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The relevance of co-factors in Asthma

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ABSTRACT: Asthma is a chronic inflammatory lung disease characterized by hyper responsiveness and variable airway resistance. This study showed that all the patients had cough and tightness of the chest, while 95% of patients were breathless and 90% of the patients experienced wheeze. There were associated allergies, which include rhinitis (75%), pharyngitis (54%), conjunctivitis (54%) and eczema (30%). Patients were impaired by asthma in the various activities like running upstairs (83%), house work (55%), exercise or sporting activities (50%), walking against gravity (49%), laughing (45), sleeping (40%), hurrying (30%), dancing (27%), singing (19%), talking (18%), sexual intercourse (17%). Some patients were unable to dance, smile, talk and have sexual intercourse with their spouses because of asthma. Common provoking factors in this environment included cold weather, environmental smoke and house dust, sporting activities, upper respiratory tract infections, mode changes and emotions, and spraying of perfumes. Others are tobacco smoke, excessive breeze, cold water, Paint odor, insecticide and food, hair spray, animal dander, pollen and walking etc. Prevalence of asthma was found to be higher among students than in any other profession.

Key Words: Asthma, chronic inflammatory lung disease, Allergy, Cofactors, hyper responsiveness.

Introduction

Bronchial asthma is one of the chronic diseases worldwide, affecting an estimated 300million people around the globe [1]. It is characterize by chronic inflammation with increased airway responsiveness leading to airways obstruction which is associated with variable airflow limitation that is reversible either spontaneously or with treatment [2]. It presents as recurrent episodes of wheeze, breathlessness, chest tightness and cough particularly at night or in the early morning [2]. There is often broncho constriction without any known precipitating factor. However some provoking agents of the obstruction in the airways may be specific such as antigen- antibody reaction. It may also be non- specific stimuli like exercise, emotional stress, cold air or pharmacological agents as histamine or metacholine [2]. Characteristic features on examination of patients with asthma includes prolonged expiratory phase of respiration, and diffuse bilateral wheeze (rhonchi) that are reversible on treatment. However there may be no signs detectable between episodes. Asthma is multifactorial in origin, arising from a complex interaction of genetic and environmental factors [3].

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Airway inflammation occurs when genetically susceptible individuals are exposed to certain environmental factors which includes. However, the exact processes underlying asthma may vary from patient to patient³. Other associated allergic conditions include Rhinitis, pharyngitis, conjunctivitis and dermatitis [3]. Studies have shown that more than 70% of asthmatic patients have other associated allergic co-morbid conditions [4] that could worsen asthma and vice versa. However allergic rhinitis is commonly associated with asthma than others. As a result of the morbidity and cost associated with these co morbid conditions, Clinicians should therefore consider these conditions in other to prevent worsening of asthma.

The pathology is that of inflammation with vasodilatation, edema and cellular infiltrate [5]. Cellular infiltrates include neutrophils, eosinophils, lymphocytes and mast cells. There are patchy desquamation and squamous metaplasia of the mucosa cells lining the airway lumen. Substance-P within the airway nerves is increased while –Vaso-active Intestinal Peptide (proposed neurotransmitter of the NANC airway nervous system) is reduced in airway nerves [5]. Airway narrowing result from airway smooth muscle contraction, vasodilatation of bronchial vessels, oedema of the sub mucosa tissues and hyper secretion of mucus into the airway lumen [5]. Asthma causes impairment of patient's activity. In the report of Juniper *et al.*, [6], items of impairment in asthma and the response included walking (13%), Running uphill (13%), house work (11%), hurrying (10%), work activities (10%), exercising/ sports (10%), walking uphill or upstairs (10%), sleeping (9%), jogging/running (8%), cycling (8%), talking (6%), social activities/visiting friends (6%), playing with pets (5%), playing with children (4%), laughing (4%), gardening (4%), sexual intercourse (4%), home maintenance (3%), singing (3%) and dancing (3%).

This study was designed to assess the importance of the prevalence of asthma symptoms and associated allergies and importance of occupation in asthma. Items of impairment in asthma were defined.

Materials and Methods

The clinical setting was the respiratory unit of the department of Medicine, University of Benin Teaching Hospital (UBTH), Benin City, Edo state. The patients recruited cut across the various professions in the society. A total of 3000 patients were seen in the respiratory clinic during the study period of eighteen (18) months, out of which two hundred (200) were asthmatic patients above the age of 18 years. Forty-five (45) patients were excluded from the study on account of being treated for co-morbid conditions like hypertensive heart diseases, tuberculosis etc. Thirty- five (35) declined from the study for various reasons like stigma, busy schedules etc.

