Original Article

Impact of Adherence to Asthma Management Guidelines in Asthmatic Patients: A Primary Healthcare Center Study

Samia Salem Al-Musallam[1], Fotooh Ahmed Al-Jariky[1], Asia Saad Alhamdan[2], Jassim MA Ibrahim[3], Seham Ahmed Ali[4]

[1]Khaldiya Clinic, Primary Health Care Center, Kuwait
[2]Faiha Clinic, Primary Health Care Center, Kuwait
[3]Department of Pediatrics, Mubarak Al Kabeer Hospital, Kuwait
[4]Department of Statistics, Kuwait University, Kuwait

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ABSTRACT

Objective: To study the effect of adherence to asthma management guidelines on the control of asthma symptoms and the results of peak expiratory flow rate (PEFR) in asthmatic patients

Design: Cross sectional study

Settings: Asthma clinic at Khalidiya Health Care Center

Subjects and methods: A convenience sample of 162 asthmatic Kuwaiti patients aged between four and 83 years were interviewed through a structured questionnaire.

Results: Out of 162 patients, 140 participants (86.4%) reported not using controller medication. One hundred and five participants (64.8%) fit in the category of uncontrolled asthma. Only 21 participants (13.0%) were on controller medication prior to the study. All participants who were on controller treatment, got their prescription by a specialist. The difference between the two proportions was significant at $p < 0.0001$. Of the 162 participants, only 28 cases (17.3%) did not require alteration of their management plan. The remaining 134 participants required changes to their original management plan either by adjusting the dose of their medication or adding controller medication in the form of separate or combined therapy.

There was a significant improvement in the PEFR after applying the new management plan with median of actual PEFR 350 in comparison to 390 two weeks later, after applying the new management plan ($p < 0.001$).

Conclusion: Despite evidence that adherence to asthma management guideline improves outcome, general practitioners are reluctant to prescribe controller medication.

KEY WORDS: asthma, controller medication, general practitioners, guidelines

INTRODUCTION

Asthma is a severe and sometimes fatal and chronic disease affecting a large proportion of the population[1]. It represents a significant health risk and public health burden in the United States. According to data from the national health interview survey, 10.2 million adults in the United States had asthma in 1996. By 2000, that number had increased to 14.7 million[2].

Western Europe has some of the highest prevalence rates of asthma in the world. Among children, the regional average is 13.0%; in adults the prevalence is lower (8.4%)[1]. Furthermore, according to data from the population-based surveys there has been a 2 - 4% annual increase in asthma prevalence rates in most European countries over the past 15 years[1].

Data in Kuwait shows that 18% of the population suffers from asthma manifestation[3]. Kuwait is ranked 13th among 56 countries in the prevalence of symptoms of asthma in children[4].

The primary mechanism for combating this well recognized increase in the prevalence of asthma has been the development of guidelines to promote standardized methods of diagnosis and treatment[1]. In 1993 the National Heart, Lung and Blood Institute (NHLBI) and the World Health Organization convened a working group to develop a global strategy for asthma management and prevention which was subsequently published as the Global Initiative for Asthma (GINA)[5].

The aims of this study were to assess the effect of adherence to asthma management guidelines on the improvement of asthma symptoms and to investigate its impact on peak expiratory flow rate (PEFR) in asthmatic patients followed up in the asthma clinic of the primary healthcare center at Khalidiya.

Adress Correspondence to:
Dr. Samia Al-Musallam, MRCGP (Int.), Primary Health Care, Khaldiya Clinic, Kuwait. Tel: (965) 4834065, Fax: (965) 4817538, E-mail: samq8tia @yahoo.com

SUBJECTS AND METHODS

Khaldiya Healthcare Center is a family medicine clinic that serves a population of 13,000. By using the ministry of health computer registry system, we identified 1907 subjects registered as asthmatics. Out of these 1907 subjects 1343 are Kuwaiti citizens and 564 are expatriates. Only 364 are registered in the asthma clinic registry. This number is explained by the fact that many asthmatic patients seek help only during acute attack and are thus not registered in the asthma clinic registry. Also, the expatriate population has high rate of turn over.

