

Bronchial Asthma among Medical students in Saudi Arabia

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ABSTRACT

Background: bronchial asthma is a common chronic respiratory disease affecting adolescents and young adults nationality and worldwide and its prevalence has increased in developed and developing countries over the last three decades.

Aim of the Work: to establish the prevalence of bronchial asthma among medical students in Saudi Arabia and the relationship between asthma and some associated risk factors.

Patients and Methods: a descriptive cross-sectional study. Data were collected from randomly selected undergraduate medical students of 6 universities, during the academic year 2017-2018. A predesigned questionnaire was disseminated to the targeted population to complete it.

Results: the prevalence of physician-diagnosed bronchial asthma in our participants was 19.2%. Males reported insignificant higher prevalence of bronchial asthma compared to females ($P=0.195$). Bronchial asthma was significantly associated with skin allergy 32.9% ($P=0.001$), allergic rhinitis 61.6% ($P=0.001$), hay fever 12.3% ($P=0.001$) and obesity 28.8% ($P=0.009$). While it was insignificantly associated with smoking ($P=0.428$), passive smoking ($P=0.561$), diabetes ($P=0.254$) and performing muscular exercise ($P=0.322$). Precipitating factors to bronchospasm was dust in 43.8%, certain foods in 1.4%, hot weather in 2.7% and multiple factors in 52.1%. Herbal treatment was tried in 34.2%; desensitization in 6.8% and 68.5% needed emergency treatment. Response to medical treatment was good in 89.1% of cases.

Conclusion: the prevalence of physician-diagnosed bronchial asthma in our participants was 19.2%. Males reported insignificant higher prevalence of bronchial asthma than females. Bronchial asthma was significantly associated with skin allergy, allergic rhinitis, hay fever and obesity. While it was insignificantly associated with active smoking or passive smoking.

Keywords: Prevalence, Physician-diagnosed asthma, associated symptoms, medical students, Saudi Arabia.

INTRODUCTION

Bronchial Asthma is a chronic respiratory inflammatory disorder of the airways that is characterized by episodes or attacks of impaired breathing, affecting up to 10% of adults and 30% of children and adolescents^[1]. The prevalence of asthma has increased in developed and developing countries over the last few decades. Asthma is of public health concern because it is a major cause of infirmity, and reduces the quality of life of affected cases. Asthma nowadays is a focus of clinical research and public health programs as a common chronic disease causes considerable morbidity and mortality^[2]. Undiagnosed and untreated asthma have a major impact on quality of life of the affected person as well as the families^[3]. Compared to other chronic obstructive pulmonary disease like (COPD), asthma does not result in death, but left untreated and in compliance to treatment can be fatal, and the WHO estimate that 380,000 persons died due to asthma in 2015^[3]. Asthma prevalence was 14.1% in the adolescent age group^[4].

Adolescents with asthma are at risk of significant morbidity and disability that affect their general health and will being^[5]. In the Northern Borders Region of Saudi Arabia, the prevalence of asthma among adults ≥ 15 years was 6.45% according to the national household survey in 2016^[6]. The prevalence of asthma in Saudi adults is under-investigated. Saudi Initiative for Asthma did not report the prevalence of asthma in adults, stating that there is a need to investigate asthma among the adult Saudi population^[7]. Results from a national Saudi household survey published in 2013, estimating the burden of chronic medical conditions including asthma among the Saudi population aged 15 years or older, indicated a self-reported clinical diagnosis of asthma to be 4.05%^[5]. A cross-sectional study was conducted at Al-Baha University, AlBaha, Kingdom of Saudi Arabia to determine the prevalence of asthma symptoms and associated factors among medical students. It was found that, the prevalence of recurrent asthma symptoms was; shortness of breath and cough in 31.3%, sleep interruption by

shortness of breath or cough at night in 17.9%, wheezing in 12.5%. Aggravating factors were: dust in 11.6%, exercise in 9.8%, perfumes in 4.5%, smoking in 3.6%, and pets in 3.6% [8]. A cross-sectional study was carried out on 16 to 18-year-old male students in the Northern Borders Region of Saudi Arabia during the academic year 2017–2018. It was reported that, the prevalence of physician-diagnosed asthma was 11.4%. The prevalence of lifetime wheeze, and exercise-induced wheeze were 30.3% and 19% respectively. The prevalence of night cough and wheezing attack in the past 12 months were 17% and 16.8% respectively [9]. Up to our knowledge, there is lack in studies about the prevalence of asthma among medical students, as they understand the pathogenesis, symptoms, signs and all about the disease. Most of the asthma prevalence studies in Saudi Arabia were conducted on adolescents or children. This study aimed to establish the prevalence of bronchial asthma among medical students in Saudi Arabia and investigate the relationship between asthma and some associated risk factors.

