# CHOICES AND PREFERENCES IN ASTHMA MANAGEMENT

W C Tan, K S Chia, L G Goh

# ABSTRACT

We conducted a questionnaire survey of the management of asthma among doctors in Singapore to determine the trend and range of prescribing habits. Standardised questionnaires were sent to 3,153 medical practitioners registered with the Singapore Medical Council. The overall response rate was 25.3% (797 out of 3,153 doctors). The data were grouped and analysed according to one of 4 respondent-defined groups: (1) non-specialist general practitioners (NS-GP); (2) non-specialists (house officers, medical officers and specialist-in-training) who worked in MOH hospitals (NSMOH); (3) chest specialists; (4) non-respiratory specialists. Patients tended to underestimate the severity of their disease. Inhaled or nebulised beta-agonist was the treatment of choice for acute severe asthma in adults and children for all 4 groups of respondents. In the maintenance treatment for chronic asthma, inhaled and oral beta-agonists and oral theophylline were the mainstay of treatment for adults and children. Nocturnal asthma was similarly treated. The use of inhaled steroids was variably conservative and was reserved for situations where bronchodilators proved inadequate.

Keywords: Asthma management, audit, bronchodilators

## INTRODUCTION

Many countries have reported an apparent increase in the prevalence of asthma<sup>(1-3)</sup>. Although more drugs are available in the past decade for the treatment of asthma, the mortality of asthma has shown a paradoxical increase in many countries<sup>(4)</sup>. This has led to a closer scrutiny of the prescribing habits of doctors and the way asthmatic patients are managed.

In 1984, an asthma questionnaire survey was conducted among all members of the European Society of Pneumology (SEP) and a random sample of non-SEP members in 16 European countries. The results showed that physicians in the different countries differed in their choices and dosing schedules of drugs used in the management of asthma<sup>(5)</sup>. We conducted a similar questionnaire survey of the management of asthma among doctors in Singapore.

An audit of asthma therapy is important but difficult to assess for several reasons. The definitive diagnosis of asthma is problematic because of the difficulty in defining asthma clearly. The pharmacological management of asthma is a controversial issue<sup>(6,7)</sup>. Definition of what constitutes mild and moderate asthma are imprecise. Current information is inadequate for setting up exact algorithms for optimal treatment of different categories of severity in asthma.

The purpose of this survey is, therefore, not to determine how physicians should diagnose and treat asthma. Rather the aim is to derive a better understanding of the spectrum of

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choices and preferences in the management of asthma. In this study we examined routine practices and identified the similarities and differences in the diagnosis and treatment of asthma among doctors in different practices in Singapore.

# **METHOD & MATERIAL**

#### The Survey Method

The questionnaire used was similar to that used in the European audit of 1984, with slight modifications for clarity<sup>(5)</sup>. A copy was sent to all practising doctors. This was achieved by obtaining a list of doctors registered with the licensing body, the Singapore Medical Council. Because of problems of logistics no attempt was made to pre-select only physicians.

The questionnaire is divided into 5 sections: General Information, Diagnosis, Management of Asthma. Asthma Patient Information/Education and Treatment. There are two types of questions in the questionnaire: (a) questions requiring a four point scale, eg "Do you obtain a measurement of lung function each time you see a patient with asthma? Choose one answer: *Never, Sometimes, Often or Always*". (b) questions requiring a ranking of sequence, eg "What do you consider as the correct sequence for treating acute severe episodes? Please give sequence (1 up to 7: you need not select all choices)".

The questionnaires were sent to the doctors in two phases. In the first phase, questionnaires were sent to 3,153 doctors registered with the Singapore Medical Council. The initial set of questionnaires was sent in May 1989 and a lapse of 3 months was allowed for the response. A second set of questionnaire was then sent to each of those who had not responded initially and a further three-month period was permitted for a response.

#### Analysis of Data

The details of the returned questionnaires were grouped according to the type of practice of the respondent: (1) nonspecialist general practitioners (NS-GPs); (2) non-specialist non-GP (NS-Non-GP) who comprise hospital doctors such as house officers, medical officers and specialists-in training. Specialists are further subdivided into (3) chest specialists (S-C); and (4) non-chest specialists (S-NC).

The analysis was based as far as possible on a 4-point scale for each question. For questions where respondents were required to rank the sequence of drugs, each sequence is given a score and the average score is computed. The lowest score is the first preference.

#### ASTHMA QUESTIONNAIRE An audit of asthma diagnosis and treatment (N U S Questionnaire)

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## RESULTS

#### **Response Rate**

The description of the study population and the distribution of the response according to the types of employment are shown in Table I. The overall response rate was 25.3% (797 out of 3,153 doctors to whom the questionnaires were sent). The distribution of respondents is not representative of the doctors in Singapore. The best response was from the doctors working in hospitals and outpatient clinics within the Ministry of Health (30.3%).

