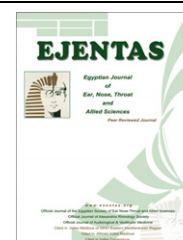




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## ORIGINAL ARTICLE

# How far are we from adhering to national asthma guidelines: The awareness factor

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### KEYWORDS

Asthma;  
 SNAP;  
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**Abstract** *Background:* The Saudi national asthma protocol (SNAP) for asthma management was released in 1995 in an attempt to streamline asthma management practices in Saudi Arabia and improve the quality of care for asthma. Up to our knowledge, few studies assessed the adherence of Saudi physicians to the national asthma guidelines.

*Objectives:* The objective of this present study was to assess the level of adherence of pediatricians and primary care physicians (PCPs) to the current SNAP recommendations and identify barriers to physician adherence.

*Methodology:* This is a cross-sectional study involving pediatricians and PCPs selected randomly from five major governmental hospitals in Riyadh, Saudi Arabia. Subjects were administered a self-administered questionnaire comprising 24 questions assessing their awareness of SNAP and their level of adherence to the recommendations.

*Results:* The response rate was 38% (80/206). Out of most of the physicians who responded, 70% (56) were aware of SNAP, and only 78.2% ( $n = 43$ ) of them had modified their management of asthmatic patients according to the SNAP recommendations. The level of knowledge of the pharmacotherapy and diagnostic parts of the guidelines ranged between 41.5% and 90.7% in the pharmacotherapy part, and 53.7–59.6% in the diagnostic part. The most common barriers to adherence to SNAP were lack of awareness (25.2%), patient non-compliance (18.9%) and lack of resources (13.5%). There was no significant difference in awareness between pediatricians and PCPs (69.2%, 70.7% respectively).

*Conclusion:* This study reveals a substantial gap between the actual care provided by pediatricians and PCPs to asthmatic patients and the recommendations formulated in the Saudi National Asthma Protocol (SNAP). Lack of awareness remains the most common barrier for adherence to the guidelines followed by patient non-compliance. To improve SNAP guideline adherence, tailored interventions that address barriers to adherence need to be implemented.

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## 1. Introduction

Bronchial asthma is a common chronic inflammatory disorder of the lung airways. Asthma can be a potentially life-threatening condition and a frequent cause for emergency room (ER) visits and hospital admissions.<sup>1</sup> Recent studies showed worldwide increase in the prevalence of asthma, particularly in the second decade of life, where this disease affects 10–15% of the global population.<sup>1</sup> The prevalence of asthma in Saudi Arabia has risen from 8% in 1986 to 25% in 2001.<sup>2</sup> The frequency and severity of asthma signs and symptoms vary widely from patient to patient as well as individually over time.<sup>3</sup> Many factors have been identified as possible causes of the increased morbidity and mortality in asthmatic patients, and many of them are considered avoidable. Some of the factors include delay in asthma diagnosis, noncompliance with prescribed medical regimens, and an inability to use medications properly especially inhalers.<sup>4,5</sup>

The goals of asthma guidelines are to emphasize the appropriate use of preventive and treatment medication and routine measurement of lung function. In addition, they aim to minimize chronic symptoms that impair normal activity (including exercise), prevent recurrent exacerbations, minimize the need for ER visits or hospitalizations, and to maintain near-normal pulmonary function. These goals should be met while providing optimal pharmacotherapy with the fewest adverse effects and while meeting patients' and families' expectations of satisfaction with asthma care.<sup>3</sup>

The Saudi National Asthma Protocol (SNAP) was first published in 1995, and it was last updated on 2005, in an attempt to streamline asthma management practices with an emphasis on increasing the awareness among physicians about the importance of appropriate classification of asthma severity to ensure adequate and prompt pharmacotherapy.<sup>6</sup> Adherence to the guidelines is a cornerstone in effective asthma management. A recent study in the United States of America (USA) reported that adherence to national asthma guidelines can cause a 56% reduction in outpatient visits, and a 91% decrease in ER visits for the treatment of asthma.<sup>7</sup> Although the Saudi national guidelines have been available for over seventeen years, only few studies have been conducted to determine the level of awareness and adherence. In a previous study, the level of awareness of the SNAP among PCPs was low (52%).<sup>8</sup> Another study conducted in a large tertiary hospital ER reported that the documented treatment of patients with an acute asthmatic episode varied significantly from what is recommended by the national and international asthma management guidelines.<sup>9</sup>

The objective of this present study is to assess the adherence level of pediatricians and PCPs to SNAP recommendations for the management of asthma, and to identify barriers preventing physicians from applying SNAP recommendations to their daily practice.

