician should inform him or her about the symptoms of asthma and how to handle the disease, by avoiding all triggers, in accordance with a preset plan	Yes	874 (90.6)	36 (3.7)	55 (5.7)
The patient should be educated about how to manage an acute asthma attack	Yes	887 (91.6)	45 (4.6)	36 (3.7)
There is no need for treatment of asthma in children younger than 6 years of age	No	630 (65.1)	159 (16.4)	179 (18.5)
The patient can stop taking medication after an acute asthma attack (beta-agonists and inhaled steroids)	Yes	324 (34.8)	387 (41.5)	221 (23.7)
One patient's asthma medication can be used by another asthmatic, without referral to a doctor	No	698 (73.1)	156 (16.3)	101 (10.6)
Steam inhalation for the treatment of asthma is better than mask or tube	No	227 (23.7)	371 (38.7)	361 (37.6)
There is no need for using mask if the patient is older than 5 years of age	No	272 (28.8)	222 (23.5)	449 (47.6)
An asthmatic patient can be treated in a primary care clinic without referral to a pulmonology clinic, since it's a common disease (excluding severe disease)	Yes	239 (24.8)	571 (59.3)	153 (15.9)
Inhaled medications for asthma can cause addiction (inhaled BA can cause tolerance)	No	327 (34.1)	361 (37.6)	271 (28.3)
Asthma's prophylactic treatment can cause dangerous side effect if used without an acute asthma attack	No	226 (23.4)	386 (39.9)	355 (36.7)
For better treatment of asthma, specialized centers are required to provide education and awareness to the patients and the community	Yes	820 (84.5)	68 (7)	82 (8.5)
Asthma could lead to increased school absenteeism in children	Yes	737 (75.4)	153 (15.7)	87 (8.9)
There is a need for including scientific content about asthma in students' curricula	Yes	790 (81.9)	84 (8.7)	91 (9.4)
There is a need for creating educative programs for schools, aiming to increase awareness about asthma	Yes	881 (90.6)	30 (3.1)	61 (6.3)

BA = Beta agonists

asthma knowledge ( $P = 0.117$ , CI [-1.12, 0.13]), with a mean knowledge score of 17.19 and 16.69 for individuals who know people who suffer from asthma and individuals who don't, respectively, as illustrated in Table 3.

### Correlations

The results show that asthma knowledge shows positive correlation with age, marital status and level of education;  $r = 0.152$ ,  $0.150$ , and  $0.197$ , respectively, meaning that as each of the variables' value increases the asthma knowledge increases, as seen in Table 4.

### Self-education

55.2% of the sample is familiar with the topic of asthma; 31% read through the internet, 22.8% through the doctor, 10.6% via reading a publication or an educational brochure, 7.7% through newspapers and magazines, and 3.4% via other means. As for the preferred way to get medical information about asthma; 50.8% agreed that it should be through health workers 36.8% through reading on the internet, 20.6% via reading a publication or an educational brochure, 7.5% through newspapers and magazines, and 3.4% via other means, as illustrated in Table 5.



**Table 3: Mean score and significance for asthma knowledge**

Category	Mean score for asthma knowledge	P	CI
Sex			
Male	16.60	0.052	-0.01, 1.22
Female	17.21		
Age (years)			
<18	15.01	<0.001	0.60, 1.41
18-30	16.77		
30-50	17.74		
>50	17.79		
Marital status			
Single	16.00	<0.001	0.91, 2.14
Married	17.52		
Number of children			
1-2	17.52	0.511	-0.34, 0.67
3-4	17.36		
≥5	17.99		
Level of education			
Less than a high school	15.45	<0.001	0.83, 1.57
High school	15.86		
Universal	17.40		
Graduate	18.83		
Do you suffer from bronchial asthma?			
Yes	17.62	0.108	-1.54, 0.15
No	16.92		
Does anyone of your children suffer from asthma?			
Yes	18.17	<0.001	-2.19, 0.72
No	16.72		
Does anyone of family member or friend suffer from asthma?			
Yes	17.19	0.118	-1.12, 0.13
No	16.69		

CI = Confidence interval

**Table 4: Pearson's correlation**

Category	Pearson's correlation (r)	P
Age	0.152	<0.001
Marital status	0.150	<0.001
Level of education	0.197	<0.001