#### Diagnosis

#### Beta Agonist Reversibility Test

The majority of chest physicians *often* (67%) used the beta agonist reversibility test in the diagnosis of asthma; the majority of GPs (54%) and non-respiratory specialists (52%), and a third of non-GPs *never* used them. Table II shows the proportion of doctors who *often* utilise the respective tests.

## **Bronchial Provocation Test**

The majority of non specialists, both GPs and non-GPs (83% and 62%, respectively) and non-chest specialists (67%) *never* used tests of bronchial hyperresponsiveness for the diagnosis of asthma. The majority of chest specialists (86%) used this test with varying frequency (Table II).

## Peak Flow Rate Records

Most NS-non-GPs (69%) and non-chest specialists (51%) and

Table I - Description of Study Population

Type of Employment	Numbe	er (🛷)	Response Ra	ate% (No.)
Government	1,307	(41.5)	30.3	(396)
University	251	(7.9)	22.7	(57)
Private	1,487	(47.1)	22.7	(337)
Others	5	(0.2)	20.0	(1)
Not Working	103	(3.3)	5.8	(6)
Total	3,153	(100)	25.3	(797)

Table II - Percentage of Respondents who "often" use the following Diagnostic Tests for Asthma

		Non	-Specia	lists		Specialists			
Tests	GPs(	No.)	Non-G	Ps (No.)	Ches	st (No.)	Others (No.)		
	—				1-				
ß Reversibility	24	(64)	36	(107)	67	(10)	23 (41)		
Provocation	0.8	(2)	4	(12)	21	(3)	6 (10)		
PER Records	6	(16)	32	(95)	47	(7)	22 (39)		
Skin Test	0.4	(1)	0.3	(1)	7	(1)	6 (11)		
RAST	9	(23)	10	(23)	21	(3)	12 (20)		
Steroid Test	14	(36)	13	(38)	60	(9)	9 (15)		

## Table III - Sequence of Drug Used in the Treatment of Acute Severe Asthma in Adults\*

Sequence	Non-Spec	ialists	Specialists			
ofUse	GPs Non-GPs Chest		Chest	Others		
İst	Inhß2	Inh B2	Inh B2	 Inhß2		
2nd	SCAdren	IV Aminop	<b>IV</b> Steroid	<b>IV</b> Aminop		
3rd	IV Aminop	IV Steroid	IV Aminop	SCArden		
4th	IMB2	Ipr Br	Ipr Br	IV Steroid		
5th	IV Steroid	SC Arden	IMB2	IMB2		
6th	lprBr	IMß2	SC Arden	IprBr		

\* Similar results are found in the treatment of childhood asthma

all chest specialists used peak flow records infrequently, and the majority of GPs (71%) never used them.

## Trial Course of Steroids

Most doctors *sometimes* used a trial course of steroids for the diagnosis of asthma: Chest specialists (93%); NS-GPs (72%); NS-Non-GPs (57%); non-chest specialists (53%).

#### Skin Tests, RAST Test and Chest Radiographs

The majority of doctors (72% to 88%) with the exception of chest specialists *never* used skin testing or RAST (specific serum IgE) in the diagnosis of allergy in asthma. Most doctors in all four groups *often* or *always* obtain a work history and *often* perform chest radiographs to exclude other diseases and complications.

## Management

#### Monitoring

The majority of chest specialists (60%), but only a minority of GPs (7%), NS-non-GPs (18%), and non-chest specialists (16%) measured lung function at each visit. All four groups of doctors seldom asked their patients to record their daily symptoms or to record peak expiratory flow at home.

## **Patient Education**

Most doctors would inform their patients of the diagnosis of asthma. Information booklets were infrequently distributed by all four groups of doctors (11 to 33%), though the doctors overwhelmingly supported the concept of an Asthma Society (83% to 94%).

All doctors felt that their patients more often underestimated than overestimated the severity of their condition. In particular, underestimation seems most frequent among the patients of chest specialists (60%).

On the use of inhalers, most doctors (70% to 100%) would initially instruct their patients on the method of use, though a smaller percentage (53% to 100%) would perform subsequent checks on the accuracy of inhaler techniques.

# Treatment

#### 1) Acute Asthma

In the treatment of severe episodes of acute asthma in adults and in children, inhaled or nebulised beta agonist heads the sequence of therapy for all the respondents. The second and subsequent choices differ between the groups of doctors. The second choice among general practitioners is a parenteral sympathomimetic such as adrenaline for adult patients. Parenteral aminophylline is the second or third choice for all respondents in the treatment of acute asthma in adults and in children. Parenteral corticosteroids are the second choice for chest physicians and third choice for non-specialists but are fourth and fifth choices among the S-NC specialists and general practitioners respectively (Table III).

