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MAGNITUDE OF BRONCHIAL ASTHMA AMONG ADOLESCENT AGE GROUP RESIDING IN URBAN AGRA: A CROSS SECTIONAL STUDY

Medicine

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ABSTRACT

SUMMARY: Asthma is one of the most important chronic diseases of childhood, causing substantial morbidity. There is paucity of studies in India regarding asthma in children with recent reports showing wide variation in Asthma Prevalence among adolescents from different geographic areas in India. The present study was carried out to determine the prevalence of bronchial asthma in adolescents residing in urban Agra, and to assess the precipitating factors on the basis of the questionnaire and spirometry. A total of 2075 children 10–19 years of age from the three schools in Agra were surveyed. It was an observational study. The prevalence of bronchial asthma was found to be 7.4% which is almost similar to those seen in other parts of Northern India and helps to identify the risk factors which may help in Preventing or reducing further exacerbation and morbidity

KEYWORDS

Bronchial Asthma, Adolescents, Questionnaire, Spirometry

INTRODUCTION

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness, and cough that vary over time and in intensity, together with variable expiratory airflow limitation[1] .Asthma is currently one of the world's most common long-term non communicable disease; affecting about 300 million people worldwide [2,3] and number could increase further by another 100 million by year 2025.[4]Prevalence of asthma among developed countries is more (2.7-20%)[4,5,6,7,8,9] than reported from India.[10] There is limited data on asthma epidemiology from the developing world, including India.[11] Although some attempts have been made, studies suffer from several scientific drawbacks including lack of uniformity of the methodology and analysis of data.[11] Asthma rates are officially low in India, although there is some recent evidence that the true prevalence is higher than previously thought.[10] To date, the total estimated burden of asthma is an overall prevalence of 3% (30 million patients), and among adults over the age of 15, a median prevalence of 2.4%.[10] The population prevalence of asthma reported in different field studies is variable and ranges from 2.4% to 6.4%. Among school children, higher prevalence rates have been reported. [12]

Diagnosis of asthma is suspected in children with recurrent episodes of airflow obstruction characterized by recurrent wheeze/recurrent isolated cough/recurrent breathlessness/nocturnal cough/tightness of chest. Asthma being characteristically episodic, there may be no signs at the time of evaluation. Spirometry and peak flow meter can be used as an aid to diagnosis, provided the child can perform the test. Problems in case definition for community survey of childhood bronchial asthma have been circumvented by standard questionnaires.[13]The proportion of Indian school children suffering from bronchial asthma has increased to more than double in the last 10 years.[14] The increase in prevalence of asthma in children may have serious implications in their adult life, as 40% of children with trivial wheeze and 70–90% of those with troublesome asthma continue to have symptoms in mid adult life.[15] Children with asthma also have an increased risk of school absenteeism and hospitalizations when compared with unaffected children.[16]

The present study aims to find out the prevalence of bronchial asthma in adolescents of Agra region and to identify risk factors associated with asthma among these patients.

MATERIAL & METHODS

Subjects for the survey were selected from three schools located in Agra. Among all Schools of Agra, Three schools were randomly selected, one from Government, One from Private and one from convent School. All student from 6th Standard to 12th Standard of selected College were freshly Screened for Bronchial Asthma by using self Administration Questionnaire of International study of Asthma and Allergy in Childhood. A total of 2075 school children in the age group 10-19 years were surveyed. Every child was subjected to this questionnaire in the presence of their parents. On the basis of the questionnaire, those students who were found to be asthmatic were selected for spirometry. Spirometry could be performed only on those students whose parents gave consent and various lung functions (forced expiratory volume [FEV], forced vital capacity [FVC], and peak expiratory flow [PEF]) were measured with it.

INCLUSION CRITERIA

a. History of dyspnea with wheeze
b. Currently symptomatic
c. Age group between 10 and 19 years
d. Both males and females were taken for study
e. H/O bronchial asthma and allergic Rhinitis

EXCLUSION CRITERIA

a. Tuberculosis – past or present
b. Age group: <10 years or >19 years
c. Any other associated respiratory or systemic disease.

