



CLINICO EPIDEMIOLOGIC STUDY OF ADULT PATIENTS PRESENTING WITH NEW ONSET BRONCHIAL ASTHMA IN NEPAL

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ABSTRACT

Background: Despite being one of the most common respiratory disease, the epidemiological and clinical aspects of the bronchial asthma varies in different parts of the world. This study is done to find out if there are any specific patterns of the disease in relation to clinical features, risk factors, severity, triggers, and socio demographic factors. **Methods:** Ninety five patients were enrolled in this study based on clinical diagnosis of bronchial asthma as per case definition of Global initiative for Asthma (GINA) from March 2014 to April 2015. All the detail data of risk factors, triggers, symptoms and data from investigations like pulmonary function test, chest radiographs, sputum profile, absolute eosinophil count and hs-C reactive protein were collected. **Results:** We observed female predominance with 69.5% with median age of 40.04 years. 38.9% of patients had history of significant exposure to indoor air pollution. Cough (87.4%) was the most common clinical symptom on presentation and wheeze (81.1%) was the most common clinical examination finding. Most of them (44.2%) presented with mild persistent bronchial asthma and 76.8% of study population had upper respiratory tract infections as triggering factor. C reactive protein was elevated in 58.9% and Absolute eosinophil count was raised in 42.1% of patients. **Conclusion:** Younger age, female with exposure to indoor air pollution are more prone for adult onset bronchial asthma which is usually triggered by upper respiratory tract infections, mostly presented with cough and wheeze and elevated C reactive proteins and absolute eosinophil counts.

KEYWORDS: Asthma, clinic-epidemiological, Nepal.

INTRODCUTION

Asthma is a heterogeneous disease, characterized by chronic airway inflammation which is diagnosed clinically 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. The clinico epidemiological study of asthma includes all the clinical entity of asthma including its clinical features, risk factors, severity, triggers, socio demographic factors and their effect on various aspect of asthma such as its prevalence, knowledge and beliefs towards asthma, treatment and prevention.^[1] The estimated prevalence of asthma is 300 million people of all ages, ethnic groups and geographic origins, and it is estimated that additional 100 million people will be affected by 2025.^[2] Based on the standardized methods to measure the prevalence of asthma and wheezing illness in children and adults, the global prevalence of asthma was found to be 1% to 18% in different countries.^[1] It is estimated that death from asthma worldwide is 250,000 annually. Asthma accounts for about 1 in every 250 deaths worldwide but mortality does not appear to correlate well with prevalence.^[2]

In the developed countries rates of asthma have plateaued since the mid1990s but in the developing countries it is increasing.^[3] The number of disability-adjusted life years (DALYs) lost due to asthma worldwide has been estimated to be currently about 15 million per year. Worldwide, asthma accounts for around 1% of all DALYs lost, which is similar to that for diabetes, cirrhosis of the liver, or schizophrenia.^[2] The true rate of bronchial asthma within the general population is likely to be greater than that recorded. Bronchial asthma is one of the most frequent clinical condition requiring hospital visit in B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal which indirectly reflects high burden of this disease. In spite of understandable clinical concerns about difficulty in managing the patients with bronchial asthma in Nepal, in many settings clinicians do not explore for various clinico epidemiological aspects and its associated impact on the prognosis. Most of the information on these patients is based predominantly on published studies from developed countries and it is unclear how this information are synthesized and applied by the physicians who are primarily responsible for the care of the patients presenting with bronchial asthma in Nepal.

The major purpose of this study is to provide an evidentiary basis for the relationship between various socio-demographic and epidemiological aspects of bronchial asthma and its clinical presentation in the specific context.^[3]

MATERIALS AND METHODS

The study was Cross-sectional observational hospital based study, carried out in the Division of Pulmonary, Critical Care and Sleep Medicine, Department of Internal Medicine of BPKIHS. All the patients with *the clinician diagnosed* New Onset Bronchial Asthma presenting at outpatient services and hospitalized were consecutively recruited in study for a period of one year (March 2014-April 2015). For the purpose of study, Bronchial Asthma was defined as per the Global Initiative for Asthma (GINA) 2012. The diagnosis of New onset Bronchial asthma was made on clinical grounds based on *one or more* of the following within the period of 12 month.

