Clinical Profile and Risk Factors of Bronchial Asthma: A Cross Sectional Study From Tertiary Health Care Center In India.

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Abstract:
Introduction: The key to effective therapeutic management of asthma is patient level risk stratification and disease characterisation. There is a lacuna in the literature in understanding the patient profile of Indian asthmatics. So, the current study was conducted to asses various risk factors associated with bronchial asthma, various modes of presentations, severity and complications of asthma.
Methods: It was cross sectional study consisting of 100 patients with bronchial asthma. Demographic details, Risk factors associated with bronchial asthma and clinical symptoms (cough with or without expectoration, wheeze, chest tightness, shortness of breath with duration for all patients were recorded. Patients were evaluated for comorbidities by systemic examination. Comorbidities illness is defined as the presence of coexisting cardiac failure, ischemic heart disease, diabetes mellitus, hypertension, and thyroid disorders. AEC and spirometry were done in all the cases. Descriptive statistics were done using excel sheet.
Results: The age group of the patients ranged from 15 to 60 years with mean age of 38.96±10.564. The incidence of asthma is equal in both males and females. Bronchial asthma was more common in urban population and more in the illiterate group. Most common symptoms were cough in 94% of cases followed by shortness of breath in 82%, wheeze in 43% and chest tightness in 32%. Most common grade of Dyspnoea was grade 1. Mean FEV1 is 60.35±19.106, Mean FVC is 60.83±19.44 and FEV1/FVC ratio is 72.117±17.03 and majority of the patients has severe obstruction. Minority of the patients are addicted to smoking and alcohol.
Conclusion: Current study evaluated the demographics, risk factors and clinical profile of asthma patients in tertiary care centre in south India. The results are consistent with literature. These results may help in patient level risk stratification and disease characterisation.
Key words: Bronchial Asthma, Clinical Profile, Risk Factors, Risk Stratification

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I. Introduction

Asthma is a major cause of chronic morbidity and mortality throughout the world and there is evidence that its prevalence has increased considerably over the past 20 years[1]. It has been estimated that around 300 million people of all ages, and all ethnic backgrounds, suffer from asthma. Its prevalence ranges from 4.5% to 12.7%[2]. International study of asthma and allergy in children phase -3 study has reported higher prevalence of 10-20% in some areas of India.[3] Because of its increased prevalence, as well as the increased morbidity and mortality from this disease, asthma has come to be recognized as a major worldwide public health issue, and the burden of this disease to governments, health care systems, families, and patients is increasing worldwide[1]

Asthma is a heterogenous disease with symptoms that varies in time and intensity and a characteristic variable expiratory airflow limitation.[4] Many factors trigger the worsening of asthma including pharmacological agents.[5] Within India there is wide variation in prevalence and environmental triggers of asthma[6].

The key to effective therapeutic management of asthma is patient level risk stratification and disease characterisation[7]. To the best of our knowledge, there is a lacuna in the literature in understanding the patient profile of Indian asthmatics. Phenotype based clustering studies may not be directly applicable to India because of environmental confounders[7]. To fulfil this unmet need we conducted this study aiming to asses various risk factors associated with bronchial asthma, various modes of presentations, severity and complications of asthma.

II. Methods

Study site:

This is a cross sectional study conducted in hundred consecutive patients diagnosed as bronchial Asthma attending the department of pulmonary medicine in ESIC Medical College, Sanathnagar, Hyderabad during period from May 2018 to November 2018 were selected by adhering to inclusion and exclusion criteria.

Study Design:
It was cross sectional study consisting of 100 patients with bronchial asthma. The inclusion and exclusion criteria used for this study were:
Inclusion criteria:
a)   Patients presenting with any of the clinical symptoms like cough, wheeze, chest tightness and diagnosed case of bronchial Asthma.
b)   Age >15yrs.
c)   Both males and females.
Exclusion criteria:
a)   Status asthmaticus
b)   ACOS (Asthma COPD overlap syndrome)
c)   Patients below 15 years of age.

