Assessment of Asthma Control in a Sample of Asthmatic Patients in Taif City, Saudi Arabia

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ABSTRACT

Background: asthma Control Test (ACT) Questionnaire is developed to meet the guidelines internationally accepted for asthma management by measuring adequacy and any alteration in control of asthma, occurring spontaneously or after starting asthma management. **Objectives:** to assess control of asthma in a sample of patients diagnosed as asthmatics in Taif City based on Asthma Control Test (ACT) **Methods:** fifty asthmatic patients, from those attending the out patients clinic in King Abdul Aziz Specialized hospital and chest hospital in Taif city, were included in this study in the period from July to December, 2013. Patients were subjected to: full clinical history and examination for clinical classification of the disease and to recognize controlled from uncontrolled patients; review for the treatment plan for each patient; (ACT) questionnaire was used to identify patients with poorly controlled asthma. **Results:** clinical classification of asthma showed that 20% of patients had intermittent asthma, 24% had mild persistent asthma, 32 % had moderately persistent asthma and 24% of patients got severe persistent asthma. According to ACT only 24% of patients were controlled, while the rest of patients 76% were considered uncontrolled. **Conclusion:** ACT was found to be a reliable tool for assessment of uncontrolled asthmatic patients when implemented in Taif city. **Recommendations:** conduct more studies in different geographical areas to assess effectiveness of the AST questionnaire in different situations and different asthmatic patients.

Keywords: Asthma, Asthmatic Patients ,Taif City.

INTRODUCTION

Asthma is an inflammation in the lung airways affecting the sensitivity of the nerve endings leading to easy irritation in these airways. During the attack, swelling of the airway linings occur leading to narrow airways and reduction in air entry to and from the lungs. [1] Asthma could start in any age but it usually starts in childhood. The disease is manifested by episodes of shortness of breath and wheezing varying in frequency and severity from a patient to another. [2]

Asthma is not a curable disease, but it is can be controllable as regard symptoms. As asthma changes from time to time, it is mandatory to adjust treatment to sign and symptoms of the disease. [3] Improving health status of asthmatic patients require close monitoring by proper history taking, physical examination and repeated follow up by pulmonary function testing to classify the degree of the disease. [4] Asthma is classified according to severity into intermittent, mild, moderate or severe persistent. [5] The best management for asthma is by detecting the triggering factors which precipitate an asthma attack and eliminating exposure to them. These triggers include; air pollution, a contact with a pet, tobacco smoke, sulfite-containing foods, certain drugs as aspirin and non-selective beta-blockers. If triggering factors were avoided and the patient still has symptoms, drug therapy must be started. Asthma management is planed according to the type and degree of asthma. [6]

Clinical classification of severity of asthma is done according to frequency of symptom, symptoms by night time, predicted $\%FEV_1$, variability in FEV_1 and frequency of short acting beta two agonist usage in order to control symptoms as in table (1). [5] Lung function measurements together with bronchial hyper responsiveness may play an important role to evaluate the effect of inhaled corticosteroids (ICS) and other controller medications in asthmatics.[7]

Asthma Control Test (ACT) questionnaire is developed to meet asthma therapy guidelines; it measures both adequacy and any change in control of asthma symptoms, whether occurring spontaneously or after drug therapy. The questions required to assess control of asthma

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include: symptoms occurring by day and night, limitation of activities, caliber of the airways and the use of rescue medications. The top five symptoms include: symptoms awaking the patient by the day time, symptoms awaking the patient by the night time, daily activity limitation and difficulty in breathing together with occurrence of wheeze. Daily rescue bronchodilator use should be included. [8]

Spirometry with post bronchodilator response should be obtained as the primary test to establish asthma diagnosis; asthma signs differ in severity according to presence or absence of acute attack and its severity. We can classify asthma severity and make the treatment plan according to it. Drugs used for asthma therapy are classified into two main categories: the first is the quick-reliever medications (short acting medication) used to treat acute symptoms; they include short acting beta$_2$- agonists (SABA) as salbutamol, which is the first step in management of symptoms of asthma. Short-acting muscarinic antagonist (SAMA) medications as Ipratropium bromide. Patients with occasional attacks, no other medication are needed. The second class medication is the controller medications (long-acting medications) used to prevent exacerbation in mild asthma as low-dose ICS may be received one or two times per day, according to severity of symptom as Fluticasone propionate metered dose inhaler. [9] Inhaled steroids are the best effective therapy for prolonged asthma control. Patients suffering from daily attacks should receive large doses of ICS and those with severe asthma, oral steroids may be needed. [10]

