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Prevalence of Asthma among High School Students in Ajman, Uae: A Cross-Sectional Study

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ABSTRACT

Introduction: Asthma is a global health issue which occurs in all countries regardless of economic status and development. It forms a huge burden on its patients and their families.

Objective: To assess the prevalence of Asthma amongst high school students in Ajman and the factors associated with that.

Methods: A cross-sectional study was conducted in three schools in Ajman among male and female students aged 15-18 years old. Signed consent was obtained from parents/guardians and self-administered questionnaire was used for data collection which covered prevalence, socio-demographics details, knowledge and burden of asthma.

Results: Out of 455 students (185 boys and 270 girls), the prevalence of asthma was 9.8%. Among asthmatics the prevalence of wheeze, cough and breathing difficulty in the past one month was 27.9%, 12.3% and 25.7% respectively. Relatively more females (10.5%) had asthma than males (8.7%).Exposures including positive family history of asthma/allergies ($P<0.01$), passive smoking ($P<0.05$), exposure to cockroaches ($P<0.05$), physical activity ($P<0.01$), and weather changes ($P<0.01$) were found to be statistically significantly associated with Asthma.

Conclusion: The prevalence of Asthma among school students was 9.8%. The major factors associated with asthma were family history of asthma/allergies, passive smoking, cockroaches, physical activity and weather changes.

1. INTRODUCTION

Asthma is a worldwide non-transmissible chronic disease identified through re-occurring attacks of dyspnea and wheezing, the clinical presentation based on the intensity and recurrence fluctuates from patient to patient.Manifestations may arise multiple times per day/week, and for certain asthmatics, these symptoms get exacerbated during exercise or at night. The wall of bronchi gets inflamed, leading to constriction of the airways decreasing the inflow and the outflow of air through the lungs in an asthma attack. Insomnia, weakness during the day, physical inactivity, lethargy, and school/work absenteeism are some of the consequences that result due to asthma. However, asthma has a lower mortality than other chronic diseases. The etiopathogenesis of asthma are not comprehended entirely. However, they range from genetically predisposing factors accompanied with environmental factors/allergens that may trigger an allergic or hypersensitivity reaction or

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simply inflame the airways. Asthma is a global health issue which takes place in all countries regardless of economic status and development. It is no surprise that most mortality related to asthma exists in the low and lower-middle income regions.Asthma hasn't been given as much attention as needed with respect to diagnosis and treatment. It forms a huge burden on its patients and their families and limits their individual performance lifelong[1]. Asthma is associated with a specific chronic inflammation of the mucosa of the lower airways which get infiltrated with activated eosinophils and T lymphocytes, and there is activation of mucosal mast cells.Direct observation by bronchoscopy indicates that the airways may be narrowed, erythematous, and edematous leading to airway remodeling and inflammation due to hyper responsiveness[2].

2. MATERIALS AND METHODS

This research follows a cross-sectional study design where the target population is high school students attending grades 10, 11 and 12 in schools in Ajman. Inclusion criteria included students aged between 15-18 years old who were attending grades 10, 11 and 12. Both genders and any nationality were included. To calculate sample size, a study conducted in KSA in 2011 was used which showed that the prevalence of wheeze among students aged 16-18 years was 18.5%[3]. The minimum sample size obtained was 440, but data was collected from 456 students. This research was carried out in three Schools in Ajman. This study was conducted over a period of nine months. The study used a self-administered questionnaire as an instrument to achieve the objectives of the study. The questionnaire was developed after doing a thorough literature review on the prevalence and factors of asthma across different parts of the world. Moreover the use of most common drugs used by asthmatics and other prophylactic equipment like inhalers and nebulizers also included. The draft questionnaire was content validated by three public health experts. A pilot study was conducted and the questionnaire was finalized. The proposal was approved by the ethics committee of Gulf Medical University. The parents/guardians of the students were fully informed about the purpose of this research and signed consent was obtained voluntarily by them. They were ensured that all information provided by their children will be kept confidential in the Department of Community Medicine for a period of three years and that any information revealing the participant's identity was not recorded. After obtaining approval from Ethics Committee, the study was conducted in all schools who have given permission. Data collected was entered into Excel and then transferred to SPSS software version 24. All variables were summarized and reported using descriptive and inferential statistics. A P-value of 0.05 or less was considered significant. Crude and specific prevalence of asthma was expressed in percentage.