AIM OF THE WORK

To establish the prevalence of bronchial asthma among medical students in Saudi Arabia and the relationship between asthma and some associated risk factors.

PATIENTS AND METHODS

Research design: cross-sectional study.

Research environment: The sample size was calculated using the sample size equation $n = z^2 * p(1-p) / e^2$ considering the prevalence of bronchial asthma in young adults of Saudi Arabia is 50%, target population more than 1000 and study power 95%. Data were collected from randomly selected 60-65 undergraduate medical students of each faculty of medicine of Northern Border University, Qaseim University, King Abdul-Aziz university, King Saud university, King Khalid University, and Umm Al-Qura University, Kingdom of Saudi Arabia, during the academic year 2017-2018. A structured close-ended questionnaire was distributed to the participants to collect the demographic data and history of physician diagnosed bronchial asthma.

Inclusion criteria: Willingly participating medical students of both genders. **Exclusion criteria:** Unwilling participants and those

unavailable for any reason during the study period. A predesigned questionnaire was disseminated to the targeted population to complete it. The parameters in the questionnaire included presence of physician-diagnosed asthma, age, gender, Academic grade, smoking, passive smoking, allergic rhinitis, skin allergy, Hay fever, family history of bronchial asthma, exercise, history of other chronic diseases as obesity and diabetes, and other important socio-demographic data. **Ethical considerations:** Participants were informed about the study objectives and that participation is completely voluntary. No names were recorded on the questionnaires. All questionnaires kept safe. **Statistical Methods:** Descriptive statistics and testing of hypothesis were used for the analysis. The data were analyzed using SPSS V.16.0 (SPSS Inc; Chicago, IL, USA). The Chi-square test was used to examine the association between different variables. $P < 0.05$ was considered as statistically significant.

RESULTS

Table 1 shows the socio-demographic characteristics of the studied students. The total number of our participants was 381, all of them were medical students at different grades, and 57.2% of them were males. Table 2 illustrates the prevalence of bronchial asthma, chronic inherited diseases, smoking and exposure to passive smoking and performing muscular exercise in the studied students. The prevalence of bronchial asthma in our group was 19.2%. Smokers were 8.4% only while 18.4% exposed to passive smoking, 24.7% perform Muscular exercise. Table 3 shows the relationship between Bronchial asthma and sociodemographic variables, family history of skin allergy or allergic rhinitis, family history of bronchial asthma and chronic or inherited diseases among the studied students. Males reported higher prevalence of bronchial asthma compared to females but the relation between sex and bronchial asthma was insignificant ($P = 0.195$). There was a highly significant relation between bronchial asthma and family history of bronchial asthma ($P = 0.0001$), family history of skin allergy or allergic rhinitis ($P = 0.002$) and chronic or inherited diseases ($P = 0.0001$). Table (4) reveals the relationship between bronchial asthma and smoking, passive

smoking, muscular exercise, skin allergy, allergic rhinitis, hay fever, obesity, diabetes among the studied students. Bronchial asthma was significantly associated with skin allergy 32.9% (P= 0.001), allergic rhinitis 61.6% (P=0.001), hay fever 12.3 % (P=0.001) and obesity 28.8% (P0.009). While it was significantly associated with smoking (P=0.428), passive smoking (P=0.561), diabetes (P=0.254) and performing muscular exercise (P=0.322). Precipitating factors to bronchospasm was dust in 43.8%, certain foods in 1.4%, hot weather in 2.7% and multiple factors in 52.1%. Herbal treatment was tried in 34.2%, desensitization in 6.8% and 68.5% needed emergency treatment. Response to medical treatment was good in 89.1% of cases but no response to treatment in 8.2%. (Table 5)

Table 1: Socio-demographic characteristics of the studied students, 2018 (N=381)