Long acting beta agonists (LABA) have a prolonged action about 12 hours; they are combined with ICS in patients with uncontrolled symptoms. Long-acting muscarinic antagonist (LAMA) as Titropium, are alternative options to combine with ICS in patients having moderate or severe symptoms. [11] Antileukotrienes as *Montelukast* or zafirlukast can be used instead of ICS, but not preferred. Antileukotriene drugs can also be added to ICS but LABA are better. [12]

Unresponsive asthmatics to combined controllers and relievers can receive special type of treatment as anti IgE immunoglobulins and thermoplasty as Anti-IgE antibodies (Omalizumab) which block the binding of IgE to mast cell-membrane receptors, with inhibition of the release of mediators [13].

Thermoplasty of the bronchi is a procedure performed via bronchoscope after sedation of the patient in the outpatient clinic; it delivers heat into the airways via Alair System to decrease the thickness of smooth muscles which constrict in the acute episode and consequently improving symptoms [14].

AIM OF WORK

1- To assess control in asthma symptoms in a group of asthma patients in Taif City based on asthma control test (ACT) questionnaire.

2- To improve quality of life and health status in those patients.

PATIENTS AND METHODS

Patients: the current study was carried out on 50 patients subjects attending the out patients clinics in King Abdul Aziz Specialized hospital and chest hospital in Taif city in the period from July to December, 2013. Asthmatic patients were classified into intermittent, mild, moderate and sever persistent asthma by history taking, physical examination and pulmonary function tests detected from patient's records and diaries.

Each patient signed a written consent to participate in the study.

Patients were subjected to the following:

I. Full history taking and clinical examination to recognize controlled patients from uncontrolled: We asked the patients about the presence of any of the symptoms of asthma including chest tightness, coughing, wheezing or difficulty in breathing , and if the symptoms were increased by night or in the morning, due to exposure to triggers as cold air, exercise, perfumes, fumes, certain types of food or dust. Some asthmatic patients complain of gastro-esophageal reflux disease and sleep disorders [15].

II. Review for the treatment plan for each patient by asking about drug therapy for asthma, if inhaler or oral. Patients were also asked about the use of controller medications. Drug therapy of coexisting disease had been obtained from patient diaries.

III. ACT questionnaire assesses frequency of symptoms of asthma, reliever medications usage, affection of daily activity by asthma symptoms and patients assessment of control of asthma. The scale had 5-points 1=symptoms occurring all the time and 5= not occurring at all; the rate of control of asthma is assessed as follows: 1= the patient is not controlled and 5= the patient is controlled, so the score ranges from (5) with minimal asthma control to (25) with perfectly controlled asthma, so that higher scores reflects better control of asthma, scores greater than 19 means that the patient had good control of asthma. [16]

We asked the patients the following questions:
1-   How many times your symptoms prevented you from going to school or work in the last 4 weeks? (Limitation of daily activities).
2-   How many times you got difficulty in breathing in the last 4 weeks? (Shortness of breath).
3-   How many times your symptoms woken you up in the night time or early in the morning? (Symptoms awaking the patient by night time or in the early morning).
4-   How many times you used reliever medications in the last 4 weeks? (Symptoms awaking the patient by night time or in the early morning).
5-   How can you rate your control of asthma in the last 4 weeks? (Rating the control of asthma in the last 4 weeks).

IV-Patient education:
We checked if the patient has had the following information:
• Know about the nature of the disease which is important to keep them adherent to treatment for life as it is a chronic disease similar to diabetes and hypertension, so it is controlled by medication and avoidance of trigger factors as exercise, cold air, fumes, and perfumes, certain types of dust or food but never cured. They should know how to avoid these triggers to prevent the asthmatic attacks.
• Know the differences between the controller medications which are used to reduce the occurrence of the attacks and reduce inflammation of the air ways and decrease the occurrence of future exacerbation and the rescue

or reliever's medications which are used during asthma attack to treat acute symptoms

• The patients should receive steroids in the early morning to coincide with the natural release of cortisone from the adrenal glands to minimize the occurrence of Cushing's syndrome and decrease the incidence of adrenal suppression [17].