The subjects suspected of having bronchial asthma and/ or associated respiratory allergies were requested to come to the Outpatient Department of Tuberculosis and Chest Department, S.N. Medical College, Agra for further evaluation. Those who cooperated and reported to the Tuberculosis and Chest Department, S.N. Medical College, Agra were subjected to a detailed clinical history followed by a thorough clinical examination along with a chest X-Ray P/A view.

SPIROMETRY

Spirometry was performed on the children and the following parameters were evaluated

i. FVC
ii. FEV in 1 s (FEV1)
iii. Ratio between FEV1/FVC
iv. PEF rate (PEFR).

FEV1/FVC ratio <70% of predicted values for a given height and weight were taken as abnormal. Although it was kept in mind that a case suspected of suffering from bronchial asthma might have a normal PEFR and spirometry at the time of investigation, if the spasm is totally reversed with or without treatment. The spirometry was repeated after 20 min to assess the reversibility of the airway obstruction. The data collected from the questionnaire and spirometry were subjected to statistical analysis for computing the result. It was an observational study. Various parameters such as age, sex, socioeconomic factors, living conditions, family history, dietary factors, as well as exposure to environmental pollution, were analyzed to find out any relevance in the causation of disease pattern.

STATISTICALANALYSIS

Statistical methods used for evaluation included Chi-square test. The IBM SPSS Statistics for Windows, Version 20.0. (Armonk, NY: IBM corp.) Has been used for the data analysis.

Observation

TABLE 1. Factors affecting Bronchial Asthma and its Significance

Factors	Parameters	Asthma absent no	Asthma Absent %	Asthma Present	Asthma Present %	Prevalence	P value
Sex	Female	916	46.7	48	42.1	4.9	0.05
	Male	1045	53.3	66	57.9	5.9	
Age	Age 15-19 Yrs	1256	68.9	98	39.4	7.23	0.001
	10-14Yrs	568	31.1	151	60.6	21	
Socio-Economic Status	Others (Lower+Middle Class)	1443	82.4	204	62.8	14.3	0.001
	Upper class	307	17.6	121	37.2	28.27	
Diet	Non Veg	640	32.7	75	53.2	10.4	0.001
	Veg	1314	67.3	66	46.8	4.7	
Passive smoking	Absent	768	38.7	95	65.5	11	0.05
	Present	1215	61.3	50	34.5	3.9	

TABLE 2 Factors affecting Bronchial Asthma and its Significance

Factors	Parameters	Asthma absent no	Asthma Absent %	Asthma Present	Asthma Present %	Prevalence	P value
Environment Around House	Bad	1215	68.3	95	32.2	7.03	0.001
	Good	565	31.7	200	67.8	26.14	
Exposure to pets	Absent	1798	92.3	49	38.6	2.65	0.4
	Present	150	7.7	78	61.4	34.2	
Family H/O Asthma	Absent	1874	94.8	56	56.6	2.9	<0.001
	Present	102	5.2	43	43.4	29.65	
Allergic Rhinitis	Absent	1945	98.5	75	75	3.71	<0.001
	Present	30	1.5	25	25	45	

DISCUSSION

This study in school going children of Agra showed the prevalence of bronchial asthma 7.5% which is almost similar to those seen in other parts of Northern India. The findings of our study are supported by a study conducted by Prasad et al. in their questionnaire based study, which recorded the prevalence as 7.7%.[17] Asthma prevalence is increasing globally due to urbanization, air pollution, and environmental tobacco smoke. According to Behl et al., prevalence is 2.3% in Shimla.[18] Singh et al. 2004 reported 12.8% prevalence rate based on pretested, modified, already validated asthma questionnaire.[19] However, Chhabra et al. in 1999 reported 15.7% prevalence of bronchial asthma (questionnaire based).[20] The high prevalence rate was also reported by Parmesh, who showed a prevalence of 29.5%.[21] According to Gaur et al., the prevalence of asthma and rhinitis in children as 8% and 7.3%.[22]