- Episodic, Recurrent and Chronic symptoms of airflow obstruction as breathlessness, cough, wheezing, and chest tightness; symptoms frequently being worse at night or in the early morning as reported by the patient. Prolonged expiration and diffuse wheezes on physical examination.
- Complete or partial reversibility of airflow obstruction, either spontaneously or following bronchodilator therapy as measured by Pulmonary function test (PFT) or Peak Expiratory Flow (PEF).
- Positive broncho-provocation challenge with methacholine or histamine.

The majority of pulmonary function test was done at the first contact or within 3 days of hospitalization or whenever patient was fit to perform the test. Asthma was classified according to the GINA guidelines as intermittent, mild persistent, moderate persistent and severe persistent asthma. All consecutive patients more than 18 years of age fulfilling the case definition of clinician diagnosis of New Onset Bronchial Asthma and giving consent for the study were included.

Data collection

An informed verbal or written consent was taken. The study protocol was submitted for ethical approval to institutional ethical review board (IERB) and ethical clearance to conduct the study was obtained. A detailed socio-demographic data for every patient was collected and information was recorded in structured proforma which included age, sex, smoking history, and history of exposure to biomass smoke, visit to health care facility with recurrent respiratory symptoms in the past, history of pulmonary tuberculosis, use of respiratory medication as inhaler, steroids, domiciliary oxygen and co-morbid conditions. Detailed signs and symptoms, and clinical parameters were also noted. Chest radiograph, sputum for gram stain and culture were done. Arterial blood gas analysis (ABG) and/or pulse oximetry were done as and when required. Pulmonary function test was performed in all patients. Forced expiratory volume in one second (FEV1) and forced vital capacity (FVC) was measured. FEV1 and FVC were expressed as a percentage of the predicted values for age, sex, and height. PEF was done on routine basis. Routine biochemical investigation as required for the treatment of patients for Bronchial asthma was performed. The high sensitivity C reactive protein (hs-CRP) levels and absolute eosinophil count (AEC) were done in all patients.

RESULTS

Baseline Characteristics of the Study Population

During the study period of one year we enrolled 95 adult patients presenting with new onset bronchial asthma. Among our study subjects 69.5% of were females whereas only 30.5% were male. 27.4% patients were age group of <30 years, 27.4% were age group of >50 years followed by 40-49 years (23.2%). The mean age of the population was 40.04 years. Majority of patients were below age of 50 year. Nearly 60% of our study population had an occupation related to domestic household activity, majority of them being females.

Table 1: Baseline Characteristics depicting Socio Demographic Profile of Adult Patients Presenting with New Onset Bronchial Asthma.

Characteristics	Categories	No of Patients	Percentage (%)
Age group in years	<30	26	27.4
	30 – 39	21	22.1
	40 – 49	22	23.2
	≥50	26	27.4
Mean age ± SD (Min – Max)		40.04±13.37 (18 – 69)	
Gender	Female	66	69.5
	Male	29	30.5
Religion	Hindu	89	93.7
	Muslim	4	4.2
	Buddhist	2	2.1
Educational status	No Formal Education	14	14.7
	Formal Education	81	85.3
Marital status	Unmarried	14	14.7
	Married	80	84.2

	Widow	1	1.1
Occupation	Farmer/Labourer	8	8.5
	Businessman	6	6.3
	Student	15	15.8
	Housewife	57	60.0
	Teacher	9	9.5

Nearly 85% of our study populations were nonsmokers, while 14.7% gave the history suggestive of maternal smoking. Interestingly 38.9% of our study population had significant history of exposure to indoor air pollution due to use of biomass fuels and surprisingly 42.1% of the patients presenting with new onset bronchial asthma in

our study population had history of regular intake of alcoholic beverages. Nearly 10% of the subjects presented with past history of recurrent chest infection, whereas 2% patients had past history of pulmonary tuberculosis.