• The beliefs of asthmatic patients was the most important challenge in asthma management, as most patients refuse to use the inhalers because of the fear of getting use of them or because of their side effects. Some patients prefer the oral or parental drugs. We convinced the patients to use inhaler drugs as they reduce the adverse effects of prolonged medications which should be taken for long life for their anti-inflammatory effect, and these drugs are directly delivered to the lung in micrograms with minimal side effects on other organs, while the oral drugs have many side effects and they are delivered in milligrams.
• On the other hand patients should learn to use very short courses of oral steroids in sever attacks and discontinue the oral route after improvement and shift to the inhaled route.
• Patients were asked if they can use inhaler medications in a proper way, using these drugs with a spacer device and making proper techniques reduce oropharyngeal deposition and maximize the delivered powder into the lung for better response. [18]

V- Statistical analysis: Results were analyzed by statistical package for social sciences (SPSS) Data were expressed as mean ± SD and percentage.

RESULTS
Fifty female asthmatic patients were included in this study, their ages ranged from 20-59 years 1.2±13.9); they were detected from those attendants at the outpatient's clinic in King Abdul Azeez and chest hospital in Taif city.
Clinical classification of asthma showed that 20% of patients had intermittent asthma, 24% of patients had mild persistent asthma, 32 % of patients had moderately persistent asthma and 24% of patients got severe asthma (table 2 and figure 1).
As regard medications only 33% of patients used controller medications in the form of ICS and

long acting bronchodilators as Salmeterol, Seretide, Symbicort, Foradil, Meflonid and Pulmicort inhalers, while 67% of patients received other medications in the form of rescue medications as short acting bronchodilators (salbutamol) and anticholinergics (Ipraproprium bromide) (table 3 and figure 2).

According to ACT questionnaire only 24% of patients were controlled with more than 19 score, 90% of them were treated by controller drugs. 76 % of patients were considered uncontrolled with less than 19 score, of these uncontrolled patients, 85% were receiving rescue medications (table 3 and figure 3).

DISCUSSION

Asthma is a common disease. It is related to increased morbidity in the population manifested by school or work absenteeism and unscheduled hospital admission, so it is important to know why asthma control is defective with poor quality of life. [10] Self-assessment of asthma and a stronger doctor-patient relationship can improve asthma outcomes. [19]

For the purpose of improving health status and quality of life in patients with bronchial asthma in Taif city, Asthma Control Test (ACT) questionnaire was done on asthmatic patients attending the outpatient's clinic in King Abdul Aziz and chest hospitals after a period of re-evaluation of symptoms and treatment. Drug information was checked from patient's diaries.

The results of this study were similar to the results of *Patel et al.* [20] who studied a randomized, comparative study for assessment of the safety and efficacy of controller drugs as ICS and LABA as drug therapy of moderate and severe attacks. They found that controller medications made a significant improvement in pulmonary functions and symptoms of asthma.

Same results were obtained by *kim et al.* [21] who deduced that inhaled Budesonide in a dose of 800 µ g daily improved symptom scores significantly, rate of acute attacks of asthma, pulmonary function tests and bronchial hyperresponsivness as assessed by challenge of asthmatic children aging between 2 and 5 years old with cold air. These results were explained by *Peter and Barnes* [22] who suggested that steroids switch off genes of inflammation through recruiting the nuclear enzyme histone deacetylase-two which make the activated site responsible for initiation of gene inflammation (the activators of this enzyme), might have anti-inflammatory effects. It also stimulates steroid anti inflammatory action.

The results of _Mary et al. [23] were also in accordance to our results, they studied the Correlation between asthma control and quality of life in patients with moderate and severe asthma and concluded that about 50% of the patients had partially controlled or uncontrolled asthma, with significant impact on quality of life, they observed a high concordance in the assessment of asthma control through ACT and GINA criteria, as well as a good agreement between the assessment of asthma control and quality of life which encourage the importance of routine use of assessment instruments for asthma control and quality of life in clinical practice.

In contrast to our results, **Tantisira *et al.*** [24] studied genetics of steroids in asthma and found that there is no change in annual asthma exacerbation rates with improvement in controller use, thereby on quality of life .