Demographic details, Risk factors associated with bronchial asthma and clinical symptoms (cough with or without expectoration, wheeze, chest tightness, shortness of breath with duration for all patients were recorded. Patients were evaluated for comorbidities by systemic examination. Comorbidities illness is defined as the presence of coexisting cardiac failure, ischemic heart disease, diabetes mellitus, hypertension, and thyroid disorders. AEC and spirometry were done in all the cases.

Statistical analysis:
Data were transferred from data collection sheets to an excel spread sheet (Microsoft, Redmond, WA USA). Simple statistics such as percentage were used to calculate the prevalence.

III.   Results

1.   Age:
In our study majority of patients with asthma presented in adult age group. 39% of patients were in 4th decade and 38% of patients were in 3rd decade. (Table 1) The mean age of onset was 40 ±11 years in males and 37±8 years in females.

Table 1: Distribution of age of onset.

Age groups (in yrs.)	No of cases (n)	Percentage (%)
15-20	10	10
21-30	13	13
31-40	28	28
41-50	39	39
51-60	10	10
Total	100	100

2.   Distribution of Sex:
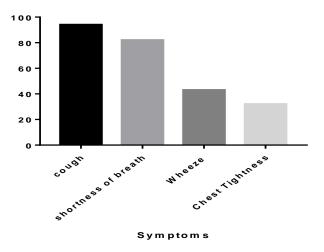There was an equal distribution of sex in our study.
3.   Distribution based on education, place of residence and occupation:
In our study, we observed that majority of patient are from urban area (68%), illiterate (60%) and unskilled workers (66%) compared to rural area (32%), literate (40%) and skilled workers (34%).
4.   Clinical Presentation:
Most common symptoms were cough in 94% of cases followed by shortness of breath in 82%, wheeze in 43% and chest tightness in 32%. Majority of the patients presented with cough. In our study only 7% of patients did not have dyspnoea. In patients who had dyspnoea, majority of them had grade 1 (46%) followed by grade 2 (33%) and grade 3 (14%). No patient in our study presented with grade 4 dyspnoea.
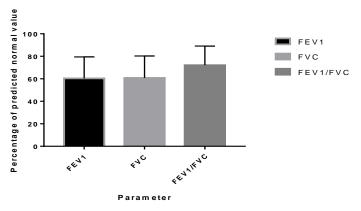
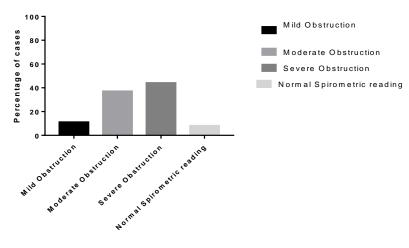**Graph 1:** Clinical presentation of patients with asthma (Frequency of symptoms represented in percentages)

5.   Spirometric Assessment:

In the present study it was observed that mean FEV1 is 60.35 ± 19.106, Mean FVC is 60.83 ± 19.44 and FEV1/FVC ratio is 72.117 ± 17.03. (Graph 2 a) In our study only 8% of the participants had normal spirometry, 44% had severe obstruction 37% had moderate obstruction and 11% had mild obstruction. Majority of the patients in the study were having severe obstruction. (Graph 2 b)

Graph 2a: Spirometric Measurements

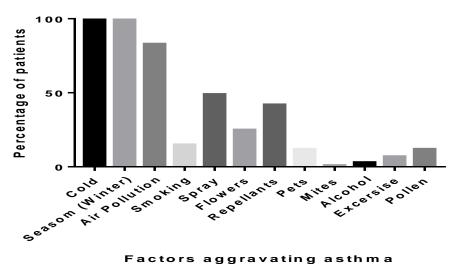**Graph 2b**: Severity of obstruction based on spirometry

6.   Life style and habits:
Out of 100 patients with bronchial asthma majority of the patients don't exercise i.e., 95% while only 5% of the participants do exercise. Out of 100 participants 27% had addiction to tobacco smoking 23% had addiction to alcohol. Remaining 73% are non-smokers and 77% are non alcoholic.

