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A cross sectional observational study of prevalence and risk factors of uncontrolled Asthma among adults in a tertiary care hospital

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***Abstract*---**Introduction: Asthma is a chronic inflammatory disease of the airways causing episodes of airflow obstruction. This chronic inflammation increases airways hyper responsiveness (AHR) to stimulants. In general, Asthma has become an important public health problem. Asthma is not only a leading cause of hospitalization in children, but also an important chronic condition causing school absenteeism. There is also increase in hospital admissions and emergency department visits to a greater degree worldwide which has lead to changes in medical practice. Materials and Methods: A cross sectional observational study was conducted for a period of one year (January 2021 to December 2021) at the department of Respiratory Medicine, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry. All adults >18 years of age of both genders with a diagnosis of asthma according to GINA guidelines for a duration of at least one year. Other causes of obstructive airway disease like bronchiectasis, post TB Obstructive airway disease were excluded. Informed consent was obtained from all the participants. Results: A total of 220 subjects completed the questionnaire satisfactorily. The male: female ratio was 59:51 and mean age of subjects was 35.25±12.34 years with majority of them (59.1%) belonging to the 26-45-year age group. The mean body mass index (BMI) was 25.75±3.80 and 62.8% were overweight and obese. Conclusion: Uncontrolled asthma is still widely prevalent in India. The major risk factors associated with poor control were elderly, obesity, OSA, GERD, smoking and pollution. Hence, achievement of optimum asthma control needs to address several factors including sociodemographic and modifiable risk factors in addition to ensuring education regarding medication compliance and proper inhalational techniques.

***Keywords*---**asthma, airways hyper responsiveness, body mass index.

Introduction

Asthma is a chronic inflammatory disease of the airways causing episodes of airflow obstruction. This chronic inflammation increases airways hyper responsiveness (AHR) to stimulants.[1] In general, Asthma has become an important public health problem. Asthma is not only a leading cause of hospitalization in children, but also an important chronic condition causing school absenteeism.[2] There is also increase in hospital admissions and emergency department visits to a greater degree worldwide which has lead to changes in medical practice. Childhood asthma is mostly under diagnosed and also undertreated, owing to various factors like ignorance, misconceptions and lack of awareness.[3] Prevalence of bronchial asthma varies from place to place due to changes in environmental factors. The genetic profile and viral infections also predispose to asthma. Increase in exposure to environmental smoke and air pollution has lead to increase in prevalence of asthma in urban areas.[4] Asthma is generally considered a disease of developed countries and affluent societies in developing countries. There is little information about epidemiological trends of asthma in Urban India especially in lower income groups.[5] Hence the current study was undertaken to enable us to identify the burden of uncontrolled asthma and region specific risk factors, if any in order to plan appropriate strategies with the ultimate goal of achieving the maximum level of asthma control.

Materials and Methods

Study design

A cross sectional observational study.

Study Duration

January 2021 to December 2021 (1 year).

Study Location

Department of Respiratory Medicine, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry.

All adults >18 years of age of both genders with a diagnosis of asthma according to GINA guidelines for a duration of at least one year. Other causes of obstructive airway disease like bronchiectasis, post TB Obstructive airway disease were excluded. Informed consent was obtained from all the participants. The subjects were then administered a structured, validated and piloted questionnaire regarding demographic information like age, gender, occupation, educational status, BMI and presence or exposure to specific risk factors like smoking, pollution, reflux disease and comorbidities like diabetes, thyroid disorders and exacerbations. The level of control of their asthma was assessed by the GINA endorsed asthma control questionnaire whose scores classified subjects as well, partly and uncontrolled asthma. Questionnaire administration was done either by telephonic interview or on physical visit by trained personnel.

Statistical Analysis

Data was analyzed by SPSS 20.0 software. Quantitative data was expressed in mean and standard deviation. Unpaired T test and Chi square test were used to assess association of continuous and dichotomous variables with uncontrolled asthma respectively.

Results

A total of 220 subjects completed the questionnaire satisfactorily. The male: female ratio was 59:51 and mean age of subjects was 35.25±12.34 years with majority of them (59.1%) belonging to the 26-45-year age group. The mean body mass index (BMI) was 25.75±3.80 and 62.8% were overweight and obese.