## Discussion

In the Saudi Arabian community, people are aware of the disease (mean score = 16.97, 57% of the sample) however, there are many misconceptions regarding bronchial asthma in children. Previous studies that were conducted on parents with asthmatic children have also shown low asthma knowledge results, such as the mean score of the parents was 15.5, which was 50% of the total score.<sup>[14]</sup> There was a higher score in another study, with a mean of 18.3 for parents with asthmatic children who were admitted to New Castle Mater Hospital and John Hunter Hospital.<sup>[15]</sup> In addition, in another study,

parents scored 19.9 in the Royal Children Hospital, Australia.<sup>[16]</sup> Comparably, one of the highest percentages on the asthma knowledge test was an average of 72% by parents.<sup>[17]</sup>

The majority of the population in this study knows the disease and its predisposing factors, however a few can differentiate between bronchial asthma and other respiratory disorders. Moreover, about 50% don't know its correct symptoms. Concerning the medications for asthma, a minute percentage of the people thought and comprehend the medications for asthma in mild and severe cases according to the asthma severity index (mild, moderate, or severe respiratory distress) and the Saudi Initiative for Asthma guidelines. Regarding the misconceptions, the majority of the population thinks that some inhaled medication for asthma can cause addiction, that asthma's prophylactic treatment can cause dangerous side effect if used without an acute asthma attack, steam inhalation for the treatment of asthma is better than mask or tube, and that there is no need for using a mask if the patient is older than 5 years of age. Hence, there is both misconceptions and unawareness regarding the topic.

The bronchial asthma awareness question showed three categories of people; aware, unaware, and people with misconceptions. The main misconceptions were that asthma and chest diseases in children are the same, symptoms of bronchial asthma include fever, a runny nose, and throat inflammation, that the frequent use of antibiotics helps in diminishing the complications of asthma, exposure of sudden changes in the environment doesn't affect the progression of asthma and that asthmatic children should avoid sport activities and certain foods such as fish, eggs, and bananas. It is true that there is a close link between asthma and allergy, allergens are common asthma triggers; however not all asthma is caused by allergens (nonallergic asthma). Furthermore, certain food associations were seen in studies that children who started eating fish at 6-12 months had a significantly lower risk of wheezing when they were 4-year-old compared with children who began eating fish later.

The questions that were asked regarding the treatment of the disease was carried out to assess the people's understanding about the concept of treatment, such as that the patient can't stop taking the medication after an acute asthmatic attack or the use of steam inhalation, which is sometimes performed by breathing in hot steam or taking a hot shower could likewise help in asthma relief, some people use hot water steam as nebulizer. Some of the main misconceptions is that an asthmatic patient can't be treated in a primary care clinic, that inhaled asthma medication may cause addiction and that asthma's prophylactic treatment can have dangerous side effects if used without an asthmatic attack. Prophylactic treatment should be taken according to guidelines in order to avoid any serious adverse event, however if taken by the guidelines no dangerous side effects will occur, also regarding addiction beta agonists can tolerance so they should be taken according to the guidelines. There is a difference between unawareness and misconceptions. It is seen that there is a percentage of unawareness in each of the asthma awareness questions, however misconceptions are more hazardous since if an incorrect action is taken regarding the disease, this might be dangerous.

**Table 5: Self-education**

Question	Answer	n (%)
Have you ever read or search about the topic of asthma?	Yes	540 (55.2)
	No	439 (44.8)
If "yes," what are the ways to access information?	Reading on the internet	322 (31.0)
	Through the doctor	237 (22.8)
	Viewing publication or an educational brochure	110 (10.6)
	Newspapers and magazines	80 (7.7)
	Others	32 (3.1)
The preferred way to get medical information about BA (reading on the internet)	Through the doctor	528 (50.8)
	Reading on the internet	382 (36.8)
	Viewing publication or an educational brochure	214 (20.6)
	Newspapers and magazines	78 (7.5)
	Others	35 (3.4)

BA = Beta agonists

### Conclusion

The bronchial asthma knowledge in the Saudi Arabian population is insufficient, and efforts should be carried out to spread asthma knowledge to the people. Bronchial asthma management should include patients, parents, and public awareness regarding the disease, its symptoms, medications, and consequences.

### Acknowledgments

Authors would like to thank all volunteer students, interns and residents and others whom helped in the process of distributing the questionnaire among participants.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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