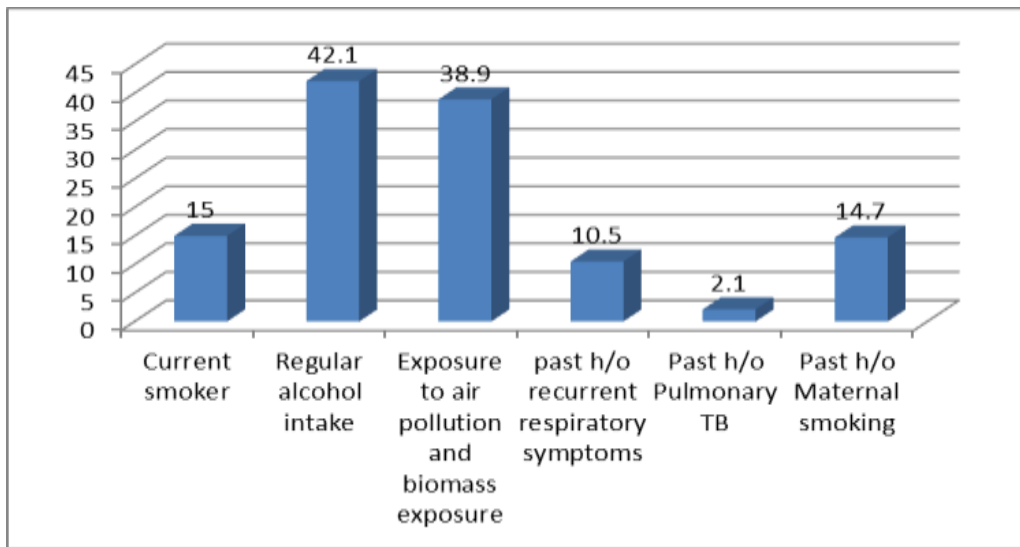


Fig 1: Risk Characterization of Patients Presenting with New onset Bronchial Asthma.

Cough (87.4%) was the most common complaint whereas patient complaining of wheezing was the second most common clinical presentation (82.1%). Shortness of breath was found in 50.5%, increased sputum production

was reported by 38.9% of the study population and chest tightness was complained by 30.5% of the study population.

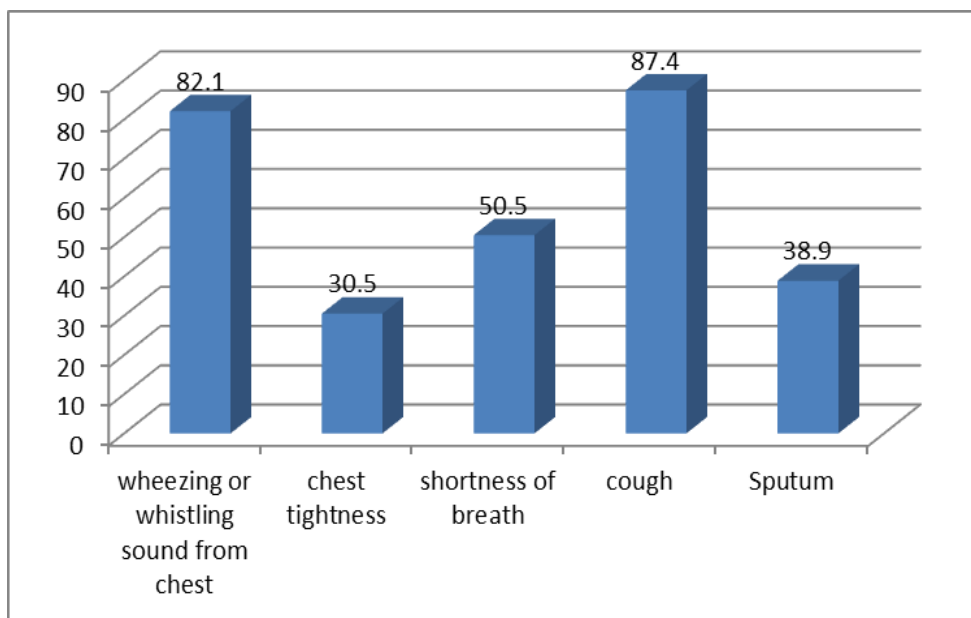


Fig 2: Clinical Characteristics of patients presenting with New Onset Bronchial Asthma.

Most common triggering factor was Upper Respiratory Tract infection (76.8%) followed by seasonal variation (71.6%). Increased Exposure to smoke and strenuous

physical activity were reported as important triggers by 45.3% and 34.7% of our patients respectively.

