

## Reassessment of Cases of Uncontrolled Bronchial Asthma in Port-Said Chest Hospital

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### ABSTRACT

**Background:** bronchial asthma is a heterogeneous disease 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. This definition was reached by consensus, based on consideration of the characteristics that are typical of asthma and that distinguish it from other respiratory conditions. The causes of poorly controlled asthma may lie in any of four major areas: diagnosis, medications, provoking agents, and presence of co-morbid conditions.

**Aim of the work:** this study aimed to assess causes of improper control of bronchial asthma among patients in Port-Said Chest Hospital.

**Patients and Methods:** this retrospective study was done on 100 uncontrolled asthmatic patients selected from outpatient clinic or inpatient wards in Port-Said Chest Hospital, over a period from January to May 2016.

**Results:** non-compliance and uncontrolled co-morbidities were the most common presented causes of uncontrolled asthma (55% for each), however tt improper represented 32% of cases. Other less common causes were infection, offending drug, improper diagnosis, wrong technique and resistant asthma.

**Keywords:** asthma control test, uncontrolled asthma, bronchial asthma, asthma co-morbidities

### INTRODUCTION

The responsible causes of initiating asthma are specific factors referred as allergens, which are present in the patients' surroundings originating from outdoor and indoor environment. Hence, allergens are divided into two categories; the outdoor allergens such as pollen grains, fungal spores, dust particles and non-specific irritants, and the indoor allergens such as House Dust Mites (HDMs), animal allergens, fungal allergens, insects and rodent allergens, etc...<sup>(1)</sup>.

Inadequate control of asthma continues to present a serious problem, despite advances in our understanding of the inflammatory basis of asthma and a growing acceptance of disease management guidelines. Patients with inadequately controlled asthma often have limited therapeutic options and remain at a high risk of serious morbidity and mortality<sup>(2)</sup>.

Despite advances in the diagnosis and management of asthma, surveys indicate that many patients have poorly controlled symptoms and experience frequent exacerbations. Three quarters of hospital admissions and nine out of 10 deaths from asthma are likely to be preventable. The financial impact of asthma is considerable, in large part due to the cost of asthma medications, hospital admissions and time lost from work<sup>(3)</sup>. This study aimed to assess causes of improper

control of bronchial asthma among patients in Port-Said chest hospital.

### PATIENTS AND METHODS

#### Patients:

This retrospective study was done on 100 uncontrolled asthmatic patients selected from outpatient clinic or inpatient wards in Port-Said Chest Hospital, over a period from January to May 2016.

#### Inclusion criteria

1. Patients aged > 18 years.
2. Gender: both sexes.
3. According to GINA 2014 guidelines, patient considered uncontrolled if he has 3-4 of the following symptoms:
  - Daytime asthma symptoms more than twice/week.
  - Any night waking due to asthma.
  - Reliever needed for symptoms more than twice/week.
  - Any activity limitation due to asthma.

#### Exclusion criteria

- Patients with any other chronic disease (heart diseases, liver diseases, kidney diseases and endocrinal disorders).
- Patients with upper or lower airway lung disease other than asthma.

▪ Patients with clinical signs of acute infection or inflammation in the previous 2 weeks of enrollment in study.

**METHODS**

All patients were subjected to the following:

A) Clinically

Comprehensive history taking with stress on: Personal history: especially age, gender, occupation, special habits, Past history: Of chronic diseases ex. diabetes mellitus, hypertension, ischemic heart diseases, chronic lung and kidney diseases, Drug history: betablocker, NSAIDs, ACEI, inhalers, drug allergies, oxygen, nasal spray or any other drug that patient chronically take, Family history: Bronchial asthma, allergic rhinitis,

atopic MAN, lung fibrosis and cancers and Co-morbidity: Gastro-oesophageal reflux and Allergic Rhinitis.

Comprehensive general and local chest examination with stress on: inspection, signs of respiratory exhaustion or impending failure, palpation, percussion and auscultation.