Variable	Frequency	Percent
Age Group		
< 21	124	32.5
21-25	235	61.7
>25	22	5.8
Sex		
Female	163	42.8
Male	218	57.2
Academic grade		
1st	25	6.6
3rd	60	15.7
2nd	39	10.2
5th	70	18.4
4th	60	15.7
6th	69	18.1
Intern	58	15.2
Marital status		
Single	354	92.9
Married	27	7.1

Table (2): Prevalence of bronchial asthma, chronic inherited diseases, smoking and exposure to passive smoking and performing muscular exercise in the studied students, 2018 (n=381)

Variable	No	%
Bronchial asthma		
Yes	73	19.2
No	308	80.8
Chronic or inherited diseases		
No	304	79.8
Yes	77	20.2
Smoking		
Ex-smoker	10	2.6
Non smoker	339	89.0
Smoker	32	8.4
Exposure to passive smoking		
May be	88	23.1
No	223	58.5
Yes	70	18.4
Performing muscular exercise		
No	287	75.3
Yes	94	24.7

Table (3): Relationship between Bronchial asthma and sociodemographic variables, family history of skin allergy or allergic rhinitis, family history of bronchial asthma and chronic or inherited diseases among the studied students, 2018

Variable	Bronchial asthma		Total (N=381)	P value	
	Yes (N=73)	No (N=308)			
Age group	<21	23	101	124	0.298
		31.5%	32.8%	32.5%	
	21-25	43	192	235	
		58.9%	62.3%	61.7%	
>25	7	15	22		
	9.6%	4.9%	5.8%		
Sex	Female	35	128	163	0.195
		47.9%	41.6%	42.8%	
	Male	38	180	218	
Marital status	Single	67	287	354	0.417
		91.8%	93.2%	92.9%	
	Married	6	21	27	
Family history of skin allergy or allergic rhinitis	No	8.2%	6.8%	7.1%	0.002
		33	200	233	
	45.2%	64.9%	61.2%		
Yes	40	108	148		
	54.8%	35.1%	38.8%		
Family history of bronchial asthma	No	22	216	238	0.0001
		30.1%	70.1%	62.5%	
	Yes	51	92	143	
Chronic or inherited diseases	No	69.9%	29.9%	37.5%	0.0001
		27	277	304	
	37.0%	89.9%	79.8%		
Yes	46	31	77		
	63.0%	10.1%	20.2%		

Table (4): Relationship between bronchial asthma and smoking, passive smoking, muscular exercise, skin allergy, allergic rhinitis, hay fever, obesity, diabetes among the studied students, 2018

Variable		Bronchial asthma		Total (N=381)	P value
		Yes (N=73)	No (N=308)		
Smoking	Ex-smoker	3 4.1%	7 2.3%	10 2.6%	0.428
	Non smoker	66 90.4%	273 88.6%	339 89.0%	
	Non smoker	4 5.5%	28 9.1%	32 8.4%	
Passive smoking	May be	20 27.4%	68 22.1%	88 23.1%	0.561
	No	39 53.4%	184 59.7%	223 58.5%	
	Yes	14 19.2%	56 18.2%	70 18.4%	
Performing muscular exercise	No	53 72.6%	234 76.0%	287 75.3%	0.322
	Yes	20 27.4%	74 24.0%	94 24.7%	
Skin allergy	No	49 67.1%	266 86.4%	315 82.7%	0.0001
	Yes	24 32.9%	42 13.6%	66 17.3%	
Allergic rhinitis	No	28 38.4%	225 73.1%	253 66.4%	0.0001
	Yes	45 61.6%	83 26.9%	128 33.6%	
Hay fever	No	64 87.7%	302 98.1%	366 96.1%	0.0001
	Yes	9 12.3%	6 1.9%	15 3.9%	
Obesity	No	52 71.2%	260 84.4%	312 81.9%	0.009
	Yes	21 28.8%	48 15.6%	69 18.1%	
Diabetes	No	71 97.3%	305 99.0%	376 98.7%	0.245
	Yes	2 2.7%	3 1.0%	5 1.3%	

Table (5): Frequent wheezing, predisposing factors of bronchospasm, treatment, response to medical treatment and occurrence of complications among asthma cases, 2018

Variables	Frequency	Percent
Frequent wheezing		
No	36	49.3
Yes	37	50.7
Precipitating factors to bronchospasm		
Dust	32	43.8
Certain foods	1	1.4
Hot weather	2	2.7
Multiple factors	38	52.1
Treatment		
Herbal treatment	25	34.2
Medical treatment	52	71.2
Needing emergency	50	68.5
Desensitization	5	6.8
Response to Medical treatment		
Good	65	89.1
Weak	2	2.7
No response	6	8.2
Occurrence of asthma complications		
No	55	75.3
Yes	18	24.7