## 2. Methodology

### 2.1. Study design and participants

This study was a cross-sectional study conducted between February and April 2008. A self-administered questionnaire was randomly and anonymously completed by the study sample.

Participants were among eighty physicians working at five large governmental hospitals in Riyadh, Saudi Arabia. Physicians were surveyed from the pediatric department and primary care unit at the following hospitals: King Khalid University Hospital (KKUH), King Faisal Specialist Hospital and Research Centre (KFSH & RC), King Fahad Medical City (KFMC), King Abdulaziz Medical City (KAMC-R), and King Saud Medical Complex. Other clinics were excluded because they were studied in previous studies.

Selection of study objects was based on random sampling. Of the 80 physicians, 41 were primary care physicians (PCP) and 39 were pediatricians. Inclusion criteria of this study were all pediatricians or primary care physicians who have an active participation in asthma treatment.

### 2.2. Data collection and questionnaire

Participants took a self-administered 24-item questionnaire which assessed their knowledge and level of awareness of the SNAP guidelines. It consisted of two parts: the first part collects demographic data: age, gender, years of experience in asthma treatment since graduation, nationality, position, practice type, and participation in asthma education activities. Part two contained questions about awareness of the SNAP recommendations, level of adherence to the guidelines, and barriers that prevent adherence to SNAP guidelines. Awareness was measured using a dichotomous response (yes/no).

Physician knowledge about SNAP recommendation was assessed in 13 questions. The questions used as a quantitative method to assess adherence. These questions were adopted from the last edition of SNAP and from the literature review from previous physician surveys that examined these questions in relation to guideline adherence. Questions then were reviewed by a consultant pediatric pulmonologist. Questions found to be confusing or incorrect were clarified or removed.

### 2.3. Outcome measures

The primary outcome measure was the percentage of adherence of pediatricians and PCPs to the SNAP recommendations for asthma management. Secondary outcomes were level of awareness of SNAP recommendations and barriers preventing practitioners from adhering to the guidelines.

### 2.4. Statistical analysis

Data from this study were analyzed by using SPSS, version 16.0.2 software (SPSS Inc, Chicago, IL). Descriptive statistics for all variables were examined for the whole group. Difference between pediatricians and PCP was assessed by using Chi-square tests. Logistic regression was used for barriers to adherence.

## 3. Results

Eighty self-administered questionnaires were received for a 38.8% response rate (206 self-administered questionnaires were distributed among our target physicians). Demographic data of the survey recipients are presented in Table 1. Overall, the majority of the participants were between 25 and 35 years old (39.2%), with the mean age of 44.75 years. Most of our

Characteristics	No. of subjects	Percentage (%)
<i>Age (years)</i>		
25–35	31	39.2
36–45	22	27.5
46–55	25	31.6
56–65	2	2.5
<i>Gender</i>		
Male	55	68.9
Female	25	31.1
<i>Years of experience</i>		
Less than 5 years	20	25
5–10 years	19	23.75
11–15 years	18	22.5
16–20 years	11	13.75
More than 20	12	15
<i>Nationality</i>		
Saudi	45	55.7
Non-Saudi	35	44.3
<i>Position</i>		
Resident	23	29.5
Registrar	29	35.9
Consultant	28	34.6
<i>Specialty practice</i>		
Pediatric	39	48.8
Primary care	41	51.3
Participation in asthma related activities	46	57.5
<i>Awareness of SNAP</i>		
a. Modified their asthma management	44	78.5
b. Agree to full implementation	52	92.8