7.   Risk factors:
7a. Environmental Exposure:
Out of 100 patients 4% were exposed to smoke, 46% were exposed to pollution, 42% were exposed to dust and 08% were not exposed any of them. In the present study most common environmental factors aggravating bronchial asthma are cold and winter season (100%), followed by Air pollution (83%), Sprays (49%), Repellents (42%) and flowers (25%). Minor contributions are from smoking, pet dander, Mites, Alcohol, exercise and Pollens. (Graph 3)

Graph 3: Environmental factors aggravating asthma

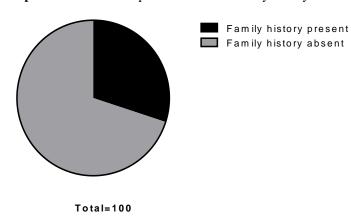**7b. Dietary factors aggravating asthma:**
Most common aggravating dietary factor for bronchial asthma is cool drinks and ice creams i.e., 100%. Sweets contribute to be 41% and fruits 20%.

7c. Mental status aggravating asthma:
Anxiety was most common aggravating factor (73%) followed by stress (66%), laugh (33%) and cry (30%). Only 2% of the cases asthma aggravates in individuals with normal mental status.

7d. Family History:
Out of 100 patients 30% have history of bronchial asthma in the family and 70% are without any history of bronchial asthma in the family. (Graph 4)

Graph 4: Distribution of patients based on family history of asthma**:**

8. Disease status and treatment:
Out of 100 cases 92% were on inhalation therapy in the form of MDI / DPI and nebulizers and 32% were on parenteral/oral medications. The AEC (Absolute Eosinophil Count) in the present study was 522.51±252.191. Mean duration of asthma in years was 7.620±8.983 Average no of attacks per year is 4.

9. Complications:
Out of 100 cases 65% were with complications, 24% were with hypertension,4% were with Diabetes mellitus, 6% had thyroid disorder and 1% had epilepsy.

IV. Discussion

Bronchial asthma is a chronic inflammatory disease of airways, prevalent worldwide with variable geographical and seasonal pattern. Disease is under diagnosed, under and poorly treated with poor compliance.

In the present study the age group of the patients varied from 15 years to 60 years, highest number were recorded in 4th and 5th decade of life. The maximum incidence of 67% occurred between 31-50 years of age which is similar to the study conducted by Singh et al[8] where incidence was 67% between the age group of 31-60 years.

In the present study mean age of the participants were 38.96±10.564years, which is similar to the study conducted by Harsha M et[10] al in which mean age is 43.4 ± 20.8 years and A Halim et al[10] where mean age of patients was 36.64±4.91years.

In the present study there was an equal predominance of both males and females with a ratio of 1:1 which is similar to study conducted by Harsha M et al[10] where male to female ratio is 1.3:1.

In the present study Out of 100 patients 68% hailed from urban area and 32% hailed from rural area. There was urban predominance over rural with urban to rural ratio of approximately 2:1 which is similar to the study conducted by Singh et al[8] in which urban patients are 65% and rural are 35% which is almost equal to 2:1 ratio.

In the present study 60% of the patients were illiterate where as 40% were literate, in contrast to the study conducted by Elfaki NK et al[9] where illiterates are 11% and literates are 89%. This difference could be because of shorter duration of study lesser participants in the present study.

In the present study most, common symptoms were cough in 94% of cases followed by shortness of breath in 82%, wheeze in 43% and chest tightness in 32% which is similar to the study conducted by Harsha M[10] et al in which the chief complaint was Dry cough (72%), Cough with expectoration (58%), Dyspnoea (64%), Wheeze (34%), Chest discomfort (32%) and study conducted by A Halim et al[11] where almost all patients had classical triad of dyspnoea, wheeze and cough. Expectoration of scanty mucoid sputum was recorded in 60% cases. Chest tightness or discomfort was noted in 33% cases.

