Prescribing for asthmatic children in primary care

Are we following guidelines?

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ABSTRACT

Objective: Guidelines for asthma management have been developed both locally and internationally. The aim of this study was to evaluate the adherence of primary care physicians in the National Guard Iskan Primary Care Center to these guidelines.

Methods: The records of 206 asthmatic children who visited the National Guard Iskan Primary Care Center, Jeddah, Kingom of Saudi Arabia, during the months of February 1998 through June 1998, were reviewed. The following data was extracted from them; presenting symptoms, number of visits, names of asthma medications, whether doses were documented or not and number of times antitussives were prescribed.

Results: The most common presenting complaint was cough followed by wheeze and shortness of breath (mean ± SD, 14 ± 13.8, 8.8 ± 10.3 and 4.4 ± 5.8). Oral salbutamol was the most frequently prescribed medication. The doses of asthma medications were not documented in 37.3% of cases. Preventive therapy was prescribed to 35.4% of children and emergency steroids were prescribed to 30.6% of children. The mean age of asthmatic children receiving inhaled medications was significantly higher than those other forms of therapy ($p<0.00001$). Antitussives were prescribed 2,536 times (mean 12.3).

Conclusion: Prescribing for asthmatic children did not conform to national guidelines for treatment of asthma. These findings suggest that ways need to be found: (i) to increase the use of current asthma management guidelines by practitioners; (ii) to improve documentation of prescribed medications and their dosage and; (iii) to improve education of parents in home management measures.

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Asthma is the most common chronic childhood disorder.[1] Its prevalence is increasing worldwide.[2-4] In addition, physicians seem less reluctant to address the diagnosis of childhood asthma.[5-6] From 1980-1993, the prevalence increased to 160% in children <4 years and the death rate from asthma nearly doubled among persons 5-24 year-old.[7] In the United States of America nearly 5,000,000 children are affected.[7] In the United Kingdom (UK) and Australia affects 10-20% of children.[8] The prevalence of asthma among Saudi school children was found to be 10% in Riyadh, Kingdom of Saudi Arabia (KSA) compared to 13% in Jeddah, KSA and Qassim, KSA, and 17% in Abha, KSA.[9,10] Mortality and morbidity from asthma are unacceptably high.[11]

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Until the early 1990's, asthma killed approximately 2000 people every year in UK.[4] The impact of childhood asthma on patients and their families is considerable. It results in school absence and psychosocial problems including limiting the child's sporting and recreational activities, functional impairment, low self-esteem and distress to the children and their families.[12-13]

Although childhood asthma seems to be a condition ideally suited to be cared for in general practice, most of the published research has shown it to be underdiagnosed and undertreated in this setting.[4,6,14-15] Worldwide, governments have initiated asthma management guidelines and programs.[3] The Saudi National protocol for asthma management was developed in order to improve management carried out by physicians.[2,5] However, despite these efforts, both local and international studies have shown that asthmatics are receiving sub-optimal care.[16-18] A previous study carried out in KSA showed that asthma structure (equipment and medications) was deficient in the Primary Health Care Centers (PHCCs) of the Ministry of Health, KSA.[17] This deficiency was thought to be the main cause of sub-optimal asthma care. On the other hand, the National Guard Iskan PHCC, Jeddah, KSA is well equipped for provision of standard asthma care. Asthma care equipment such as nebulizers, inhaler devices and asthma medications (recommended by the Saudi National Asthma Protocol)[5] are available. Therefore, we conducted this study to evaluate whether PHC physicians who have proper asthma structure follow the national guidelines for asthma management.

Methods. Patients' daily registry filled by physicians were searched for the diagnosis of asthma. An asthma registry for the study period was created. Records of all asthmatic children aged ≤14 years who consulted their physician at the National Guard Iskan Primary Health Care Center, Jeddah, KSA during the months of February 1998 through June 1998, were reviewed, cover to cover. Records not containing the diagnosis of "asthma" within physicians' notes were excluded. A preset checklist was used to asses the documentation of the following data in the records; presenting symptoms, number of visits, names of asthma medications, weather doses were documented or not and number of times antitussives were prescribed. According to statistical data available at the PHCC, the number of registered children below 15 years of age was 6509 children, all of which were Saudi. Thus, based on the prevalence of childhood asthma reported by Al-Frayh et al[10] as 13%, the study population had been estimated to be approximately 846 children (the estimated number of asthmatic children within the catchment area of the PHCC). The sample size was calculated using the statistical program Stat-Calc (EPI Info statistical package version 6) with a confidence level of 95%. The optimal sample size was 206 records. The data was entered to a PC and analysis was carried out using EPI Info version 6 statistical software package. Mean ± SD was used to describe categorical variables. Analysis of variance test (ANOVA) was used for normally distributed data. For data not normally distributed, Kruskal-Wallis test was used to compare variables and accordingly the median was used rather than the mean. A p-value <0.05 was considered significant.