B) Pulmonary function tests: evaluation of pulmonary function tests including forced vital capacity (FVC), forced expiratory volume in the 1<sup>st</sup> second (FEV<sub>1</sub>), forced expiratory flow at 25-75% of vital capacity (FEF<sub>25-75</sub>).

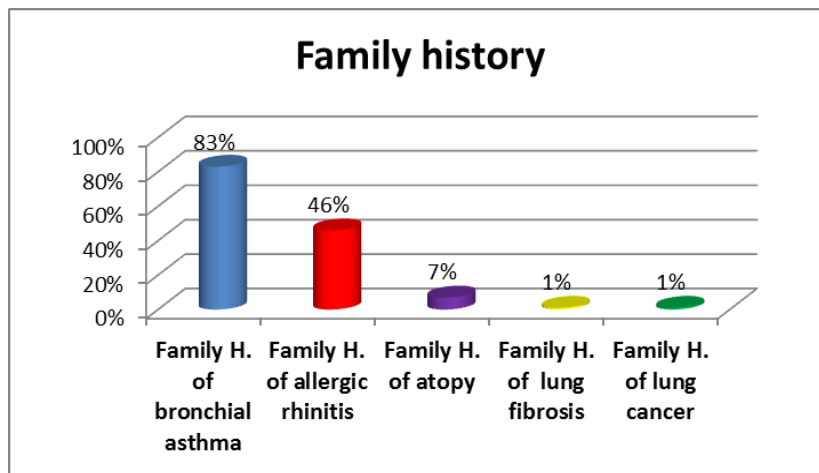
C) Chest X-ray: was done for detecting any abnormal findings which may suggest an alternative diagnosis or additional complications.

**RESULTS**

**Table 1:** family history among patients who were included in the study.

	<b>N= 100 patients</b>
<b>Bronchial asthma</b>	83
<b>Allergic rhinitis</b>	46
<b>Atopy</b>	7
<b>Lung fibrosis</b>	1
<b>Lung cancer</b>	1

This table shows that; 83%, and 46% of patients gave family history of bronchial and allergic rhinitis, respectively however a smaller percentages of the patients gave family history of atopy, lung fibrosis and lung cancer, 7%, 1% and 1% respectively.



**Figure 1:** distribution of family history among the study group.

**Table 2 :** history of CO- among patients included in the study.

<b>Co-morbidites</b>	<b>N= 100 patients</b>
<b>GERD</b>	21
<b>Allergic Rhinitis</b>	45

