The Prevalence of Smoking among sample of Kuwait Asthmatics and its impact on the response of the treatment

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Cite this article: The Prevalence of Smoking among sample of Kuwait Asthmatics and its impact on the response of the treatment, Anna Pul and Crit Car Med. 2018; 1(2): 001-002.

Submitted: 3 June 2018; **Approved:** 28 June 2018; **Published:** 29 May 2018

ABSTRACT

Background: Bronchial asthma is one of the most common diseases in Kuwait. Smoking also is on the rise in Kuwait. We therefore conducted this study to at prevalence of smoking among sample of Kuwaiti patients and the impact on asthma control.

Methods: Descriptive study of 50 outpatients who were prospectively assessed from single center (Al-Jahra hospital) that diagnosed recently as bronchial asthma using American Thoracic Society/European Respiratory Society (ATS/ERS) criteria definitions of asthma between the period of 1st of April and 20th may 2013.

Patients were divided into two groups: group A smokers and group B non smokers. Pulmonary function test using spirometer and asthma control test (ACT) was done for every patient at the time of visit and after 4 weeks to determine the effect of smoking on asthma control as a primary outcome using GINA guidelines definition for Asthma control and treatment

Results: At study entry 30% of sample size were smoker asthmatics. Smokers showed worse symptoms of wheezing, cough, and shortness of breath compared to non-smokers asthmatics whereas non-smokers asthmatics were more likely to have seasonal symptoms and use salbutamol MDI. Both groups showed similar spirometry findings at study entry. At 4 weeks from the first visit there was a significant difference in symptoms and signs of bronchial asthma between the 2 groups. Both measures of asthma control test and spirometer results favored non-smokers. Smokers asthmatics were more likely to use rescue salbutamol MDI and non-compliant. No hospital admissions or acute exacerbations during the period of the study.

Conclusions: Smoking was associated with worse asthma control and poor compliance among asthmatics.

INTRODUCTION

Asthma, a common and chronic disease of the airways, that is phenotypically, and heterogeneous disorder of multifactorial origins. It involves both genetic and environmental factors. It is increasing in incidence and prevalence in the world to the stage called asthma epidemic. Asthma affects 300 million people suffering from asthma and more than 250,000 asthma-related deaths each year [1]. Smoking is a known trigger factor for asthma exacerbations. In the large Swedish study of 15813 adults, it was found that smoking could be associated with increased incidence of adult onset asthma [2]. Moreover, evidence exists of genetic-environmental linkage between asthma and smoking [3]. Asthmatics who smoke are a growing health concern especially among adolescents [4]. Smoking in Kuwait is a major health concern with nearly 34.5% of the population is smokers [5]. Also, among 664 Kuwaiti male university students 50% of them were smokers at the time of graduation, which signals a rising young generations to be smokers [6]. Many of the asthmatics in Kuwait are smokers either actively or passively. Asthma in Kuwait according to health officials is 25%. Many factors contributed to rising asthma in Kuwait besides smoking. In one study with 13 years follow up of 2066 Kuwait post-Iraqi invasion in 1990, war-related trauma was associated with asthma [7]. Also Kuwait hot, and dusty weather contributed to asthma related morbidity that was demonstrated in one study [8]. A Kuwait 1991 oil fire was also found to be a possible contributor factor [9]. Given the high prevalence of asthma in Kuwait and also the rising number of smokers, we have conducted this study to look at the prevalence of smoking among sample of Kuwait asthmatics and the impact of smoking on asthma control among smokers compared to non-smoking asthmatics.

METHODS

Data were derived from single center Al-Jahra hospital in Kuwait. Al-jahra hospital is public tertiary hospital with 870 beds. We have used the outpatient respiratory clinics (3 outpatient clinic per week with more than 80 patient per week) using patient based questionnaire survey for 50 Kuwaiti outpatients who are prospectively assessed were newly diagnosed as bronchial asthma between April 1st and May 20th, 2013. Chest physician diagnosis, depending on history taking, clinical, radiological, pulmonary function tests, and ATS/ERS criteria of asthma spirometry definition were used for diagnosis of asthma [10]. Global Initiative foe Asthma (GINA) guideline was the standard of asthma care and treatment followed in this study [11]. None of the patients were on regular controller inhaler.

The 50 outpatients were prospectively assessed and divided them into two groups:

Group A newly diagnosed asthmatics, Kuwaiti patients who are active smokers and divided into males and females as follows:

1) 15 males, Kuwaiti smokers with bronchial asthma
2) 10 females, Kuwaiti smokers with bronchial asthma

Group B newly diagnosed bronchial asthma, Kuwaiti, non-smokers and divided into males and females as follows:

1) 15 females, Kuwaiti, non smokers with bronchial asthma
2) 10 males Kuwaiti non-smokers with bronchial asthma

Age range for both groups was between 35 years to 60 years old. Questionnaire included demographic data, symptoms, medications, asthma control test, and spirometry was used for every patient, Asthma Control Test, pulmonary function tests using spirometer done at the first visit and after 4 weeks in the second visit. Respiratory therapist did spirometry, and interpretation done by an independent chest physician