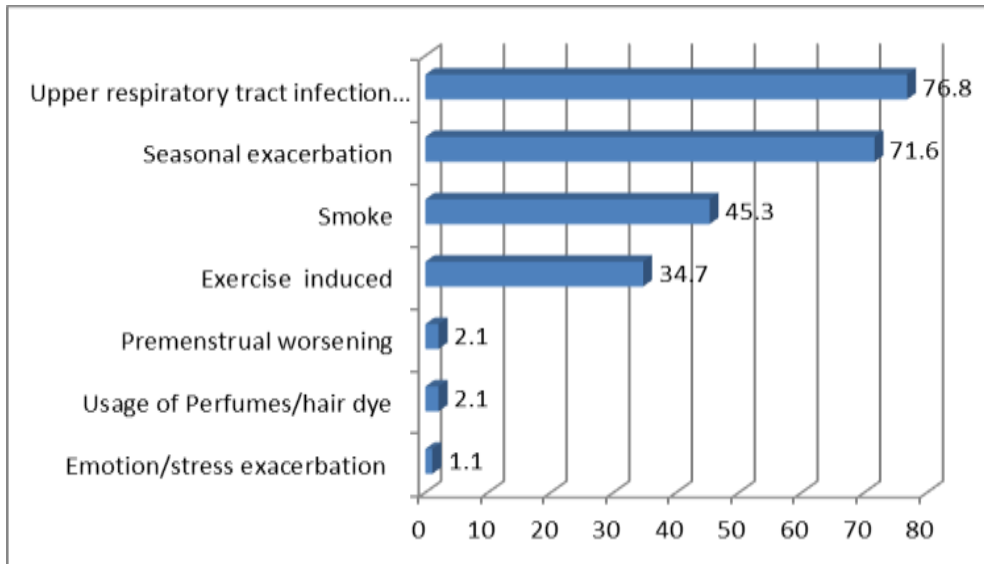


Fig 3: Triggers of New Onset Bronchial Asthma in Adults.

History and symptoms suggestive of Gastroesophageal reflux diseases (GERD) was reported by 60% of the patients while 43.2% had BMI > 25 kg/m². Only 20% had symptom suggestive of allergic rhinosinusitis. Majority of patients in our study population presented with abnormal physical finding with normal chest X ray. Sputum test for microbiological organism was positive only in 11% of patients. Majority of study population (58.9%) had elevated hs-CRP level and 57.9% have elevated absolute eosinophil count. Based upon the clinical classification, 44.2% of our study subjects had mild persistent symptoms, 32.6% had symptoms of intermittent severity, 22.1% patients were categorized as having moderately persistent bronchial asthma whereas only 1.1% of the patients had severe persistent bronchial asthma.

DISCUSSION

In the present study, we have identified specific populations of adult patients with new onset bronchial asthma visiting at the different healthcare facilities. The mean age of the study population was 40.04 years in our study. Similar observations were reported by Aggrawal *et al* from their multicentre study of clinic epidemiological study of bronchial asthma from Chandigarh India. Our observations are also in agreement with many other such studies conducted in similar region.^[4] Anuradha *et al* from their study of epidemiological study of bronchial asthma from India also reported that majority of the patients presenting with new onset bronchial asthma were in younger age group.^[5] Similarly, Kaur *et al* and Rao *et al* from India also reported in their studies that new onset bronchial asthma is the diseases of young adults in Indian subcontinent.^[6,7]

In our study female predominance (69.5%) among the patients with new onset bronchial asthma was observed which are consistent with several other studies demonstrating an increased prevalence of asthma symptoms in female patients. Genetic disposition seems to be the primary determinant of asthmatic disease. Sex, genetically determined, has also been shown to influence the development of new onset bronchial asthma. Many studies reveal the possibility that separate genetic mechanisms play a role in asthma at different ages for both males and females.^[8] The fact that there are sex differences in the incidence, prevalence and severity of asthma in adults is generally accepted as well as the hypothesis supporting the sex hormones influence differences in the susceptibility to asthma.^[9,10,11] These trends can also be observed in recurring discussions on secondary influential aspects such as the association between asthma and pregnancy.^[12]

Nearly 40% patients of new onset bronchial asthma in our study had history of significant exposure to indoor air pollution due to use of biomass fuels. Our findings reflect upon the increasing trends of tobacco smoking and presence of other risk factors associated with asthma in the local community, specially the patterns of household energy use and extent of indoor air pollution in the population which have been also seen in various literatures.^[13,14] Similarly, cough being the most common clinical symptom of the new onset bronchial asthma in our study can be explained by differences in the levels of environmental exposure, including indoor air pollutants as well as high rates of tobacco smoking.