The study was a cross sectional analytic case control design, involving clinical and lung function assessment. The diagnosis of asthma was made using the following criteria:

1. History of recurrent cough.
2. Breathlessness.
3. Chest tightness.
4. Wheeze.
5. Physical examination indicating asthma and or expiratory wheeze with evidence of hyper inflated lungs.
6. Lung Function tests. This includes Peak Expiratory Flow Rate (PEFR) and Forced Expiratory Volume in one second(FEV₁)
7. Reversibility test with bronchodilator, shown by improvement of at least 15% and above within 15 minutes of β_2 agonist bronchodilator aerosol inhalation.

All subjects completed the clinical asthma control questionnaires that were personally served to the subjects.

Results

The mean age of patients was 31.7 ± 12.6 . The mean body mass indices were 24 and 24.8 for both male and female respectively. Their FEV₁ and PEFR % predicted were 70.5 and 68 respectively. The prevalence of asthma symptoms were cough (100%), Chest tightness (100%), Breathlessness (95%), Wheeze (90%). Rhinitis was a prominent co allergic condition in this study. Items of impairment of asthma included running upstairs (83%), housework (55%), exercise/sports (50%), walking upstairs (49%), laughing (45%), sleeping (40%), hurrying (30%), dancing (27%), singing (19%), talking (18%), sexual intercourse (17%) etc. The provoking factors of asthmatic attack include cold weather (91%), environmental smoke (83%), home dust (75%), sports (63%), upper respiratory tract infections (55%), emotions (53%), perfume (49%), tobacco smoke (46.7%), excessive breeze (46.7%), cold water (36.7%), insecticide (29%), food (24%), hair spray (24%), animal dander (23%), walking (20%), beddings (19%), daily work (18%), drugs (15.8%), overfeeding (15.8%), alcohol (7.5%), stress (5%). The incident of asthma was higher amongst students than any other profession as revealed in Table 5.

Table 1: Patient Characteristics

Subjects (n)	120
Age (yrs)	31.7 ± 12.6
Sex (M/F)	49/71
Body Mass Index	24/24.8
Family History (Yes/No)	81.7/18.3
Associated Allergies	
Rhinitis	90 (75%)
Pharyngitis	65 (54%)
Conjunctivitis	65 (54%)
Dermatitis	36 (30%)
FEV ₁ % Pred. Pre-bronchodilator	70.5
PEFR % Pred. Pre-bronchodilator	68

FEV₁: forced expiratory volume in one second

PEFR: peak expiratory flow rate

Table 2: Prevalence of asthma symptoms

Symptoms	M	F	Total (%)
Cough	49	71	120 (100)
Chest Tightness	49	71	120 (100)
Breathlessness	49	66	115 (95.8)
Wheeze	48	61	109 (90.8)

Table 3: Items of impairment in asthmatics.

Activities	No of Patients (%)
Running Upstairs/uphill	100 (83.3%)
Housework	67 (55.8%)
Exercise/sport	61 (50.8)
Walking upstairs/uphill	59 (49.1)
Laughing	54 (45)
Sleeping	49 (40.8)
Hurrying	37 (30.8)
Dancing	33 (27.5)
Singing	23 (19.1)
Talking	22 (18.3)
Sexual intercourse	21 (17.5)
Playing with pets	16 (13.3)
Social activities	12(10)
Work activities	14 (11.6)
Gardening	11(9.1)
Mopping the floor	9 (7.5)
Bicycling	8 (6.6)
Driving	5 (4.1)
Playing with children	(0.83)

Table 4: Prevalence of Provoking Factors

FACTORS	Frequency %
Cold weather	100 (91.7)
Environmental smoke	98 (83.3)
House dust	91(75)
Sports	76 (63.3)
Upper Respiratory Trout Infection	66 (55)
Emotions	64 (53.3)
Perfume	59 (49.2)
Tobacco smoke	56 (46.7)
Excessive breeze	56 (46.7)
Cold water	44 (36.7)
Paint odor	40 (33.3)
Insecticide	35(29.2)
Food	29 (24.2)
Hair spray	29 (24.2)
Animal Dander	28 (23.3)
Pollen	28 (23.3)
Walking	24 (20)
Bedding	23 (19.2)
Daily work	22(18.3)
Drug	19 (15.8)
Overfeeding	10 (15.8)
Alcohol	9 (7.5)
Stress	6 (5)

Table 5: Job distribution of asthmatics.