3. RESULTS

Through our research we were able to determine that the prevalence of asthma among high school students in Ajman is 9.8%, with the most prevalent age group being 17 years and older (11.0%), followed by 15 year olds (10.3%). The disease was seen to be more common among females than in males at 10.5% and 8.7% respectively.

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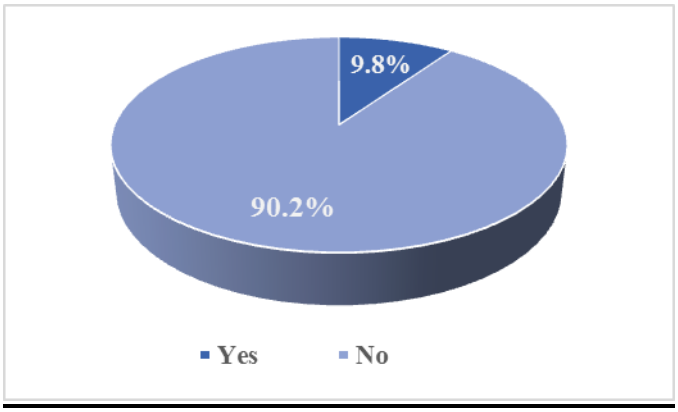

With regard to prevalence of asthma, the Normal BMI group and Overweight BMI group were roughly the same, being at 10.4% and 10.1% respectively. Underweight and obese groups, the prevalence was 5.8% and 4.5% respectively. The association observed was statistically not significant. The most significant factors associated with asthma/breathing difficulty/ coughing are positive family history of asthma/allergies, passive smoking, cockroaches, physical activity and weather changes.

Table 1: Factors associated with Asthma

Exposure	Group	Asthma				P
		Yes		No		
		No.	%	No.	%	
Smoking	Yes	17	10.1	151	89.9	NS
	No	21	11.3	165	88.7	
Cockroaches	Yes	2	66.7	1	33.3	<0.05
	No	36	10.3	315	89.7	
Chalk/ chalk dust	Yes	9	13.4	58	86.6	NS
	No	29	10.1	258	89.9	
Strong smells	Yes	13	14.1	79	85.9	NS
	No	25	9.5	237	90.5	
Physical activity (mild/moderate/ intense)	Yes	12	20.7	46	79.3	<0.01
	No	26	8.8	270	91.2	
Changes in weather / cold or hot air	Yes	20	17.1	97	82.9	0.007
	No	18	7.6	219	92.4	
Family history of Asthma/allergies	Yes	27	14.5	159	85.5	<0.01
	No	15	6	234	94.0	
Friends smoke	Yes	9	13	60	87.0	NS

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	No	34	9.3	331	90.7	
Smoke at home	Yes	12	17.4	57	82.6	<0.05
	No	31	8.4	338	91.6	

From this study we were able to see that there is a significant association between asthma and wheezing, and difficulties in breathing. 27.9% of asthmatics said they experienced wheezing and 25.7% experienced breathing difficulties.

Table 2: Cross tabulation of Asthma vs. wheezing, coughing and breathing difficulties

Variable	Group	Asthma				P
		Yes		No		
		No.	%	No	%	
Experienced wheezing in the daytime	Yes	17	27.9	44	72.1	<0.001
	No	26	6.7	361	93.3	
Experienced coughing in the daytime	Yes	27	12.3	192	87.7	NS
	No	16	7.1	210	92.9	
Experienced breathing difficulties in daytime	Yes	19	25.7	55	74.3	<0.001
	No	23	6.3	344	93.7	

4. DISCUSSION

The present study observed that the prevalence of asthma among high school children as 9.8%. Most recent data from CDC reported that the prevalence of asthma among 15-19 year olds was 10%[4]. In addition, a study conducted in Florida, observed the prevalence as 14.5%[5]. Another study conducted in Brazil had a 12.4% confirmed diagnosis of asthma[6] and a study conducted in Turkey found a cumulative prevalence of Asthma as 7.5%[7]. A study conducted in Iran and in Kuwait found to an Asthma prevalence of 9.5% and 16.8%[8]-[9].The present study found that in total, there were more females than males and also there were more female than males who had asthma, with females being at 10.5% as opposed to 8.7% of those being males. A study conducted in Brazil to assess the frequency of asthma concluded that 13.1% was the total prevalence of active asthma, which was higher in girls than in boys[10]. In another study conducted in Fortaleza, in 2010, the results show that there is predominance of asthma in females[11]. A research conducted in Midwestern city had shown that female students show a significantly higher prevalence for current asthma than male students, (16.4% vs 9%)[12]. However, we found two studies, one conducted in Iran and another one conducted in Kuwait that showed a higher male predominance[8]-[9].In the present study, we collected data from three age groups and we found for those students who do have asthma, the largest group was those who are 17 and above, comprising 11% of the results but in the 15-year-old age group is