Surprisingly, wheeze was not the most common complaint among the patients presenting with new onset bronchial asthma our study. There may be less awareness

of wheeze being a symptom of asthma, even in those with frequent wheezing. The prevalence rates of cough, wheeze and shortness of breath in appropriate clinical settings can be justifiably used as surrogates of disease burden, especially in areas where data on healthcare utilization and mortality are unavailable.

Interestingly, history and symptoms suggestive of Gastro-esophageal reflux diseases (GERD) was reported by 60% of the patients. According to the studies in the literature, pathological GERD can be found in 30% to 80% of patients with asthma. Gastro-esophageal reflux disease (GERD) may cause, trigger or exacerbate bronchial asthma.^[15] Upper Respiratory Tract infection was the most important trigger of asthma attack in our study population followed by change in season & increased exposure to smoke and strenuous physical activity. These findings support the evidences of correlation between exacerbation, infection and smoking.^[16,17,18] Exposure to aeroallergens, cold weather, increased physical activity has been reported as the relevant triggers and has been convincingly shown to worsen asthma control in sensitized patients.^[19]

One of the most interesting finding of our study was abnormal physical finding with normal chest X ray. Although bronchial thickening, hyperinflation, and focal atelectasis suggest asthma when they are present, chest radiographs obtained during asthma exacerbations can demonstrate normal findings which reduce its sensitivity as a diagnostic tool. Similarly, identical findings may be observed with chronic bronchitis and viral bronchopneumonia, among other conditions and these similarities limit the specificity of chest radiography. Clinical correlation remains beneficial in the interpretation of findings.

Serum hs-CRP was found useful marker of airway inflammation in nonsmoking asthmatic patients without co morbidity in our study population. Absolute eosinophil count values showed an increase above the normal in patients with new onset bronchial asthma with predominant symptom suggestive of allergic rhinitis in our study.^[20] The association between eosinophils and allergic disease has been known for many years which is also seen in our study.^[21]

The present study is, to our knowledge, the first from this country to thoroughly describe a large cohort of adult patients with new onset bronchial asthma adult-with respect to clinical, functional and inflammatory markers. It shows that new onset adult asthma is diseases of young adults in Nepal, affects more women than men, that the majority of patients are non-atopic. The findings of this study indicate the need of an individualized approach to the treatment and management of asthma.

There are some limitations to this study. The design was cross-sectional and therefore, cause and effect cannot be determined. Some of the data was self-reported and

subject to recall bias. Subjects may have had asthma symptoms prior to formal diagnosis of asthma, and therefore, may have been categorized. The sample size may have been underpowered to detect certain outcomes, such as healthcare utilization. Separation of asthma from COPD can be very difficult in older adults and there may have been misclassification of some individuals. These data however, still add insight into various clinic epidemiological factors related to adult patients with new onset bronchial asthma in Nepal. Therefore our study is unique in that, it involves the complete description of the Adult patients with new onset bronchial asthma presenting at clinical setting in Nepal, their clinical features and methods of cohort assembling and full spectrum of risk factors for their disease The clinico-epidemiological factors identified in the present study are in agreement with findings derived from studies of new onset bronchial asthma conducted in heterogeneous populations of south east-asia region.

CONCLUSION

Majority of the patients presenting with new onset bronchial asthma were of younger age group with mean age of 40 years. Female predominance was observed which are consistent with several other studies suggestive of genetic disposition as the primary determinant of asthmatic disease. Increasing trends of tobacco smoking and presence of other risk factors associated with asthma in the local community, specially the patterns of house hold energy use and extent of indoor air pollution in the population. Cough was the most common clinical symptom of the new onset bronchial asthma in adults in our study that can be explained by differences in the levels of environmental exposure, including indoor air pollutants by use of biomass fuels as well as high rates of tobacco smoking. Wheeze was the most common physical sign we found among our study population. An interesting finding was the abnormal physical finding with normal chest X-ray. However, biochemical markers like high sensitivity C-reactive protein (hs-CRP) was found to be a useful marker of airway inflammation in nonsmoking asthmatic patients. Similarly, increased level of absolute eosinophil count was also common in patients with new onset bronchial asthma.

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