Results. Two hundred and six records were reviewed. The age of asthmatic children ranged from 5 months to 15-year-old; with a mean (SD) of 6.42 years (± 4.5). The male: female ratio was 1.5:1. The overall mean (SD) number of physicians' visits per child was 40.7 (±1.9) visits (in a maximum period of 6-years, as the PHCC was established in 1992). However, 30% of patients visited their physician more than 50 times, including 7 patients (3.5%) exceeding 100 visits. The mean (SD) number of visits with cough (which was the most frequent presenting symptom), wheeze and shortness of breath was 14 (± 13.8), 8.8 (± 10.3) and 4.4 (± 5.8). The mean (SD) number of times therapeutic asthma medication was prescribed was 18.1 (± 18.4) times per patient, whereas the dose of these medications was specified at an average of 11.4 (± 12.4) times. The dose of prescribed asthma medications was not specified for 37.3% of medications. The dose was never specified in the records of 8 patients. Salbutamol (ventolin) was the only short acting β_2–agonist prescribed. Its inhaled form was prescribed to 56% of patients, whereas its oral form was the most commonly prescribed asthma medication as 89% of patients received it (**Table 1**). Theophylline was prescribed to 39% of the patients, including 7 patients below 18 months of age. Preventive asthma medications (inhaled steroids and cromoglycate), that are approved by the National Asthma Committee,[3] were prescribed to 33% of the patients. Inhaled cromoglycate was prescribed to 5% of asthmatic children only. Emergency steroids (oral and injectable) were prescribed to 39% of the patients. The mean age (SD) of patients receiving inhaled steroids compared to those on other types of asthma therapy were 8.5 (± 3.8) and 5.2 (± 3.5) years, respectively (p-value=0.000001). Similarly, the median age of patients receiving inhaled salbutamol was 8.5 years compared to those on other types of asthma therapy was 4 years (p-value< 0.000001). Cough linctus and systemic decongestants were prescribed 2,536 times (mean ± SD, 12.3 ± 9.5). They were prescribed more than 10 times for 50% of patients and more than 20 times for 15%.

Discussion. A relatively high number of asthma medications prescribed had no documentation of the dosage in patients' records, indicating poor quality of documentation. It is obvious that documenting doses of medications is essential for proper management and follow-up. This is emphasized more in patients receiving inhaled steroids, since the recommended dose widely varies from 300-2000mcg/day, and the dose should be increased or decreased according to the patient's

Table 1 - Frequency of asthmatic children patients receiving different types of asthma therapeutic agents in the National Guard Iskan primary care center (N=206).

Medication type	Prescribed		Not prescribed	
	n	(%)	n	(%)
Short acting β2-agonists				
Oral	184	(89)	22	(11)
Inhaled	115	(56)	91	(44)
Nebulized	167	(81)	39	(19)
Steroids				
Inhaled	68	(33)	138	(67)
Oral	38	(18)	168	(82)
Injectable	43	(21)	163	(79)
Other agents				
Inhaled cromoglycate	11	(5)	195	(95)
Oral ketotefin	59	(29)	147	(71)
Theophylline	81	(39)	125	(61)
Nebulized ipratropium bromide	13	(6)	193	(94)
Others*	4	(2)	202	(98)

*These were inhaled ipratropium bromide, nebulized epinephrine, oral orciprenaline (alupent: partially selective β-agonist) and salmeterol (long acting β2-agonist).

response, but unless the previous dose was specified, this would be rather difficult.[2,3] Only 56% of the children were prescribed inhaled salbutamol. In addition, this study as well as other studies carried out in KSA, showed that short acting β2-agonist in its oral form, was the most frequently prescribed asthma medication.[18] Warner in his study in the UK, found that 80% of the children were prescribed bronchodilators in the inhaled form.[19] This practice opposes the general approved recommendations, since the National Asthma Protocol has not recommended oral β2-agonists at all, but has rather recommended the various inhaled forms instead.[2] Similarly, the British Asthma Management Guidelines discouraged its use.[20] The significantly high age of patients who have received inhaled medications may be due to the preference of children's parents to use the oral form in the younger ones since it is easier to use and needs no training. Another reason could be that the PHCC only provides 'volumatic spacer', which is a device suitable for children aged 3 and above, but does not provide spacers with a mask suitable for younger children. Thus, the physician cannot prescribe an inhaled medication in this age group unless the family is willing to purchase the spacer. It could also reflect some of the false beliefs among the population regarding inhalers. On the other hand, physicians do not seem to be educating parents sufficiently on the benefits of inhaled medications compared to oral medications.