Table 1
Gender distribution

S.No	Gender	N (%)
1	Male	132 (60%)
2	Female	88 (40%)

Table 2
Age Distribution

S.No	Age	N (%)
1	<25 years	50 (23%)
2	26-45 years	130 (59%)
3	46-65 years	33 (15%)
4	>65 years	7 (3%)

Table 3
Asthma Control

S.No	Asthma Control	N (%)
1	Uncontrolled	108 (49%)
2	Well controlled	26 (12%)
3	Partly controlled	86(39%)

Table 4
Association of Baseline Variable with Type of Asthma Control among Partly and Uncontrolled Asthma Patients (N=196)

Variable	Types of poorly controlled asthma			P Value
	Total N=196	Partly Controlled n (%) 86 (44.3)	Uncontrolled n (%) 108 (55.7)	
Male	112 (57.7)	44(51.2)	68(63)	0.243
Female	82 (42.3)	42(48.8)	40(37)	

Age		28.78±8.10	39.76±11.12	0.0001
Age groups				
≤50 years		84(97.7)	86(79.6)	0.0001
>50 years		2(2.3)	22(20.4)	
Educational Qualifications				
School	90(46.4)	22(25.6)	68(63)	0.011
Graduate	104 (53.6)	64(74.4)	40(37)	
BMI Classification				
Normal weight (18.5-24.9)	70(36.1)	44(51.2)	26(24.1)	0.001
Over weight (25-29.9)	88(45.4)	42(48.8)	46(42.6)	
Obese (≥30)	36(18.6)	0(0)	36(33.3)	
Smoking status				
Non smokers	126(64.9)	74(86)	52(48.1)	0.001
Smokers	28(14.4)	2(2.3)	26(24.1)	
Passive Smokers	40(20.6)	10(11.6)	30(27.8)	
Pollution				
Absent	50(25.8)	32(37.2)	18(16.7)	0.022
Present	90(83.3)	54(62.8)	90(83.3)	
Diabetes mellitus				
Absent	148(76.3)	86(100)	62(57.4)	0.001
Present	46(23.7)	0	46(42.6)	
Hypertension				
Absent	170(87.6)	86(100)	84(77.8)	0.001
Present	24(12.4)	0(0)	24(22.2)	
GERD				
Absent	90 (46.4)	62(72.1)	28(25.9)	0.001
Present	104 (53.6)	24(27.9)	80(74.1)	
OSA				
Absent	176 (90.7)	86 (100)	90 (83.3)	0.004
Present	18 (9.3)	0 (0)	18 (16.7)	

Discussion

Our study included 220 patients with a male to female ratio of 59:51. Majority of them (59.1%) belonged to the 26-45 yr., age group. According to their BMI distribution, 62.8% were overweight and obese. The level of control as assessed by the validated GINA questionnaire showed that out of 220 subjects, 49.1% and 39.1% had uncontrolled and partly controlled asthma contributing to a total of 88.2% of poor asthma control. Only 11.8% were well controlled. Western studies show the prevalence of uncontrolled asthma ranging from 34.3% in a Latin American country to 53.2% in a study in Spain. An Italian study however, showed a reasonably proportion with good control (64.4%) and 19.8% who were uncontrolled A study on the Asthma Insights and Reality in Asia Pacific region (ARIAP), found that in both adults and children, asthma control was way far from optimum. 51.4% and 44.3% reported daytime and nocturnal symptoms with 44.7% having limitations in daily activities.[6]

However, asthma control according to GINA was not evaluated. The Asthma Insights and Management study in the Asia Pacific region (AP-AIM) reports Indian data showing that though 91% of asthmatics perceived good control, none of them had optimum control by objective criteria.[7] The International Asthma Patient Insight Research (INSPIRE) study which was a multinational study reported prevalence of 51% and 28% for uncontrolled and well controlled asthma. Compared to developed nations, studies in developing countries show a higher proportion of poorly controlled asthma as in a Chinese study showing more than 80% with poor control and Indian studies reporting 30-35% as well controlled. Hence our study shows a high percentage of subjects (88.2%) with poorly controlled asthma.[8]

Pollution was found to be significantly associated with uncontrolled asthma in our study. Both acute and chronic exposure to air pollution is found to be associated with greater number of asthma exacerbations, hospitalizations and reduced lung function. Similar observations were also seen in a few studies. Greater susceptibility to the effects of ambient air pollution was seen in children and changes in daily levels of pollution were associated with variable lung function and symptoms. Hence, air pollution plays an important role in asthma control.[9] Hence, to summarise, our study showed that almost half the subjects had uncontrolled asthma with around 88% being poorly controlled. This reflects that even with effective treatment options a significant number of asthmatics still remain far from optimum control. The important risk factors identified in our study which were significantly associated with uncontrolled asthma were increasing age, higher BMI & OSA, lower educational status, smoking and pollution and comorbidities like GERD, diabetes and hypertension.[10]

Conclusion

Uncontrolled asthma is still widely prevalent in India. The major risk factors associated with poor control were elderly, obesity, OSA, GERD, smoking and pollution. Hence, achievement of optimum asthma control needs to address several factors including sociodemographic and modifiable risk factors in addition to ensuring education regarding medication compliance and proper inhalational techniques.

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