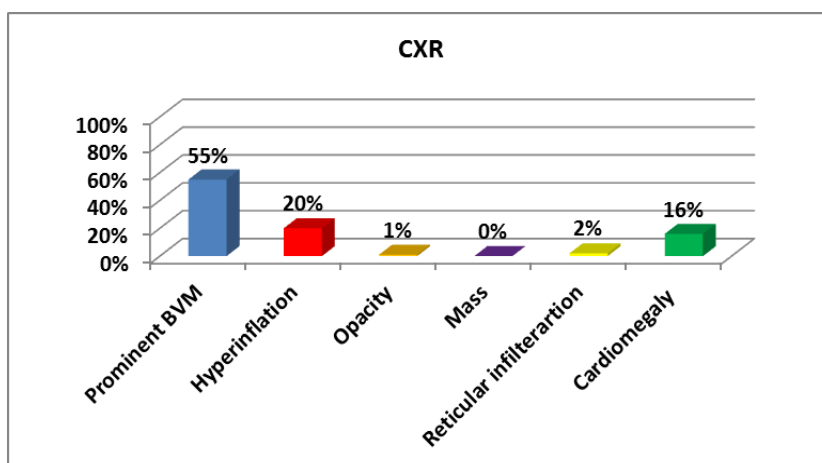
GERD: Gastro-esophageal reflux disease

**Table 3:** distribution of CXR findings among morbidities patients included in the study.

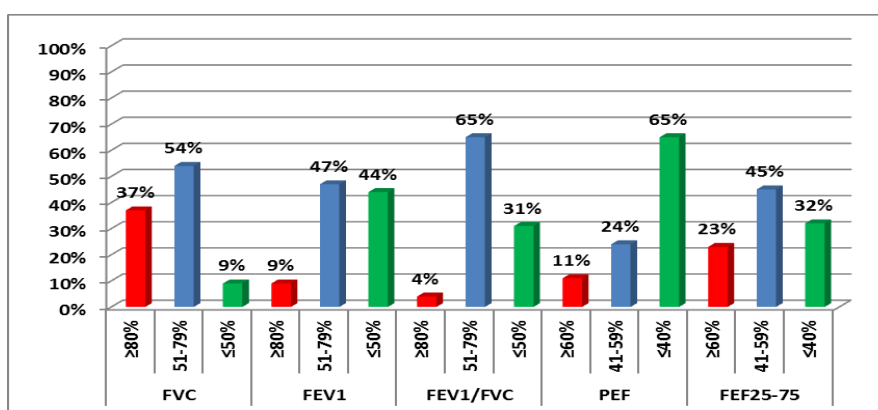
Radiological findings	N= 100 patients
Prominent BVM	55
Hyperinflation	20
Opacity	1
Mass	0
Reticular infiltration	2
Cardiomegaly	16

BVM: Broncho-vascular marking

This table shows that prominent BVM was the most common CXR findings among the studied patients (55%), followed by hyperinflation (20%), cardiomegaly (16%), reticular infiltration (2%), while no patients had lung masses.



**Figure 2:** distribution of distribution of CXR findings among the study group.



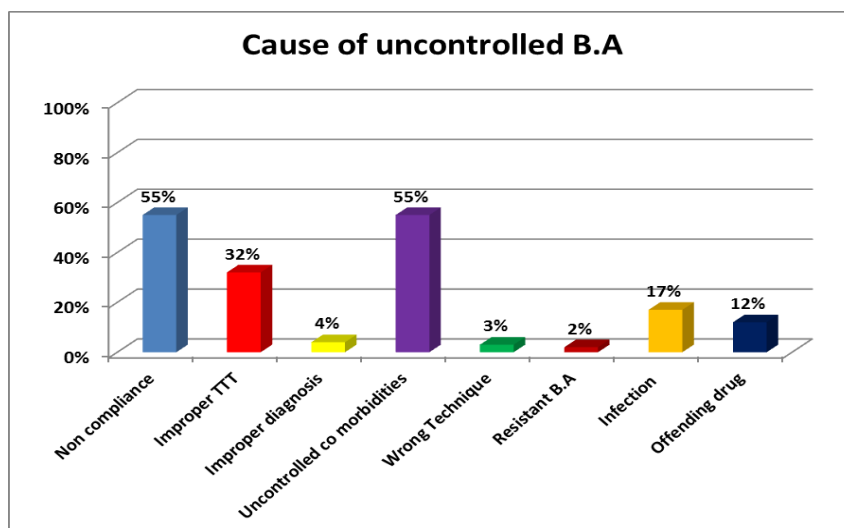
**Figure 3:** distribution of different spirometry parameters among the study group.

**Table 4:** distribution of causes of uncontrolled B.A among patients in the study.

Causes of uncontrolled BA	N= 100 patients	
Non-compliance	59	55%
Improper ttt	32	32%
Improper diagnosis	4	4%
Uncontrolled co-morbidities	55	55%
Wrong technique	3	3%
Resistant B.A	2	2%
Infection	17	17%
Offending drug	12	12%

Ttt: Treatment BA: Bronchial asthma resistant BA: Uncontrolled BA although patient is receiving proper ttt with proper dose and still uncontrolled.

This table shows that non-compliance and uncontrolled co-morbidities were the most common presented causes of uncontrolled asthma (55% for each), however improper ttt represented 32% of cases. Other less common causes were infection, offending drug, improper diagnosis, wrong technique and resistant asthma.



**Figure 4 :** distribution of distribution of different causes of uncontrolled B. A among this study group.

**Table 5:** correlation between FEV1% predicted and (chronic diseases, co- morbidities and offending drugs) among patients in this study.