In this cross-sectional study, data were collected through a face to face interview using a structured questionnaire. The questionnaire was tested on a sample of fifty patients and the questions were corrected accordingly. Informed consent was obtained from all participants. This study was approved by the ethical committee in the Ministry of Health.

The sample comprised all Kuwaiti adult patients and parents of children less than 18 years of age (n = 162) attending the asthma clinic at Khaldiya healthcare center for follow up during the period September to December 2004. Patients attending the clinic with acute asthma attacks were not included in the study.

During the initial interview the following data was sought; demographic items such as age, sex, occupation, level of education for adults and for parents of children less than 18 years of age. Height of patients was measured because it's a required parameter for the assessment of the actual and expected PEFR. Expected PEFR and actual PEFR were measured following the technique provided by the GINA guidelines[5].

Participants were asked about their current medications, who prescribed them and whether they are compliant to those medications. Current symptoms were determined by asking about the number of days during the past 14 days with any asthma symptom (including cough, wheeze, shortness of breath, or limited activity) in order to minimize recall bias.

Patients were categorized as having persistent (uncontrolled) asthma if they were symptomatic on three or more days during the past 14 days, corresponding to the definition of persistent asthma (> one symptom-days / week - GINA Guidelines)[5].

We also considered patients already on controller medications as uncontrolled if they met the previously mentioned category. Participants were classified as uncontrolled if their actual PEFR was less than the expected PEFR by 20%. PEFR was measured by using a peak flow meter (PFM)[5]. The best of three successfully performed maneuvers was included in the study.

Table 1: Socio-demographic characteristics of participants

Variables	Frequency	Percent
Sex		
Male	97	59.9
Female	65	40.1
Age (in years)		
4 - 9	43	26.5
10 - 17	37	22.8
18 - 29	9	5.6
30 - 39	17	34.6
≥ 40	56	34.5
Level of education		
Below high school	15	9.3
High school	81	50
University and above	66	40.7
Occupation		
Student	80	49.4
Teacher	17	10.5
Employee	31	19.1
House wife	20	12.3
Others	14	8.6

All participants that were classified as uncontrolled were prescribed controller medication in the form of separate or combined inhaler. For those already on controller medications, the dose was adjusted. Written instructions on how and for how long to use, what major side effects to expect, the difference between controller and reliever medications were provided. Finally the importance of long term management plan and compliance to treatment was stressed.

Participants were seen two weeks later when their PEFR was measured and enquiry made about their symptoms.

Statistical analysis:

Data were analyzed using the statistical package for social science, SPSS and descriptive statistics including frequencies, mean, and standard deviation were used to describe the study findings. The association between two qualitative variables was performed using the chi square test.

The value of $p \leq 0.05$ was used as a cut off level for statistical significance.

The 95% confidence interval (CI) for proportions was calculated assuming a binomial distribution. Non-parametric Wilcoxon - paired rank test was used to test the significant difference between medians.

RESULTS

The socio-demographic characteristics of the 162 participants is shown in Table 1. There was a

Table 2: Difference between the original and new management plans

Management Plan	Frequency	Percentage
Original Management		
Salbutamol inhaler as needed	23	14.2
Salbutamol nebulizer as needed	31	19.1
Salbutamol inhaler regular	58	35.8
Salbutamol nebulizer regular	20	12.3
Controller medication as needed	12	7.4
Controller medication regular	9	5.6
Others	9	5.6
New Management		
No change	28	17.3
Salbutamol regular	29	17.9
Combined therapy	40	24.7
Separate	59	36.4
Others	6	3.7