In the present study it was observed that mean FEV1 is 60.35±19.106, Mean FVC is 60.83±19.44 and FEV1/FVC ratio is 72.117±17.03 which is similar to the study conducted by Harsha M et al[10] in which mean FEV1 (forced expiratory volume) was 68.58±18.15, mean FVC (forced vital capacity) was 69.32±16.95 whereas mean PEFR was 62.41±20.23 and study conducted by Yanez et al[2] the mean FEV1 was 73±21 and FVC was 69±12 and Zaman at al[12] found that the mean FEV1 was 71.8±29.5, FVC was 72.2±26.9.

In the present study 8% of the participants have normal spirometry, 44% have severe obstruction 37% have moderate obstruction and 11% have mild obstruction whereas the study conducted by Harsha M et al[10] 4% had very severe obstruction, 6% had severe obstruction, 12% had moderate obstruction whereas 36% had probable obstruction. Similarly, Yanez et al[2] found that with regard to the severity of asthma,

74.3% of the patients were diagnosed with moderate persistent asthma, 15.7% with mild persistent asthma, 7.2% presented with severe persistent asthma, and 2.6% with intermittent asthma.

In the present study Out of 100 participants 27% had addiction to tobacco smoking 23% have addiction to alcohol. Remaining 73% are non-smokers and 77% are non-alcoholic where as in a study conducted by Harsha M et al[10] 36% participants had h/o addiction to smoking and 30% had addiction to Alcohol which is slightly larger than the present study. This may be due to smaller study population compared to present study Where as in the study conducted by A Halim et al[11] where 40% participants were smokers.

In the present study out of 100 patients, 4% are exposed to smoke, 46% are exposed to pollution, 42% are exposed to dust and 08% non-exposure, which indicate that the major exposure was dust followed by pollution and smoke where as in the study by Harsha M et al[10] pollution was 12% dust 13% and smoke 09% which is similar to present study.

In the present study most common environmental factors aggravating Bronchial Asthma are Cold and winter season (100%), followed by Air pollution (83%), Sprays (49%), Repellents (42%) and flowers (25%). Minor contributions are from smoking, Pet dander, Mites, Alcohol, exercise and Pollens. In the study conducted by Harsha M et al Major trigger factors were Air pollution (12%), Allergen exposure (11%), Winter (17%), Dust (13%), Exercise (12%), Food (4%), Tobacco smoke (9%), Stress (10%), RTI (11%) and Pets (3%). Here major trigger is winter season (100%) which is similar to our study.

In a study conducted by Balaji MD et al[13] 21% had exposure to dust as a triggering factor when compared to cold, which was 5%. However, 27% of children were found to have both cold and dust exposure as triggering factors. 3 % children developed an acute exacerbation following exposure to cold and dust, along with exercise. While 11% children had pets as triggering factor.

In a study conducted by Elfaki NK[9], flowers and indoor air pollution contributed to 46% and sprays contributed to 37%.

Table 2: Comparison of results of our study to other studies in literature.

Risk factors	No of cases % (Present study)	Harsha M et al[10]	Balaji MD et al[13]	Elafaki et al[9]
Cold	100	5	32	-
Season (winter)	100	100	-	-
Air pollution	83	12	-	-
Smoking	15	09	-	-
Spray	49	-	-	40
Flowers	25	-	-	64
Repellents	42	-	-	-
Pet dander	12	03	11	-
Mites	01	-	-	-
Alcohol	03	-	-	-
Exercise	07	12	3	-
Pollen	12	11	-	-
Dust	-	13	21	-

In the present study most common aggravating dietary factor for bronchial asthma are cool drinks and ice creams i.e., 100%. Sweets contribute to be 41% and fruits 20%.

In the present study Anxiety aggravates Asthma in 73% of the cases, stress aggravates in 66% of the cases, laugh 33% and cry 30%. In 2% of the cases asthma aggravates in individuals with normal mental status. In the study conducted by Harsha M et[10] al Stress acts as a triggering factor in 10% of the cases laugh and cry 20%, stress 60% and 10% of the cases and remaining were with normal mental status.