sample subjects were males (68.9%), Saudis (55%), and registrars (35.9%). Primary care specialty accounted for 51.3% of doctors who filled out the questionnaire. Our primary outcome was quantifying the percentage of self-reported adherence to SNAP. Seventy percent of physicians (56/80) were aware that SNAP exists as a national asthma management guideline. Majority of our participants, 46 (57.5%), participated in asthma education activities in the last 12 months (Table 1). Forty-four (78.5%) of those who are aware of the existence of the guidelines had modified their management of asthmatic patients according to SNAP recommendations. Most of them, 92.8% ( $n = 52/56$ ), agreed that the implementation of SNAP recommendations will lead to better management of patients with asthma (Table 1). Examining the association of our sample characteristics and the self-reported adherence to the SNAP guidelines (Table 2) showed that there is no association between adherence to SNAP and age of physicians ( $\chi^2 = 4.798$ ,  $p = 0.187$ ), gender ( $\chi^2 = 1.412$ ,  $p = 0.235$ ), years of experience ( $\chi^2 = 6.377$ ,  $p = 0.173$ ), nationality ( $\chi^2 = 2.750$ ,  $p = 0.097$ ), clinical position ( $\chi^2 = 4.935$ ,  $p = 0.085$ ), or practice specialty ( $\chi^2 = 0.021$ ,  $p = 0.884$ ).

The second part of the study was to measure adherence to SNAP by physicians who are aware of SNAP through the assessment of the participant knowledge of the protocol's recommendations about the pharmacotherapy and diagnostic components of SNAP. We were concerned that respondents might give socially acceptable answers and overreport SNAP

**Table 2** Association between characteristics of study subjects and adherence to Saudi National Asthma Protocol (SNAP).

Characteristics	Awareness of SNAP (%)		$\chi^2$ -value	<i>P</i> -value
	Yes	No		
<i>Age (years)</i>				
25–35	32.7	54.2	4.798	
36–45	27.3	25.0		
46–55	38.2	16.7		0.187
56–65	1.8	4.2		
<i>Gender</i>				
Male	73.1	59.1	1.412	
Female	26.9	40.9		0.235
<i>Years of experience</i>				
Less than 5 years	17.9	40.9		
5–10 years	25.0	22.7	6.377	0.173
11–15 years	21.4	22.7		
16–20 years	16.1	9.1		
More than 20	19.6	4.5		
<i>Nationality</i>				
Saudi	61.8	41.7	2.750	0.097
Non-Saudi	38.2	58.3		
<i>Position</i>				
Resident	25.9	37.5		
Registrar	31.5	45.8	4.935	0.085
Consultant	42.6	16.7		
<i>Specialty practice</i>				
Pediatric	48.2	50.0	0.021	0.884
Primary care	51.8	50.0		

recommendations familiarity. However, variation in responses among participants and low percentage in answering some of the questions related to the guidelines suggest validity in the responses and mitigate concerns about the overreporting of familiarity. Overall, physicians varied in their answers to the standard pharmacotherapy management of asthma (41.5% and 90.7%) (Table 3). The results showed that physicians deviated from the guidelines recommendations especially in the use of long acting  $\beta$ -2 agonist in mild intermittent asthma (questions 12), and the use of steroids in moderate persistent asthma (question 14), and question 20 (theophylline use in moderate attacks), where the percentages of those answered according to the SNAP recommendations were: 52.7% ( $n = 29$ ), 58.5% ( $n = 31$ ), and 53.8% ( $n = 28$ ), respectively. In the diagnostic part of the questionnaire (Table 4), physicians also did poorly in answering questions according to the guidelines diagnosis and hospital admission criteria with scores of 58% ( $n = 29$ ), 59.6% ( $n = 31$ ) and 53.7% ( $n = 29$ ), respectively. The most common barriers for adherence to SNAP were lack of awareness (25.2%), patient non-compliance with management plan (18.9%), and lack of resources (13.5%) (Table 5). Regression analysis showed a positive correlation between the barriers and adherence to the guidelines ( $r^2 = 0.928$ ), and it was statistically significant (Confidence Interval [CI] 7.78–10.1,  $p < 0.000$ ), Standard Error 0.78) (Fig. 2).

#### 4. Discussion

Our study demonstrates that only 70% of our sample of pediatric and PCPs were aware of SNAP, and only 78.5% of them

**Table 3** Assessment of knowledge of treatment of asthma of study subjects according to Saudi National Asthma Protocol (SNAP).