DISCUSSION

Bronchial asthma is one of the most common chronic diseases in Saudi Arabia and the reports suggest that the prevalence of asthma is markedly increasing. The recent studies have shown that the burden of the illness might be significantly higher than previously estimated, despite the abundance of high-caliber medical services and the availability of international guidelines. Consequently, many asthma patients continue to be underdiagnosed, so they are under-treated, and are at a risk of acute exacerbations resulting in missing school or work, increased use of expensive healthcare services, and affected quality of life [10]. This study has established the prevalence of bronchial asthma among medical students in Saudi Arabia and the relationship between asthma and some associated risk factors. Our study participants were 381, all of them were medical students at different grades, and 57.2% of them were males. The prevalence of bronchial asthma in our study was 19.2%. This study is considered one of a few studies conducted in the field of bronchial asthma in Saudi Arabia. Many of the previous asthma prevalence studies in Saudi Arabia and other Gulf countries were primarily conducted in children below the age of 15 years using either the ISAAC questionnaire or other research tools to screen for asthma [11,12,13,14]. However; the epidemiological studies carried out in Saudi Arabia revealed an increasing prevalence of asthma in the past three decades that may be attributed to rapid lifestyle changes related to the modernization of Saudi society, changes in dietary habits, and exposure to environmental factors, such as indoor allergens, dust, sand storms and tobacco. Additionally, this high prevalence of asthma could be attributed to an increase in asthma awareness in the medical students and among healthcare workers. Our study showed that males reported higher prevalence of bronchial asthma than females. This may be related to physiologic differences between the genders, however; there was no significant relation between sex and bronchial asthma ($P>0.05$). Our study reported a highly significant relation between bronchial asthma and family history of skin allergy or allergic rhinitis ($P=0.002$), family history of bronchial asthma ($P=0.0001$) and chronic or inherited diseases ($P=0.0001$). Another study was done on medical students in Al-Baha University,

Al-Baha area in Saudi Arabia by **Assil *et al.*** ^[8] on a sample from 112 cases, they found a very highly significant correlation ($P=0.000$) between asthma symptoms and Smoking, perfumes, dust, pets and exercise induction. On the contrary, we found no relation between asthma and smoking, passive smoking and exercise, however; Smoking also increased chances of asthma. These results are similar to those found by **Gupta *et al.*** ^[15]. The association between asthma and rhinitis is related to the neural nasal-bronchial interaction, disturbances in the warming and humidification functions of the nasal mucosa, drainage of irritants and inflammatory materials into the lungs and the presence of similar cellular infiltrates and pro-inflammatory mediators in the upper and lower airways. In our study bronchial asthma was associated with skin allergy, allergic rhinitis, hay fever, obesity and diabetes in 32.9%, 61.6%, 12.3%, 28.8% and 2.7% of the cases respectively. Also **Al-Ghobain *et al.*** ^[9] found similar results in their study. Asthma and rhinitis often represent a spectrum of the same disease (the one airway hypothesis) ^[16]. In another study, rhinitis occurred in 75 to 90% of adult subjects with allergic asthma and in 80% of adults with non-allergic asthma ^[17]. In another study, rhinitis occurred in 40 to 75% of all adults and children with asthma ^[18]. In our study we reported a high control rate. More than 70% of our cases had medical management, 89.1% of them had good response to the medical treatment. A recent asthma control survey showed that 64% of patients were uncontrolled, 31% were partially controlled, and only 5% were controlled ^[10]. The difference could be due to good compliance of our study cases to treatment as they are medical students and oriented about the complications of uncontrolled asthma.

CONCLUSION

The prevalence of physician-diagnosed bronchial asthma in our participants was 19.2%. Males reported insignificant higher prevalence of bronchial asthma than females Bronchial asthma was significantly associated with skin allergy, allergic rhinitis, hay fever and obesity. While it was insignificantly associated with active smoking or passive smoking. We recommend large scale similar researches including large samples of medical students of different universities carrying more investigations to diagnose undiagnosed cases. We recommend also health education sittings to increase the

public awareness about the importance of compliance to medical treatment of asthma.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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