RESULTS

Demographic data showed that 60% (15 patients) of smoker asthmatics were males and 40% (10 patients) was females. Non-smokers asthmatics were 60% (15 patients) females and 40% (10 patients) was males. Both groups were in the same age groups between 30-60 years (Table 1). At study entry smokers showed worse symptoms of cough (60%), dyspnea (80%), wheezes (64%), and uses rescue salbutamol inhaler compared to non-smokers who suffered from cough, dyspnea, and wheezes at 32%, 24%, and 24% respectively. Non-smokers asthmatics tend to have more seasonal symptoms and were more compliant on treatment prescribed by general practitioner in the form of rescue salbutamol metered dose inhaler (Table 2). At 4 weeks, smokers due to low compliance rate (24%) showed more pronounced symptoms of cough (48%), dyspnea (48%), wheezes (64%), and

high rate of use of rescue inhaler (72%) compared to nonsmokers who showed improvement in their symptoms of cough (16%), dyspnea (24%), wheezes (16%), and tend to use less rescue inhaler (8%) due to 84% of them were compliant on controller treatment (Table 3). Spirometry results at the study entry were comparable for both groups in the term of FEV1, FEV1/FVC and both were in the mild-moderate obstructive airway disease categories (Table 4). At 4 weeks smoker asthmatics persisted in the range of moderate obstructive airway disease, whereas non-smokers were upgraded to mild obstructive airway disease (Table 5). This is likely the result of smoking, and non-compliant effect among smoker asthmatics. Generally, Asthma control is significantly worse in asthmatics that smoke compared with never-smokers, with all symptoms related to asthma control uniformly worse in smokers, independent of FEV1.No exacerbation-requiring hospitalization recorded among patients due to the short-term follow up.

DISSCUSION

In this study we have described 50 outpatient asthmatics in which smoking poses a continuing health hazard among them that contributed to persistent subjective symptoms of asthma, and objective non-improvement in lung function. 30% of our study patients were smokers, and strikingly 40% of smokers were females. This high is going with other international data. In March 2001, the Office of the US Surgeon General released a long-awaited, detailed report called Women and Smoking, along with this statement: "When calling attention to public health problems, we must not misuse the word "epidemic." But there is no better word to describe the 600-percent increase since 1950 in women's death rates for lung cancer, a disease primarily caused by cigarette smoking. Clearly, smoking-related disease among women is a full-blown epidemic". According to the Centers for Disease Control and Prevention (CDC), smoking-related diseases cause the deaths of nearly 174,000 women in the United States each year. On average, women who smoke die 14.5 years sooner than non-smokers. Also we found that smoker asthmatics tend to be less compliant on treatment as 76% of smokers were non-compliant compared to only 16% of non-smokers. The large percentage of compliance among non-smokers (84%) was higher than many international data. In the European Community Respiratory Health Survey study [12], median compliance was 67%, and varies between 40% in USA to 78% in Iceland. In Kuwait we need longer duration of study and larger number of patients to assess the long-term compliance and whether it will persist at this high rate or not. Using modern technologies may increase compliance among asthmatics especially smokers as demonstrated that daily SMS reminder increases treatment adherence among asthmatics [13]. Cigarette smoking has special meaning for persons with asthma. In asthma, allergic inflammation of the bronchial tubes causes mucus production, leading to cough and phlegm. In long-term cigarette smokers, chronic inhalation of smoke from burning tobacco leaves also stimulates the mucous glands in the bronchial tubes to make excess mucus, giving rise to daily cough with phlegm. In asthma, spasm of the muscles surrounding the bronchial tubes and swelling of those tubes makes breathing difficult. Some cigarette smokers develop irreversible narrowing of their bronchial tubes from inflammation and scarring, causing permanent breathing problems. Persons with asthma who smoke cigarettes are in "double jeopardy": they risk episodes of breathing difficulty due to asthma on top of everyday shortness of breath from the cigarette smoke-induced lung diseases, Chronic Obstructive Pulmonary Disease (COPD). Of interest, most adults who experience the new onset of asthma after age 50 have a past history of cigarette smoking. In people with asthma, this can result in overlapping of COPD symptoms with those of asthma, which can delay the diagnosis of COPD and complicate management. It is well established that smoking affects controller medication efficacy as demonstrated in one study that smoking reduces inhaled corticosteroids efficacy [14]. In asthmatic patients who smoke, disease control is poorer than in asthmatic nonsmokers. Of all forms of smoking, maternal exposure seems to have the largest impact on asthma by increasing the frequency and severity of the disease and decreasing lung function. Asthmatic children exposed to multiple household smokers face an increased risk for respiratory illness-related absences from school, and these effects persist during adolescence but weaken during adulthood. Airway mucosal permeability is increased in smokers, which could lead to increased clearance of Inhaled Corticosteroids (ICSs) from the airways. Smokers also have decreased histone deacetylase activity, which is necessary for corticosteroids to fully suppress cytokine production, and can lead to corticosteroid resistance [15]. It has been demonstrated that inhaled corticosteroids are much less effective in asthmatic smokers. The mechanism of corticosteroid resistance in smokers with asthma is currently unexplained but could be due to alterations in airway inflammatory cell phenotypes, changes in glucocorticoid receptor α to β ratio, and reduced histone deacetylase activity. Cigarette smoking also increases the clearance of drugs such as theophylline by induction of metabolizing enzymes. Alternative or additional treatment to inhaled corticosteroids may be required for individuals with asthma who are unable to stop smoking or who have persistent symptoms following smoking cessation [16]. Most smokers are believed to take their asthma medications in the place in which they smoke, and some of them report delivering the inhaled drug just after the last cigarette puff. This behavior raises the possibility that drug particles might interact with particulate matter present in smokers' airways due to passive smoking or residual tobacco smoke (mainstream tobacco smoke polluting the lung after the last puff). The conglomeration of aerosol particles is a well-known physical phenomenon that takes place very quickly and results in an increase in particle diameter. In order to verify such a possibility, the fluticasone dry powder aerodynamic profile was studied in the presence of clean air or passive smoking; when delivered in the presence of cigarette smoke, a 15% increase in particles sized ≥ 3.00 μm was observed compared to the aerodynamic profile of the drug in clean air. The results of the survey concerning place and timing of smoking/inhaled drug actuation showed that most smokers smoke at home, and actuate the inhaler in the room in which they have smoked. Moreover, 50% of smokers deliver the drug during the first 20 min after smoking, and 22% within 5 min after the last cigarette. None of the smokers had received suggestions from their doctor regarding smoking/inhaler timing and place. These results indicate that ICSs delivered in the presence of tobacco smoke undergo changes in aerodynamic profile, leading to a possible decrease in the percentage of respirable particles [17]. This phenomenon could be one of the explanations for the steroid resistance demonstrated in asthmatic smokers. Smokers should be advised to actuate their ICSs after a reasonable time from their last cigarette puff, and should take care to avoid drug inhalation in environments polluted by passive smoking. Limitation of this study includes single center recruitment, small number of patients, and short period of follow up. Despite these limitations the results are comparable to previously reported studies examining effects of smoking on asthma control [18-19]. This study also stratifies the urgent need for specialized smoking cessation programs and regulations in Kuwait as smoking cessation is an important component of any disease and is associated with reduced mortality. Nicholas R. Anthonisen et al found in a clinical trial that Smoking cessation programs substantially reduce mortality even when only a minority of patients stop smoking among 5887 smokers with airway obstruction [20]. Also, in an interesting study, Phillip Antenessen and colleges demonstrated that Smoking cessation rather tan smoking reduction resulted in a marked decrease in three biomarkers of cigarette smoke inhalation and improved asthma regulation, whereas smoking reduction had a less pronounced effect on biomarkers and only a small effect on asthma regulation [21].