Recently, systematic controlled trials provided strong evidence that the use of spacers (inhaler holding devices) is as effective as nebulizers in acute asthma attacks. The use of spacers is also more cost effective and is associated with fewer side effects.[21,22] In this study, nebulized short acting β2-agonists were prescribed to the majority of patients (81%). This reflects a possible over-reliance on asthma 'relievers' rather than asthma 'preventors'. Asthma preventive therapy should be introduced early in children with moderate asthma and those with frequent symptoms, to reduce the need for receiving β2-agonists.[19] In an American study, Donahue et al,[23] demonstrated that inhaled steroids and cromoglycate (to a lesser extent) provide significant protection against exacerbations and hospital admissions.[23] Similarly, Aveyard[24] in his study in the UK, found that low preventor reliever ratio was associated with higher hospital admission rates. In this study only 35% of the asthmatics received preventive therapy. Other local studies showed that inhaled cromoglycate was rarely prescribed to asthmatics.[18,25] Its low prescription rate could be due to the need of committed compliant parents, as it should be given at least trice daily and requires 4-6 weeks to start its action. The generally low rate of preventive therapy could be attributed to the lack of proper follow up of asthmatic children by the same physician (lack of continuity of care). It could also be due to the absence of a clear policy for long term management of asthmatic children, within the PHCC. Ketotifen has doubtful clinical efficacy in asthma and has not been recommended by the National Asthma Protocol.[2] Despite this, it was prescribed to 29% of the children, that is more than 5 times of inhaled cromoglycate. Previous studies have proven that short courses of oral or intramuscular steroids for acute exacerbations, significantly reduce the number of relapses and decreases β2-agonist use, without an apparent increase in side effects.[26] Studies conducted in the UK have shown that systemic steroids were under-prescribed, as their prescription rate ranged from 53-55%.[16,19] In this study the low number of patients receiving such medications might have contributed to the high number of visits of the study population.

Theophylline was prescribed to a large proportion of asthmatics. The bronchodilator effect of this medication has been shown to be less than that of β2-agonists.[27,28] In addition, it has a narrow therapeutic index, a number of interactions with other drugs and its side effects can be quite serious.[4,27,29] For these reasons, in KSA as well in other countries theophyllines have been relegated to the forth line of therapy[2-3] and restricted to children with severe asthma, who fail to improve with other treatment modalities.[30] In this study, 7 infants below the age of 18 months were prescribed theophyllines, although previous studies have not shown them to produce significant effects on lung functions in infants among this age group.[4] Ipratropium bromide is the only anticholinergic agent currently approved by the US Food and Drug Administration (FDA) as a bronchodilator. It may be more effective than β2-agonists in infants. In addition, the use of ipratropium bromide with

β2-agonists, results in greater improvement in airflow than when either one is used alone.[20,30] In this study as well as other local studies, inhaled ipratropium bromide was rarely prescribed.[18,25]

Salmeterol was prescribed to one patient only. It is a long acting inhaled β_2-agonist that has recently been included in asthma management guidelines.[2-3] It has been found to be more effective and better tolerated than theophylline in the management of moderate asthma.[31] It is mainly recommended for children requiring high doses of inhaled steroids. The use of salmeterol regularly together with low doses of inhaled steroids is as effective as high doses of steroids and results in fewer side effects (namely decreased linear growth).[32-33] Cough was found to be the most frequent symptom in children with asthma. This might explain the high prescribing rate of cough linctus. Antitussives have no special role in asthma.[2] There is no evidence that any drug can especially facilitate expectoration and the assumption that sub-emetic doses of expectorants such as ammonium chloride (a substance found in many cough syrup formulas) is a myth. The use of cough suppressants containing codeine or similar opioids are generally not recommended, and should be avoided altogether in those bellow one year of age.[34] Frequent cough in asthmatics is caused by asthma, and usually responds to anti-asthma treatment. In fact, bronchodilator syrup is the only children's 'cough mixture' found to be of any use.[35]

In conclusion, prescribing patterns for asthmatic children was found to be inconsistent with the recommended guidelines. Developing an agreed asthma protocol within the practice, derived from the general guidelines, is needed to insure that all members of the PHCC follow the same procedure. Initiation of an asthma mini-clinic can help in improving the quality of care.[36] Previous studies have shown that nurse run asthma clinics can effectively reduce morbidity from asthma.[37] Auditing of prescriptions of asthmatics is necessary to be able to know the impact of protocols and guidelines.

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Related Abstract
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Search Word: asthmatic children

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Title: Incidence of bronchial asthma in a Children's Hospital, Jeddah

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Abstract

Objectives: To study epidemiological and management pattern of asthmatic children attending the emergency room of the main Childrens Hospital, Jeddah, Kingdom of Saudi Arabia and to determine the relation of temperature changes in the city to the rate of their attendance.

Methods: A retrospective review of all emergency room records in 2 years. Yearly and monthly rates of acute asthma cases required medical intervention were calculated. Monthly ratios were correlated to mean grades of temperature in the city. A sample of 2504 cases were drawn randomly to reveal factors associated with presentation and management of asthmatic children.

Results: A total of 13802 acute asthmatic children presented to the emergency room (7.2% of all emergencies). Saudis formed 61.2% and males formed 65.5% of asthmatics. Younger ages (<2 years) showed a significant predominance and family history of bronchial asthma was recorded in 74% of the sample while previous use of prophylactic therapy was very low. Dyspnea was the most frequent presenting symptom followed by cough and wheezing. Most of the cases were managed primarily by nebulized Salbutamol and only 21% required systemic steroid. Months of low temperature grades were strongly associated with more presentation of asthmatics in the emergency room.

Conclusion: Asthmatic children are forming a sizable portion of emergency attendances in Jeddah. An inadequate use of standard prophylactic therapies with a subsequent high impact on the utilization of health resources was noted. Efforts are needed by the medical community to adhere to national and international protocols for the diagnosis and management of