Survey item No.	Treatment of asthma questions	Response from physicians aware of SNAP				Key answer
		Yes		No		
		<i>n</i>	%	<i>n</i>	%	
12	In treatment of mild intermittent asthma, long acting B2 agonist can be used	26	47.3	29	52.7	No
14	Oral steroids can be used in treatment of moderate persistent asthma in children	31	58.5	22	41.5	No
15	We use as needed (PRN) B2 agonists only in treatment of moderate and severe asthma	5	9.3	49	90.7	No
16	Oral corticosteroids are recommended for most patient presenting with acute asthma exacerbation	37	68.5	17	31.5	Yes
17	In the treatment of mild persistent asthma in adults, we use as needed (PRN) B2 agonist and inhaled steroids	40	75.5	13	24.5	Yes
19	In regard to the duration of anti-inflammatory therapy, the maximum duration for using these medications is 6 weeks	6	11.1	48	88.9	No
20	Theophylline could be considered in treatment of moderate attacks in adults	24	46.2	28	53.8	No
22	In stable patients, Leukotriene-receptor antagonists (LTRAs) can be used as first line anti-inflammatory therapy and can completely replace inhaled steroids	11	20.4	43	79.6	No
23	Salmeterol and formoterol should not be used for relief of acute symptoms or without regular inhaled steroids	32	59.3	22	40.7	Yes
24	Does the oral form of short acting B2 agonist used as first line therapy of asthma	14	25.5	41	74.5	No

**Table 4** Association between knowledge of diagnosis of asthma of study subjects according to Saudi National Asthma Protocol (SNAP).

Survey Item No.	Diagnosis of asthma	Response from physicians aware of SNAP				Key answer
		Yes		No		
		<i>n</i>	%	<i>n</i>	%	
13	Exacerbation symptoms in mild persistent asthma last for two months	21	42	29	58	No
18	Spirometry is more useful than Peak Flow Meter in detecting disease variability	21	40.4	31	59.6	No
21	Criteria for admission of acute asthma attack patient includes that the patient did not respond to $\beta_2$ agonist	29	53.7	25	46.3	Yes

**Table 5** Distribution of response of barriers which prevent from adherence to SNAP recommendations.

Barriers	Responses frequency ( <i>n</i> = 111)	Percentage (%)
Lack of awareness	28	25.2
Patient non-compliance	21	18.9
Lack of resources	15	13.5
Lack of time	13	11.7
Lack of familiarity	13	11.7
Lack of agreement	8	7.2
Lack of outcome expectancy	6	5.4
SNAP is not clear	4	3.6
Lack of self-efficacy	3	2.7

reported their adherence to SNAP recommendations. This percentage of self-reported adherence, although not optimal, shows better results than what Sarrell et al. have found in their

study where the compliance rate was 40%.<sup>10</sup> Our study also showed an improvement in the awareness of the presence of SNAP among PCPs (70.7%) compared with previous study done by Al-Kabbaa et al. which was 52%.<sup>8</sup> We could not assess the reasons for lack of awareness of SNAP availability although it has been published over 17 years ago. Lack of awareness was one of the most common barriers that prevented physicians from adhering to SNAP recommendations (25.2%). Other barriers include patient non-compliance (18.9%) and lack of resources (13.5%) (Fig. 1). The role of asthma educational activities in improving awareness and adherence to the guidelines has been examined. Al-Shimemeri et al.<sup>4</sup> did a campaign to improve the awareness of SNAP and found that the use of asthma pharmacotherapy by Saudi physicians improved after the campaign. Sarrell et al. showed that only 30.7% had attended courses or workshops regarding asthma education, while in our study more than half of the sample subjects, (*n* = 46%, 57.5%) participated in asthma educational activities during the last 12 months. This could