## 2) Chronic Treatment

a) Order of Drug usage for chronic maintenance in asthma Inhaled beta agonists, oral beta-agonists and oral theophylline are the unanimous first three choices in all groups of doctors for adults and children alike. Disease modifying drugs such as disodium chromoglycate and inhaled steroids, (including ketotifen for children), are prescribed only after bronchodilators have failed to control symptoms (Table IV).

b) Preferences for an alternate delivery system and recommended dosages for inhaled beta-agonist and inhaled steroid
 In adults and children who cannot satisfactorily use a metered dose inhaler, the preferred alternative is a spacer for chest specialists (S-C) and doctors-in-training (NS-Non-GPs) or oral medication for general practitioners (NS-GP). Nebulisers are preferred over powder inhalers which are the least popular among all four groups of doctors.

Key Inb 82 : Inhaled 82 Agonist ; SC Arden : Subcutaneous Adrenaline ; Ipr Br Ipratropium Bronide; IV Aminop · IV Aminophylline; IM 82 : Intramuscular & Agonist

The recommended doses of inhaled beta-agonist and inhaled steroid prescribed for daily maintenance for adults were mainly fewer than 9 puffs a day from a metered dose inhaler (MDI), and the maximum prescribed dose usually did not exceed 14 puffs daily. Chest specialists (S-C) and doctors in training (NS- Non-GPs) gave larger usual and maximum doses to their patients than NS-GPs and S-NC (Tables V and VI). A very similar pattern was observed for the child.

## 3) Nocturnal Asthma

Nocturnal asthma was defined as the presence of early morning symptoms with falls in peak expiratory flow, if measured. Respondents were offered 16 options, subdivided into daytime

Table IV - Order of Treatment for (Chronic) Maintenance Therapy of Asthma.

Sequence	Non-Speci	alists	Specialists		
of Use	of Use GPs Non-GPs		Chest	Others	
1	1-1-00	T-1-00	0 -1 00	X N 00	
150	Inn 152	unn 152	Oral 152	Inh 132	
2nd	Oral B2	Oral ß2	Oral ß2	Oral B2	
3rd	Theophy	Theophy	Theophy	Theophy	
4th	Inh Steroid	Inh Steroid	Inh Steroid	IDSG	
5th	Ipr Br	IDSG	lpr Br	Inh Steroid	
6th	IDSG	Ipr Br	Oral Steroid	Ipr Br	

 Key
 Inh ß2 : Inhaled ß2 Agonist
 Oral ß2 : Oral ß Agonist

 Theopy : Theophylline
 Inh Steroid: Inhaled Steroid

 Ipr Br
 : Ipratropium
 IDSG
 : Disodium Cromoglycate

Table V - Recommended Inhaled Beta-Agonists in Adult (Usual & Maximum) (%)

	( - · · · · · · · · · · · · · · · · · ·									
	Non-Specialists				Specialists					
Parameter	GI GI	GPs Non-GPs		Ch	est	Others				
	Usual	Max*.	Usual	Max.	Usual	Max.	Usual	Max.		
0-4 puffs	63.3	5.6	0.4	2.6	18.2	0.0	56.6	4.1		
5-9 puffs	33.5	50.6	35.6	27.7	81.8	18.2	39.4	43.3		
10-14 puffs	2.8	32.1	60.7	43.9	0.0	63.6	3.0	37.1		
15-20 puffs	0.4	9.6	3.3	22.5	0.0	18.2	1.0	12,4		
≥20 puffs	0.0	2.0	0.0	3.3	0.0	0.0	0.0	3.1		

\* Max. = Maximum

Table VI - Recommended Inhaled Steroid in Adult (Usual & Maximum) (%)

	1	Non-Spe	cialists		Specialists				
Parameter	GI	Ps	Non-	GPs	Ch	est	Oth	ers	
	Usual	Max*.	Usual	Max.	Usual	Max.	Usu	al Max.	
							_		
0-4 puffs	69.7	15.4	0.4	8.5	18.2	0.0	60.5	6.8	
5-9 puffs	28.6	55.7	55.6	44.7	81.8	27.3	36.0	52.3	
10-14 puffs	1.7	20.2	39.9	32.1	0.0	54.5	2.0	27.3	
15-20 puffs	0.0	7.9	3.6	12.2	0.0	9.1	1.0	11.4	
≥20 puffs	0.0	0.9	0.4	2.4	0.0	9.1	0.0	2.3	