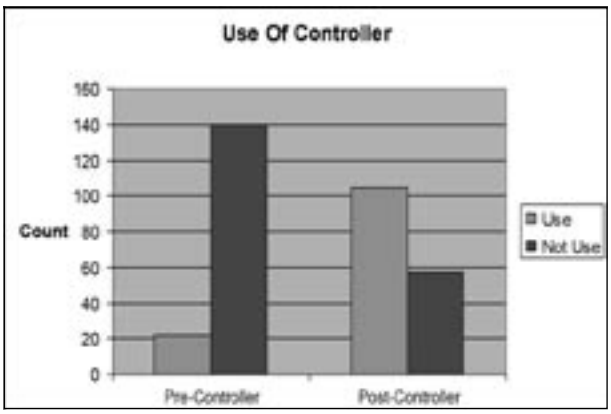

Fig. 1: Difference between the number of patients on controller medication before, and at end of the study

predominance of male subjects (male: female ratio was 3:2). The age of participants ranged from 4 – 83 years. The sample included 80 children (≤ 18 years of age) and 82 adults (>18 years of age). The majority of participants were high-school graduates (50%), most of those were students (49.4%). Seventy one percent patients reported that they were compliant to their treatment.

One hundred and forty cases (86.4%) did not use controller medication at the initial assessment of participants in our study, compared to 21 cases (13.0%) that were on controller medication (Fig. 1). All 21 cases that were on controller medication were provided with the medication by a specialist. The difference between the two proportions was significant at $p < 0.0001$. In the meantime 105 cases (64.8%) that were in the category of uncontrolled asthma were prescribed controller medication.

Out of the 162 participants, only 28 cases (17.3%) did not require an alteration of their management plan (Table 2). The remaining 134 participants required changes to their original management plan

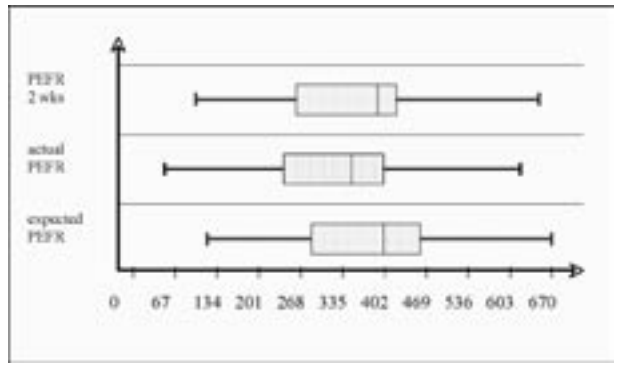

Fig. 2: Histogram illustrates the improvement of PEFR before and after applying the new management plan

either by adjusting the dose of their medication or adding controller medication in the form of separate or combined therapy. The table also shows that at the initial assessment 141 patients (87%) were on some form of bronchodilators, and 21 patients (13%) were already on controller medication, in comparison to 105 patients (64.8%) who required the initiation of controller medications in the form of separate or combined therapy.

There was a significant improvement in the PEFR after applying the new management plan with the median of actual PEFR rising from 350 to 390 within two weeks ($p < 0.001$).

DISCUSSION

The initial data showed substantial under-prescription of controller medication among patients attending the asthma clinic at Khaldiya family medicine healthcare center. Only 22 patients (13.6%) were on controller medication prior to our study despite the fact that 105 patients (64.8%) were in the category of uncontrolled asthma and were either prescribed controller medication or the dose of their medication was adjusted. This means that almost two thirds of study participants were under treated with controller medication.

The AIRE Study[1] provides direct evidence that despite the availability of effective therapies, asthma control is suboptimal for many of the current patients in Western Europe. Only 5.3% of the population surveyed met all the goals of the GINA guidelines. Another disturbing finding in the AIRE study was the high level of 'as required' use of bronchodilator medication and the low level (26%) use of anti-inflammatory medications. These findings are concurrent with the results of our study in which we found that 87% of the participants were on bronchodilators and only 13% were on anti-inflammatory agents.