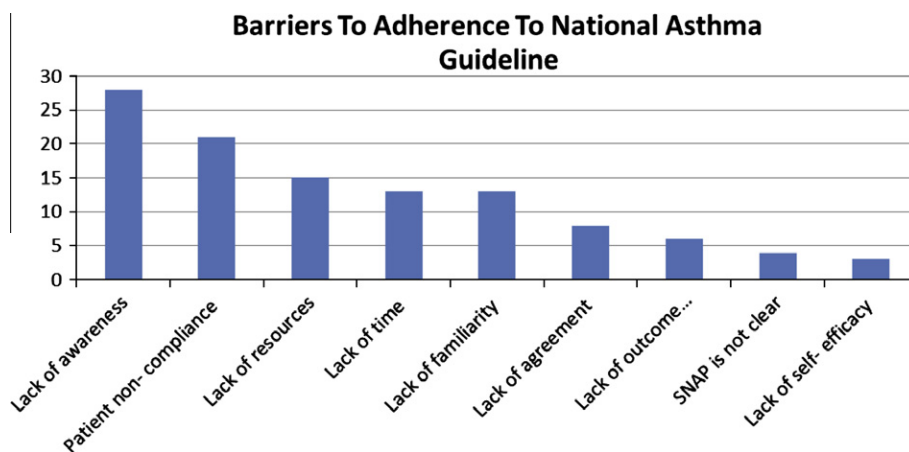


Figure 1 Barriers to adherence to asthma guidelines.

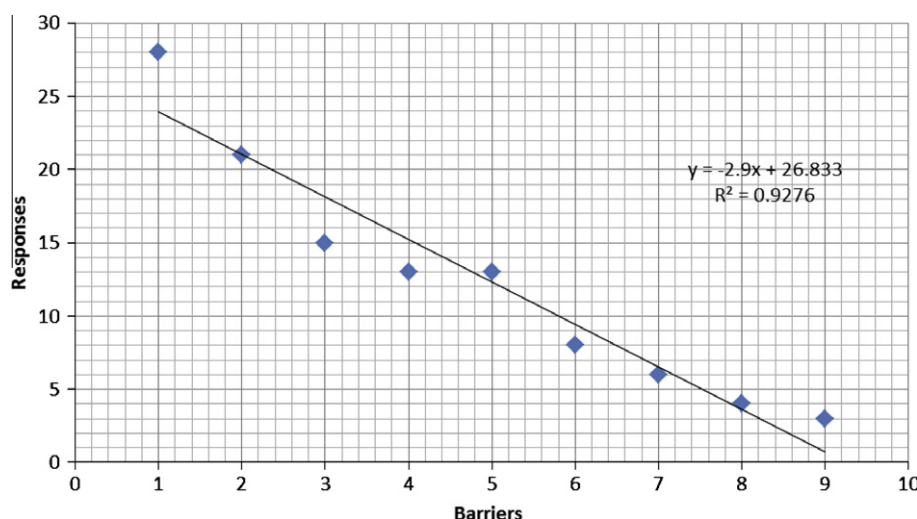


Figure 2 Regression analysis of barriers to adherence.

be a reflection of the increased asthma awareness activities that are done by several local societies. However, there is more that is needed to be done in this regard especially when the management of asthma is rapidly changing.

There are several limitations to this study. Our survey response rate was only 38.8% and respondents were pediatricians and primary care physicians. Both factors may affect the generalizability of our results to other specialties. However, these are the two main specialties that manage patients with asthma. Level of adherence was based on a self-reported questionnaire, which might not reflect actual adherence. Studies suggest that physician self-reporting can overestimate or underestimate actual practice when compared with chart audits. Finally, the presence of a barrier to adherence is based on the respondents' perception of the barrier, which may not accurately reflect how problematic a barrier is. Whether the problem is actual or perceived may also affect the type of intervention required.

**5. Conclusion**

This study reveals a substantial gap between the actual care provided by pediatricians and PCPs to asthmatic patients and the recommendations formulated in the Saudi National

Asthma Protocol (SNAP). Lack of awareness remains the most common barrier for adherence to the guidelines followed by patient non-compliance. Publications of SNAP should be followed by its proper dissemination and utilization. We also recommend that Continuing Medical Education (CME) in asthma management should be required for all physicians who participate in asthma treatment. More emphasis on patients' education should be implemented. More studies are needed to assess the satisfaction of physicians about SNAP to improve adherence and compliance.

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