As regard quality of life there was a strong relation between control of asthma and quality of life, as controlled subjects had minimal symptoms. 24% of our patients were controlled according to ACT questionnaire; they recorded more than 19 score with the least symptoms, absenteeism from work or school and use of rescue medications. Our results were in consistence to the results of *Jaime et al.* [19] who assessed asthma severity, medication use, asthma control, and patient enablement in patients with asthma treated in primary care and studied the relationship between these variables and quality of life, he they found a strong correlation between control of asthma and quality of life.

Our results were in harmony with the results of **Thomas et al.** [14] who assessed the health-related quality of life, they used St. George's respiratory questionnaire in asthmatics treated by inhaled steroids and deduced that there was an early improvement in quality of life in patients treated with fluticasone with moderate and severe persistent asthma.

Also, **Rutherford et al.** [25] found that there was improvement in health-related quality of life with budesonide, fluticasone propionate and beclomethasone dipropionate in adults with

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severe asthma.

Similar results were obtained by **Ohshima et al.** [26] They explained that, adding leukotriene antagonists to inhaled steroids to improve quality of life in asthmatic patients surveyed in suburban area decreased the number of visits to emergency rooms by complementing the anti-inflammatory effect of inhaled steroids with other anti inflammatory drugs.

Concerning patient education, most patients had misconception about the nature of the disease, triggering factors and medications as regard type of treatment, proper use and timing of the drugs. We checked this information and made a plan for educating ignorant patients hoping to get proper control of the disease and improving quality of life in these patients. The same work was done by *Hamdan et al.* [27] **who found that** improper education for asthma patients is a major cause of inability to use inhaler devices. They deduced that asthma education programs for asthmatic patients can improve the use of inhaler devices and treatment outcomes. Similar results were obtained by *Tony et al.* [28] who studied the importance of considering patients' health education when clinicians communicate with asthma patients and found that baseline health education influences subsequent control of asthma and quality of life.

CONCLUSION
ACT questionnaire is a reliable tool for assessment of uncontrolled asthmatic patients. Controller medications together with patient education can control symptoms and improve quality of life in asthmatic patients

RECOMMENDATIONS
Conduct more studies in different geographical areas to assess effectiveness of the AST questionnaire in different situations and different asthmatic patients.

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Table 1: Clinical classification of asthma. [5]

Severity in patients ≥ 12 years of age	Symptom frequency	Night symptoms	Predicted %FEV$_1$	Variability in FEV$_1$	Beta$_2$ agonist for symptom control
Intermittent	≤ 2 / week	≤ 2 / month	≥ 80%	< 20%	≤ 2 days / week
Mild persistent	> 2 per week not Every day	3–4 /month	≥ 80%	20–30%	> 2 days/week not daily
Moderate persistent	Daily	> 1 / week not nightly	60–80%	> 30%	Every day
Severe persistent	All the day	Frequent (every day /week)	< 60%	> 30%	Many times / day

Table 2: Classification of severity of asthma

Number of patients	Age in years (mean ± SD)	Type of asthma			
		Intermittent asthma	Mild persistent	Moderate persistent	Severe persistent
50	41.2±13.9	20%	24%	32%	24%

Table 3: Medication of patients

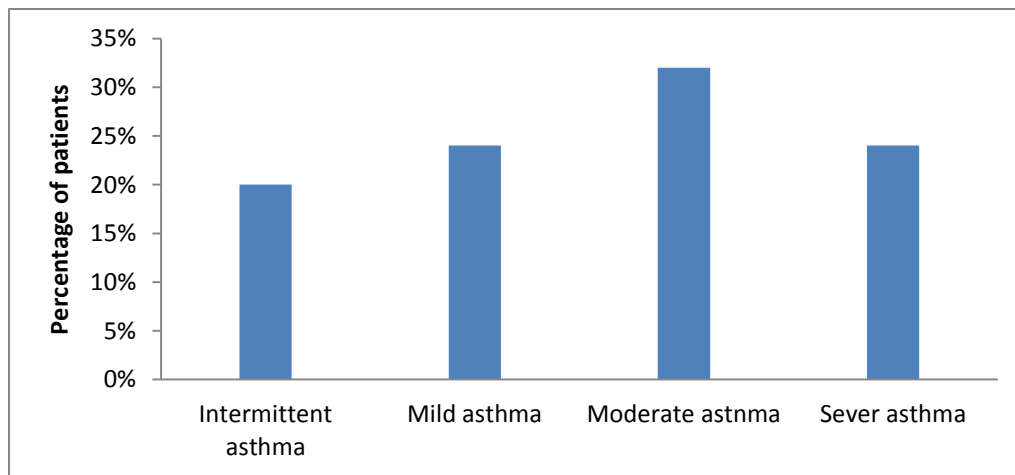| Use of rescue medication	Use of controller medication	Uncontrolled patients	Controlled patients
67%	33%	76%	24%