In both the studies Stress aggravation of Bronchial Asthma are equal although Anxiety is a major trigger in present study

In the present study 30% has family history of bronchial asthma and 70% are without family history Balaji MD et al[13] 51% had positive family history where as in another study conducted by Harsha M et al[10] 48% had positive family history. In study conducted by Singh et al[14] 35% had positive family history. In another study conducted by Elfaki NK et al[23] 67% had positive family history. The present study is similar to the study conducted by Singh et al

. In the present study out of 100 cases 92% are on inhalation therapy in the form of MDI/DPI and nebulizers and 32% are on parenteral/oral medications. The AEC (Absolute Eosinophil Count) in the present study is 522.51 ± 252.191, mean history of asthma in years was 7.620 ± 8.983 and average number of attacks per year was 4.

The current study has some limitations that include, first of all our data was cross-sectional and therefore, we couldn't assess causality. Furthermore, some behavioural data for instance smoking are self-reported that subjected to recall and social desirability biases.

V. Conclusion:

Asthma continues to have a major impact on public health internationally. Based on the obtained results, it is concluded that there are different risk factors patterns for asthma which appear to play a major role and likely contribute to the magnitude of this burden

References:

[1]. 2015 Pocket Guide for Asthma Management and Prevention in Children 5 Years and Younger - Global Initiative for Asthma - GINA [Internet]. [cited 18 March 2018]. Available from: https://ginasthma.org/Pocket-Guide-for-Asthma-Management-and-Prevention-in-Children-5-Years-and-Younger/.
[2]. Yáñez A, Soria M, De Barayazarra S, Recuero N, Rovira F, Jares E et al. Clinical characteristics and comorbidities of elderly asthmatics who attend allergy clinics. Asthma Research and Practice. 2018;4:5

[3].   Lai CK, Beasley R, Crane J, Foliaki S, Shah J, Weiland S, ISAAC Phase Three Study Group. Global variation in the prevalence and severity of asthma symptoms: phase three of the International Study of Asthma and Allergies in Childhood (ISAAC). Thorax. 2009 Jun 1;64(6):476-83

[4].   Global Initiative for Asthma (2018). Global strategy for asthma management and prevention, 2018

[5].   Paramesh H. Epidemiology of asthma in India. The Indian Journal of Pediatrics. 2002;69(4):309-312

[6].   Singh S, Sharma B, Salvi S, Chhatwal J, Jain K, Kumar L et al. Allergic rhinitis, rhinoconjunctivitis, and eczema: prevalence and associated factors in children. The Clinical Respiratory Journal. 2016;12(2):547-556.

[7].   Chung K, Wenzel S, Brozek J, Bush A, Castro M, Sterk P et al. International ERS/ATS guidelines on definition, evaluation and treatment of severe asthma. European Respiratory Journal. 2013;43(2):343-373

[8].   Singh A, Jain V, Mishra M, Singh A. Clinical profile of bronchial asthma patients reporting at respiratory medicine outpatient department of teaching hospital. Indian Journal of Allergy, Asthma and Immunology. 2015;29(1):3

[9].   Elfaki NK, Shiby AY. Risk Factors Associated with Asthma among Saudi Adults in Najran. Journal of Clinical Respiratory Diseases and Care. 2017;03(03)

[10].   Meshram M H, Dhoble M. Study of socio-demographic and clinical profile of asthma patients in rural area of Nagpur district. Indian Journal of Applied Research. 2018;8(8)

[11].   Halim A, Alam T, Ali M, Islam M, Ahammad F, Rahman S et al. Prospective Study of Bronchial Asthma. Faridpur Medical College Journal. 1970;6(2):100-103.. Faridpur Med. Coll. J. 2011;6(2):100-103

[12].   Zaman M, Ashraf S, Javaid M. Reliability of diagnosis and asthma knowledge, attitudes and perception (KAP) in rural population of NWFP, Pakistan. Pakistan Journal of Chest Medicine. 2006;12(4)

[13].   Balaji MD, Shaji SM. Clinical Profile and Triggers Of Childhood Asthma Among Patients Diagnosed At Paediatric Asthma Clinic. International Journal of Preventive and Therapeutic Medicine. 2015; 3 (2): 49-52.