	FEV1% predicted	R	p-value		
	≥80%	51-79%	≤50%		
DM	0 (0%)	4 (57.1%)	3 (42.9%)	- 0.034	0.739 NS
HTN	0 (0%)	6 (46.2%)	7 (53.8%)	- 0.114	0.258 NS
IHD	0 (0%)	2 (22.2%)	7 (77.8%)	-0.211	0.035 *
BB	0 (0%)	2 (22.2%)	7 (77.8%)	-0.211	0.035 *
NSAIDs	1 (25%)	3 (75%)	0 (0%)	0.192	0.056 NS
GERD	1 (4.8%)	13 (61.9%)	7 (33.3%)	0.052	0.608 NS
Allergic Rhinitis	7 (15.6%)	20 (44.4%)	18 (40%)	0.150	0.137 NS

DM: diabetes mellitus HTN: hypertension IHD: ischemic heart disease BB: beta blockers NSAIDs: non steroidal anti-inflammatory drugs GERD: gastro-esophageal reflux disease NS: no statistically significant difference \*: statistically significant difference.

This table shows that only patients who had IHD and patients who received B.B were the only patients who had significantly lower FEV1.

## DISCUSSION

The causes of poorly controlled asthma may lie in any of four major areas: diagnosis, medications, provoking agents, and presence of comorbid conditions<sup>(4)</sup>.

This study showed that most of the studied patients had no chronic diseases as only 7%, 13%, and 9% had DM, HTN and IHD respectively, while no one had CLD or CKD.

The present study showed that a small percentage of the studied patients received BB (9%) and NSAIDs (4%) and no one received ACEI, but regarding the controller corticosteroids inhaler there were 54% of the patients received them irregularly and 27% of the patients received nasal spray irregularly.

These findings are in agreement with those of **Barnes *et al.***<sup>(5)</sup> and **Bone**<sup>(6)</sup> who stated that oral B2 agonist should occupy a marginal role in asthma management while these findings did not agree with **Attia**<sup>(7)</sup> who found that combination of inhaled Long acting B2 agonist and inhaled corticosteroids (COMBO) were prescribed to 75% of bronchial asthma patients by their chest physicians, ICS solely were prescribed to 92.1%, oral corticosteroids were prescribed to 50% and injectable form of corticosteroids to 45.7%.

These findings did not agree with those of **Laforest *et al.***<sup>(8)</sup> who found that treatment was prescribed to 70.8% of bronchial asthma patients by their chest physicians, ICS solely were prescribed to 43.1%, oral corticosteroids were prescribed to 38% of bronchial asthma patients by their chest physicians. However, these findings are in agreement with those of **Geijer *et al.***<sup>(9)</sup> and **GINA**<sup>(10)</sup> who found that combination therapy with an inhaled corticosteroid and a long-acting B2-agonist is now a recommended treatment option in patients not controlled with a low dose of inhaled corticosteroids.

This study showed that 83%, and 46% of patients gave family history of bronchial asthma and allergic rhinitis, respectively however a smaller percentages of the patients gave family history of atopy, lung fibrosis and lung cancer (7%, 1% and 1% respectively).

**Liu *et al.***<sup>(11)</sup> analyzed 15,008 respondents aged 20 years or older with family history of asthma. They divided respondents into three familial risk groups (High, moderate and average) on the basis of the number and closeness of relatives, that they reported as having asthma and then assessed the asthma prevalence in each. They assessed associations between asthma prevalence and age, sex, race/ethnicity, income, body mass index, smoking status, household smoking exposure and physical activity (By their definitions, 2.3% of respondents were at high, 13.0% at moderate, and 84.7% at average familial risk for asthma. The crude prevalence of self-reported lifetime asthma was 11.5% among all respondents, and 37.6%, 20.4% and 9.4% among those at high, moderate, and average familial risk, respectively).

In the current study, among all risk factors, family history had the strongest association with lifetime asthma prevalence. This is in agreement with those of **Liu *et al.***<sup>(11)</sup>, they showed that a family history of asthma was an important risk factor for asthma and that familial risk assessments can help identify people at highest risk for developing asthma.