\* Max. = Maximum

## Table VII - Sequence of Drug Usage for Nocturnal Asthma in Adults

Sequence	Non-Spe	cialists	Speciali	sts
of Use	GPs	Non-GPs	Chest	Others
1st	Inh ß2 (am)	Inh B2 (am)	Jah B2 (pm)	SR 82 (pm)
2nd	SR 62 (pm)	SR Theo (pm)	Inh B2 (am)	Theo (pm)
3rd	SR Theo (am)	SR 82 (pm)	SR Theo (pm)	SR Theo (H)
4th	SR Theo (pm)	SR Theo (H)	SR Theo (H)	SR 62 (am)
5th	SR 62 (11)	SR 82 (H)	Inh Steroid (am)	Inh ß2 (pm)
6th	1nh B2 (H)	Inh 82 (H)	Ipr Br (pm)	lnh ß2 (H)

Key lnh 62 : Inhaled 62 Agonist
 SR 82 : Sustained Release Oral 62
 SR Theo: Sustained Release Theophylline

am : Daytime Dose pm : Bedtime Dose H : High Bedtime Dose and bedtime doses, and high bedtime doses. The results showed that inhaled or sustained-release beta-agonists or sustainedrelease theophylline given at bedtime in standard doses or in high doses, form the mainstay of treatment for nocturnal asthma. Only chest specialists considered inhaled steroid as a treatment option for nocturnal asthma. The results are summarised in Table VII. The results for the treatment of nocturnal asthma in children showed an identical pattern.

## 4) Desensitisation

The respondents to this question numbered 268 NS-GPs, 285 NS-Non-GPs, 10 chest specialists and 118 non-chest (S-NC). This form of treatment was unanimously unpopular: 91% GP; 88% NS-MOH; 70% chest physicians; 86% non-chest specialists *never* used it in the treatment of asthma. Only a small number from each group had used this method: 24 NS-GPs; 33 NS-Non-GP; 3C-S; and 16 NC-S.

#### DISCUSSION

This study revealed several interesting and pertinent findings. First, the management of asthma among different groups of doctors was generally consistent despite some differences in the prescribing habits of doctors according to the types of practice. Second, bronchodilators still formed the mainstay of treatment in acute and chronic asthma. Third, there is no evidence that beta-agonists were over-prescribed. Overall, there was a conservative use of corticosteroids in the treatment of acute and chronic asthma.

The overall response was 25%, lower than we had hoped. One possible explanation for this low response could be the sensitive nature of an audit whatever the subject. Hence, the results are likely to be biased and therefore had to be interpreted with due caution. However, the bias is likely to be towards those who see asthmatic patients regularly. Although our findings cannot be claimed to be strictly representative of views of doctors in Singapore, the study goes some way to showing general trends and patterns in the diagnosis and management of asthma among doctors in Singapore.

The differences observed in the frequencies in which different tests were used in the diagnosis of asthma could be explained by the differences in the nature of the practice. This is likely to be reflected in greater disease severity of the patients and the greater availability and ease of execution of complicated tests in specialist- and hospital-practices. For example, chest specialists and doctors in training are more likely than general practitioners to document beta-agonist and steroid reversibility, bronchial provocation tests for the diagnosis of asthma and to record baseline lung function at each outpatient clinic.

Inhaled beta-agonist appeared to be the unanimous firstline treatment in both acute and chronic asthma. The key role of beta-agonist in acute asthma is well-established and widely accepted. The regular use of bronchodilators other than for symptom relief in chronic asthma is controversial<sup>(6,7)</sup>. Several epidemiological reports on asthma deaths have persistently linked the circumstantial, excessive use of beta-agonist to the increased mortality. Several recent experimental studies have further increased this concern by showing a paradoxical increase in bronchial hyperresponsiveness with long-term regular use of bronchodilators in patients with asthma<sup>(7)</sup>.

In this context, two relevant findings in this study deserve emphasis. Although the results of this study did not indicate an overall excessive dose prescription of inhaled beta-agonist by physicians, they did show that all types of bronchodilators of different formulations are used sequentially before resorting to specific disease-modifying therapy. Furthermore, it would seem that our patients also tended to underestimate the severity of their disease.

Medical audit is heavily dependent on published data and

consensus views<sup>(8)</sup>. A critical analysis of this questionnaire audit is hampered by a lack of general agreement on the best form of treatment for chronic asthma. Nevertheless, a partial consensus has resulted in preliminary guidelines which advised the use of beta-agonist solely for symptom relief of bronchospasm and advocated early use of disease-modifying drugs, in particular inhaled corticosteroids<sup>(9,11)</sup>. The results of this study are therefore pertinent and timely and suggested that we should modify our prescribing habits towards this consensus.

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