Figure (1): Clinical classification of severity of asthma in Taif City
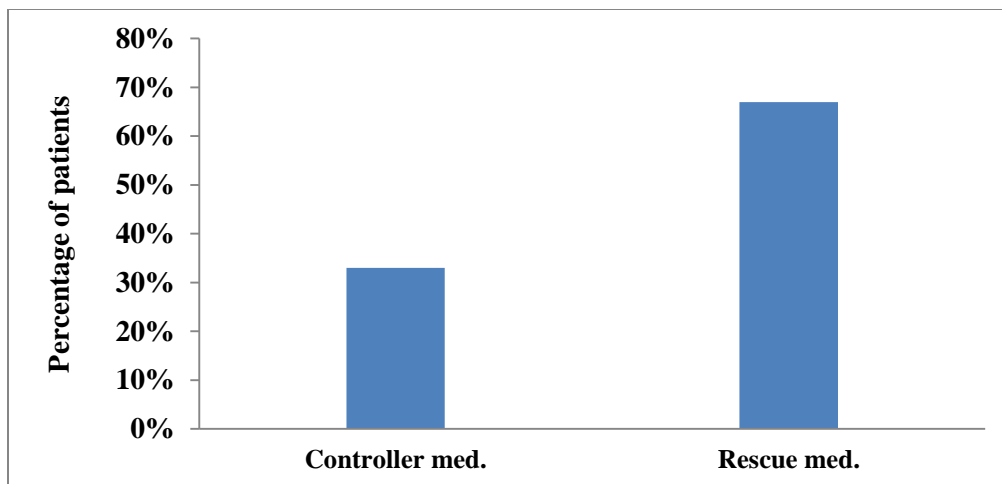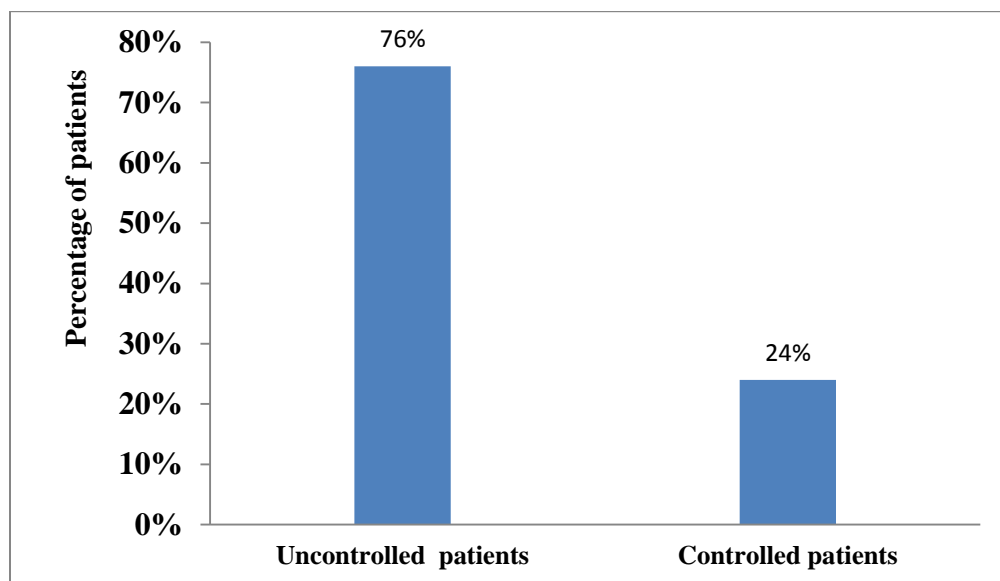
Figure (2): Percentage of patients according to medication

Figure (3): Percentage of patients according to ACT score