In addition, other factors and comorbidities such as GERD and rhinosinusitis contribute to poor asthma control, although the exact impact of these factors on the disease severity has not been well established<sup>(12)</sup>.

Present study revealed that 21%, and 45% of the studied patients gave history of GERD and allergic rhinitis respectively. These results are concordant with those reported by **Patel *et al.***<sup>(13)</sup>. Their study also demonstrated association of GERD and allergic rhinitis in BA patients and presenting a high-risk subgroup for poorly controlled asthma

Various studies have demonstrated that among atopic diseases, asthma and rhinitis are the ones most often seen in combination. In addition, allergic rhinitis is considered a major risk factor for the development of asthma, as has been well documented in various countries<sup>(14,15)</sup>. The prevalence of rhinitis in the patients with severe asthma evaluated in the present study (was 45%), however, was higher than that reported in the majority of studies found in the

literature. It was believed that the high prevalence in the current study can be attributed to the fact that the included patient population had severe asthma. Some studies have demonstrated that the presence of severe rhinitis in a patient with asthma is associated with a less favorable outcome. It is also possible that the presence of more than one allergic respiratory disease will lead to an allergy specialist referral. In addition, it has been shown that the treatment of nasal symptoms can be beneficial to the lower respiratory tract, reducing the number of emergency room visits and hospitalizations and limiting bronchial hyper-responsiveness<sup>(14,16)</sup>.

On the other hand, asthma and GERD frequently coexist<sup>(17)</sup>. Concomitance between symptoms of dyspnea and reflux is quite common, and large-scale studies have shown that the degree of reflux can be as much as 60% greater in those with asthma as compared to individuals without asthma<sup>(18)</sup>. In a study conducted in the United Kingdom, the prevalence of GERD symptoms among patients with difficult-to-control asthma was found to be 25%, which is comparable to the findings in our sample<sup>(19)</sup>.

In the current study, prominent BVM was the most common CXR finding among the studied patients (55%), followed by hyperinflation (20%), cardiomegally (16%), reticular infiltration (2%), while no patients had lung masses.

These findings are in agreement with those of **Kennedy et al.**<sup>(20)</sup> where BVM and reticular infiltration were present among 55% and 7% respectively and also with those of **Roland et al.**<sup>(21)</sup> where cardiomegally represented 22%. While, the present findings are in disagreement with those of **Buhl**<sup>(22)</sup> regarding hyperinflation which represented 34% in his study

In the present study, as regards spirometric parameters; 59% of the patients had FVC% predicted between 51–79%, (47%) had FEV1% predicted between 51–79%, (65%) had FEV1/FVC between 51-79%, (65%) had PEF% predicted  $\leq$ 40% and (45%) had FEF25-75% predicted between 41-59%.

Accumulating evidence suggested that a higher degree of peripheral airway dysfunction was associated with more frequent asthma exacerbations. **Rao et al.**<sup>(23)</sup> showed that

asthmatic patients with a low FEF 25-75%, had nearly 3 times the odds of systemic corticosteroid use and 6 times the odds of asthma exacerbations compared with those who had normal spirometry. The same authors concluded that low FEF 25-75%, in the setting of a normal FEV1 is associated with increased asthma severity, systemic steroid use and asthma exacerbations.

In the current study, non-compliance and uncontrolled co-morbidities were the most common presenting causes of uncontrolled asthma (55% for each), however improper treatment represented 32% of cases. Other less common causes were infection, offending drug, improper diagnosis, wrong technique and resistant asthma.

**Marincu et al.**<sup>(24)</sup> found that predictors for uncontrolled asthma were infectious exacerbation (58%), occupational exposure (52%), mixed (obstructive and restrictive) ventilatory dysfunction on spirometry (47%), persistent airway obstruction (42%), duration of disease (months) (40%), and smoking (36%).

## CONCLUSION

Uncontrolled BA is costly in terms of health care resources, decreased work productivity and frequent hospitalizations. Non-compliance, uncontrolled co-morbidities, improper treatment, infection, offending drug, improper diagnosis, wrong technique and resistant asthma represent a high-risk population group for poorly controlled asthma.

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