Jobs	Frequency	%
Students	67	55.8
Civil servants	8	6.7
Trader	6	5
Nurse	6	5
Business	5	4.2
Doctor	3	2.5
House wife	3	2.5
Teacher	3	2.5
Clerk	2	
Hairdresser	2	1.7
Military	2	1.7
Politician	2	1.7
Anesthetic Technician	1	0.8
Architect	1	0.8
Beautician	1	0.8
Driver	1	0.8
Engineer	1	0.8
Fuel operator	1	0.8
Pastor	1	0.8
Saw miller	1	0.8

Discussion

Asthma is a dynamic heterogeneous clinical syndrome which has a number of different patterns and may progress through different stages so that all features of the disease may not be present in one patient at a particular point in time. The hyper responsiveness and airway resistance in asthma results in the symptoms such as cough, chest tightness, breathlessness and wheeze. There may be cough variant asthma in which cough is usually a dominant symptom[7], [8] and the lack of wheeze and dyspnea is a cause of diagnostic dilemma in medical practice. This report corroborates the result of our study in which all the patients experienced cough and chest tightness (100%) while 95% and 90% of the patients experienced breathlessness and wheeze respectively.

Studies have shown that >70% of asthmatics have other associated allergic co morbid conditions [4]. In this study Allergic rhinitis (75%) occurred more frequently with asthma than, Pharyngitis (54%), Conjunctivitis (54%) and dermatitis (30%). These conditions are associated with onset of worsening asthma which leads to various life activity impairments. Studies have shown that 50-100% of patients with rhinitis also have asthma [9]. Asthma and allergic rhinitis are very common co morbidities suggesting 'one way and one disease concept. The allergic rhinitis impact on asthma (ARIA) report suggest a frequent clinical association between asthma and allergic rhinitis and the detrimental impact of allergic rhinitis on asthma [10].

A combined regimen should be used to treat both upper and lower airway allergic conditions in order to avoid rhinitis complicating asthma and vice versa. Attention must be given to other less common associated allergic conditions like pharyngitis, conjunctivitis and dermatitis which may also impact negatively on the control of asthma.

Asthma has a diurnal pattern in which symptoms and peak expiratory flow measurements are worse early in the morning (morning dipping) and the sleep pattern of the patients is disturbed [7], [8]. This is a cause for concern because the patient's work done and effectiveness during the day is affected. This may lead to road traffic and home accidents with psychological and intellectual impairments. The result of this study correlated with the work of juniper *et al.*, [6] who reported that important aspects of patients

activities like going for a walk, running and walking upstairs, doing house work, hurrying, activities at work, exercising/sports, sleeping are seriously impaired.

Asthma is multi-factorial in origin arising from a complex interaction of genetic and environmental factors [11], [12]. The strong evidence of genetic contribution to asthma was revealed in this present study (81.3%) of patients had strong family history of asthma. Furthermore, the importance of environmental factors in the etiology of asthma is evident in patients who move from one environment to the other. This is because provoking environmental factors of asthma differ from one area or state or country to the other. A change to a modern, urban, economically developed society seems to be particularly associated with the occurrence of asthma [13]. However, the most important provoking factors of asthma in our environment include cold weather, environmental smoke, house dust, sports/exercise, upper respiratory tract infections, emotions, perfume, tobacco smoke and excessive breeze.

Furthermore, this study reveals the importance of patients' occupation in the etiology of asthma. Studies have demonstrated that many agents encountered in the working place may provoke or induce asthma. The reason why asthma is more prevalent among undergraduates is not so clear but may be due to the fact that they spend time in the library inhaling fungal spores and antigens from cockroaches which are more in the library and in the hostel rooms. Students who stay indoors most of the time are prone to indoor pollutants such as nitrogen dioxide (gas cookers/ kerosene heaters), cigarette smoke etc. Dirty bed sheets and rugs are other common provoking factors among students [14], [15], [16].

Conclusion and Recommendation

In conclusion, management of asthma alone will not be complete and proper if the cofactors associated with asthma are not considered and controlled or treated. The patients' understanding of asthma must be widely expanded to include these associated factors for an adequate asthma control. It is recommended that further studies be carried out to examine these findings.

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