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only just less at 10.3%. Because of no large difference in the results, we concluded that there is no significance between age and the prevalence of asthma. However, a study done in Netherlands to test prevalence of asthma in which the population study was between 5-18 years old, showed that the age of diagnosis increased over the study timeline and was lower for boys[13]. Even though our study did show a small difference amongst the age groups, it wasn't enough to render it significant, this could be due to our narrow age group. However, the study carried out in Netherlands did show a significant difference (an increase) between the ages and prevalence of asthma.14% of asthmatic students reported wheezing inside the classroom and 13.5% outside. It was evident that 25.8% of the asthmatics experienced attacks of wheezing on physical exertion. A study was done in 2001 confirming 25% had wheezing in the past 12 months[12]. In 1996-1997, in Istanbul, Turkey another study found that the collective and present prevalence results of wheezing were found to be 13.7% and 7.2%[14]. Our study conducted in Ajman was found to have the highest prevalence of wheezing compared to other studies.We found that only 10.1% of the people who have asthma said that they have a hard time breathing around smokers, however, the result we found was not as significant as we expected it to be. This is because smoking is established by several studies a major cause for exacerbating asthma symptoms in asthmatics and producing asthma like symptoms in non-asthmatic people. We think due to our narrow age range and possibly not a large enough sample size we were not able to gather a significant result. However, we did find several studies that show that smoking causes these symptoms in asthmatics and non-asthmatics. A study we found done in 2007 in California which found several Californians suffering from asthma to be exposed to environmental pollutants and allergens in the home-such as the presence of pet allergens and tobacco smoke which can trigger asthma symptoms[14]. Furthermore, they found that 24.1% of adults with asthma like symptoms were in the presence of smokers and 65% suffered from monthly asthma symptoms in the presence of smokers[15].Coming to the cockroach sensitivity, we found that 66.7% of the respondents said they had breathing problems near them however in real terms this was only two respondents. This compared to a study conducted in April 1997 in the Central Virginia area (USA) showed that 17% were exposed to cockroach allergen and they found that the area which they investigated had already a high prevalence of asthma[16].The present study found that 20.7% of the students experienced asthma like symptoms with physical activity. Our result clearly shows that the students experienced deterioration in their symptoms as they exercised, this coincides with the fact the students experienced exercise induced asthma which causes asthmatics or normal individuals who experience asthma like symptoms during exercise. However, we found a cohort study done investigating the relationship between asthma and low physical activity and they found that the overall risk of having wheezing increased by 35% in children with low physical activity[17].Moreover, this supports another study we found done in 2011 on Korean adolescents that shows that there isn't a direct reaction of physical activity with asthma rather there's a relation between sedentary time and asthma and found that kids with existing asthma compared to kids without existing asthma were overweight and used a computer for ≥3 h per day[18]. Therefore showing that increase in sedentary time means less physical activity hence more prevalent in asthmatic children. Even though our result shows that kids experienced exercise induced asthma we found studies that showed significant results as highlighted above that moderate physical activity helps improve these symptoms.In the present study 17.1% of responses said that changes in weather did affect their asthma symptoms whereas those who have asthma and said no only accounted for 7.6%. The values obtained were significant and means that changes in the weather is a significant contributing factor. A retrospective study was carried out at 1 large urban hospital during a 2-year period

also found that fluctuations in humidity and temperature, but not barometric pressure, appear to influence emergency department visits for pediatric asthma. The additional emergency department visits occur 1 to 2 days after the fluctuation[19].

CONCLUSION

The prevalence of Asthma among 15-18 years old adolescents was found to be 9.8%, it was found to be the highest in the 17+ year olds at 11% and then closely followed by 15 year olds at 10.3%. It was relatively more in females (10.5%) than males (8.7%). The most significant factors associated with asthma/breathing difficulty/ coughing are positive family history of asthma/allergies, passive smoking, cockroaches, physical activity and weather changes.

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