In our study, asthma was in favor of boys, with 57.9% males and 42.1% females. According to Anuradha et al. in 2011, males (71.66%) outnumbered females (28.33%).[23] Chhabra et al. 1999 also reported a higher prevalence of asthma among male children of Delhi.[20] According to Kumar et al., the prevalence of bronchial asthma in school girls in Delhi was found to be 8.78%.[24] Dawson et al. (1969) found that among children of Aberdeen, the prevalence rate of asthma was 4.8%. The incidence in boys compared to girls was found to be 2:1. Asthma is more prevalent in boys than in girls. Jain *et al*. attributed it to increased bronchial lability in males. [25] Sex affects the development of asthma in a time-dependent manner. Male sex is a risk factor for asthma in prepubertal children whereas female sex is a risk factor for persistence of asthma into adulthood. As a child gets older, the difference between the sexes narrows and by adulthood the prevalence of asthma is greater in women than in men. It may be explained by lung size; lung size is smaller in male than female at the time of birth and in childhood but larger in adulthood.[26]This was similar to findings observed by Gupta *et al*.[27] Shaw et al. found that the overall prevalence of wheeze in Kawarau children was 21.3%; prevalence was much higher in boys as compared to girls (1:7.1).[28] Male sex is a risk factor for asthma in children. Before the age of 14, the prevalence of asthma is nearly twice as great in boys as in girls.[29]In our study, the prevalence of asthma from 10 years to 14 years was comparatively more than 15-19 years of age According to Aggarwal et al., the total estimated burden of asthma is an overall prevalence of 3% (30 million patients), and among adults over the age of 15, a median prevalence of 2.4%.[10] Researchers in the field opined that a higher prevalence of asthma in the younger age group was consistent with the widely believed concept of "children growing out of allergic diseases."[30]

The study revealed upper class had the largest number of patients suffering from bronchial asthma. Our finding is supported by the studies of Jain et al. and Prasad et al. and unlike the finding of Anuradha et al. which shows positive association between asthma and lower socioeconomic status people.[23]Goh et al. 1996 also reported the prevalence of parent reported asthma to be greater among subjects of higher socioeconomic status in Singapore.[31] The prevalence of bronchial asthma is significantly higher (2 times) in non vegetarian children. A vegetarian diet exerts an effect in decreasing the prevalence of asthma. Some other studies also suggest that increased consumption of green leafy vegetables and fruits are associated with a decreased risk of atopic diseases.[32-35] The prevalence of bronchial asthma is higher in a good environment around the house. This finding is in the favor of the hygiene hypothesis of bronchial asthma that suggest that exposure to infection in early life influence the development of a child's immune system along a "nonallergic" pathway, leading to a reduced risk of asthma and other allergic diseases.

In this study, the prevalence of bronchial asthma was found to be higher in association with allergic rhinitis, There was no significant correlation detected between the prevalence rates of bronchial asthma and pets in the house. The reason for this finding may be that allergens

are ubiquitous and can be found in any environment outside the home which affect the subjects.[36-38] Exposure to tobacco smoking both prenatally and after birth is associated with measurable harmful effects including greater risk of developing asthma like symptoms in early childhood. However, evidence of the increased risk of allergic diseases is uncertain.[39]

In our study, a significant relationship was observed between family history and asthma. First comprehensive study for inheritance in asthma was undertaken by cook in 1916. They came to the conclusion that familial association was due to genetic component. Since then, a number of studies have shown an association between family history and asthma.[25] Paramesh observed that the incidence of asthma in children, if one parent is having asthma, is 18%, in case of one sibling having asthma, the incidence is 1.65% and where grandparents have asthma, the incidence is 4%.[21]. The clinical relationship among asthma, allergic rhinitis, and atopic dermatitis, the so-called "allergic triad," is well known. The vast majority (~80%) of patients with asthma have allergic rhinitis, whereas 19% to 38% of patients with allergic rhinitis have coexisting asthma.[40]

CONCLUSION

The study shows a prevalence of 7.5% of bronchial asthma. This is comparatively less than other urban cities of India. One of the reasons may be the Go Green Initiative and pollution control measures taken to preserve the Monuments of Agra. Apart from genetic predisposition the study proves that environmental factors play an important role in the occurrence and exacerbation of bronchial asthma and respiratory illness.

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Conflict of interest: *None declared*

Limitation of the study. *– Owing to the small sample size and the study being conducted in a single tertiary centre, the results of the study cannot be generalized for the entire population. Further large scale studies are required.*

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