In a previous study regarding under-use of controller medications in 2002, Finkelstien *et al* found that 72.9% of children with persistent asthma were under users of anti-inflammatory medications[6].

Under-use of controller medications in the presence of persistent symptoms was alarming. In another study about under use of inhaled steroid therapy in elderly patients with asthma, Sin *et al* found that 40% of elderly patients did not receive inhaled steroid therapy within 90 days of discharge from their initial hospitalization from asthma. Patients > 80 years of age were at greater risk of not receiving inhaled steroid therapy compared to those 65 to 70 years of age[7]. These results are alarming since clinical guidelines, including those of the NHLBI[8], GINA[5] and the National Asthma Education and Prevention Program (NAEPP)[9] advocate use of inhaled corticosteroids as first-line therapy in asthma. It makes us conclude that many physicians still hesitate to use inhaled corticosteroids as first line therapy in asthma. Murphy and Neierengarten reached the same conclusion in their article entitled 'New Strategies for the Diagnosis of Asthma'[2]. Furthermore several researches published since the release of the GINA guidelines indicate that in many countries patients with asthma are inadequately treated[10,11]. This conclusion is in agreement with Logerreta *et al*[12] who in their study about compliance with NAEPP guidelines found that adherence was poor. Only 54% of respondents reported use of inhaled steroids daily. In addition, they also concluded that asthma specialists provided more thorough care than primary care physicians in treating patients with asthma. This is in agreement with our results that all the 22 cases that were on controller medication prior to our study were provided with controller medication by a specialist. The finding that 134 participants required alteration to their current management plan and that 105 participants required the initiation of anti-inflammatory medication raises the issue of primary care physicians' reluctance to use controller medications and their lack of adherence to asthma management guidelines. This is consistent with the conclusion of Leogorreta *et al*[12] that asthma specialists provided more thorough care than primary care physicians in treating patients with asthma . In the study by Sin *et al* they also found that elderly patients who receive their care from primary care physicians were at higher risk of not receiving inhaled steroids in comparison with those under the care of specialist[10]. Hartert *et al* in their study about underutilization of controller and rescue medications concluded that despite widespread promulgation of the NAEPP guidelines, providers caring for indigent older subjects with moderate to severe or potentially fatal asthma were not following these guidelines[13].

We found in our study that adherence to asthma management guidelines especially the GINA guidelines in initiating controller treatment and adjusting the dose for those who were already on controller medication if their PEFR was less than the expected by 20%, resulted in improvement of the median actual PEFR. The improvement was significant with $p < 0.0001$. This is consistent with the results of a one-year study of patients with moderate asthma conducted by Zuwallack and co-workers[14]. They reported significant improvement in FEV1, evening PEFR and asthma symptom score with inhaled fluticosone propionate compared with placebo. Similar results were reported by Haahtela and colleagues[15], who found that inhaled budesonide was significantly more effective than terbutaline alone in reducing symptoms of asthma and improving morning and evening PEFR.

The START study found that budesonide was associated with significant effects on measures of the lung function. It demonstrated a significant improvement in pre and post-bronchodilator FEV1 for patients treated with budesonide, compared to patients treated with placebo (2.24 and 1.48%, respectively; $p < .0001$)[16].

CONCLUSION

Adherence to asthma management guidelines improves the outcome of bronchial asthma patients. There is a substantial under-prescription of controller medication among patients attending our asthma clinic. This reflects the doctors' lack of adherence to asthma management guidelines. Following asthma management guidelines resulted in significant improvement in the PEFR.

More than 15 years have passed since the GINA guidelines were first published and still asthma patients are alarmingly improperly treated despite the evidence of the effectiveness of inhaled steroids.

In order to improve asthma patient care we need to target the first line gate-keepers, *i.e.* the primary care physicians and study the reasons for their reluctance to use controller medication and their lack of adherence to asthma management guidelines.

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