CONCLUSION

Smoking affects bronchial asthma symptoms and declines the pulmonary function tests. Our study confirms that asthmatic smokers shows resistant of their asthmatic condition regarding their symptoms control and pulmonary function tests in comparison to asthmatic nonsmokers who improved and were compliant on medications. Smoking cessation programs urgently needed in corporate with assessment of asthma symptoms and pulmonary function tests. Also public health education required to increase treatment adherence.

Table 1: Demographic Data

	Asthmatic smokers	Asthmatic non smokers
Number	25	25
Age (mean yrs)	35-55	31-60
Gender Males: females	15(60%) 10(40%)	10(40%) 15(60%)
Nationality	kuwaiti	Kuwaiti

Table 4: Spirometry at entry of the study for both groups

Item	Asthmatic smokers	Asthmatic non smokers
FEV1/FVC	Mean(70%-80%)of predicted	Mean(66%-80%)of predicted
FEV1	Mean(65%-75%)of predicted	Mean(62%-77%)of predicted
FEF25%	Mean(40%-60%)	Mean(41%-55%)
FEF50%	Mean(33%-45%)	Mean(30%-40%)

Table 5: Spirometry at 4 weeks for both groups

Item	Asthmatic smokers	Asthmatic non smokers
FEV1/FVC	65%-75%	75%-82%
FEV1	63%-75%	78%-85%
FEF25%	35%-55%	47%-66%
FEF50%	35%-54%	50%-65%

Table 2: Subjective symptoms among smokers and non-smoker asthmatics at entry of the study

Symptoms	Asthmatic smokers	Asthmatic non smokers
Cough	15(60%)	8(32%)
Wheezes	16(64%)	6(24%)
Shortness of breath	20(80%)	6(24%)
Seasonal symptoms	2(8%)	10(40%)
Uses of rescue medications	5(20)	
Admission to the hospital because of bronchial asthma	0	0
Compliance	4(16%)	21(84%)

Table 3: Subjective symptoms among smokers and non-smoker asthmatics at 4 weeks of the study

Symptoms	Asthmatic smokers	Astmatic non smokers
Cough	12(48%)	4(16%)
Wheezes	16(64%)	4(16%)
Shortness of breath	12(48%)	6(24%)
Seasonal symptoms	2(8%)	10(40%)
Uses of rescue medications	18(72%)	2(8%)
Admission to the hospital because of bronchial asthma	0	0
Compliance on medications	6(24%)	21(84%)

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