Respiratory Medicine (1995) **89**, 35–39

Knowledge of asthma and its management in newly qualified doctors in Accra, Ghana

I. F. A. HESSE

Department of Medicine, University of Ghana Medical School, PO Box 4236, Accra, Ghana

This study assessed first-year doctors' (House Officers) knowledge of asthma at the Korle-Bu Teaching Hospital. Seventy-two out of 80 doctors answered 32 questions on various aspects of asthma. Many of these doctors managed between one to three asthmatics per week. Few, however, did so by acceptable standards. In assessing the severity of asthma, 88% looked for cyanosis, 69% looked for pulsus paradoxicus and 63% looked for a fast pulse rate. Only 63% considered the measurement of peak expiratory flow useful. Ninety-four per cent used intravenous aminophylline, 82% intravenous hydrocortisone and 74% oxygen as the drug of choice for acute severe asthma. In moderate forms of acute asthma, 54% used salbutamol inhaler or intravenous aminophylline, 28% oxygen, 15% steroid inhaler and 14% oral prednisolone. Nebulized bronchodilators are not well known for use in either severe or moderate asthma and only 19–21% of doctors had prescribed their use. In chronic asthma, 55–65% of respondents prescribed bronchodilators compared to 19–35% who gave anti-inflammatory drugs. These results reveal insufficient knowledge of the pathophysiology of asthma, the use of standard drugs in asthma therapy and international guidelines for the management of asthma. The results also show that the pragmatic constraints which exist in developing countries preclude the adoption of international guidelines without local modification.

Introduction

Asthma is now recognized to be due to chronic inflammation of the airways. There is evidence of inflammation even in patients with mild forms of the disease (1). This current view of the pathophysiology of the disease has altered the traditional methods of management. Internationally, the rationale of management is primarily to reduce inflammation. Anti-inflammatory drugs are generally preferred to bronchodilators in modern practice (2).

The disease still has a significant morbidity and mortality which may increase worldwide despite the availability of potent drugs. Among the major factors which contribute to the morbidity and mortality of asthma are under-diagnosis and under-treatment by medical personnel and patients (3–5). Factors related to the availability of health care are also major contributors (6,7). In Third World countries where hospital facilities are inadequate and where current information about management may not be readily available, morbidity and mortality are expected to be even higher. Lack of knowledge of the pathophysiology of asthma has also contributed to the morbidity and mortality of the disease. To reduce mortality and morbidity of asthma in developing countries in particular, education of health personnel and even of patients on principles of the management of asthma is essential (8). This need has, indeed, been emphasized in the international guidelines for assessment and treatment of asthma (2).

In Ghana, bronchial asthma is well known and commonly encountered in clinical practice. However, very little systematic work has been done to establish its prevalence and the level of mortality. It is also important to determine the level of knowledge of practising doctors in Ghana of the disease and its management. The present study focuses on recently qualified doctors who, presumably, have current knowledge of the management of asthma from recent medical school training. A reason for choosing this group is that House Officers are first-in-line for the management of emergencies including asthma. Management problems are more likely to be associated with this group.

Methods

Seventy-two out of 80 House Officers (aged 25–32 years) at the Korle-Bu Teaching Hospital (KBTH) in Accra participated in this study. KBTH is the primary referral centre in Ghana. It has a bed capacity

Received 1 October 1993 and accepted in revised form 25 March 1994.

0954-6111/95/010035+05 $08.00/0

of 1700, and is the main hospital for training students from the University of Ghana Medical School. House Officers involved in this study had worked in the KBTH for up to 12 months after graduation from medical school. They included doctors trained at the University of Ghana Medical School, the School of Medical Sciences, Kumasi and a number from schools outside Ghana.

Each respondent answered 32 questions on various aspects of asthma, including its management. Some of the questions demanded multiple responses to determine degree of knowledge. The areas surveyed included

1. experience with the management of asthma;
2. assessing the severity of asthma;
3. choice of drugs for managing acute and chronic asthma;
4. knowledge of the effectiveness of drugs commonly used;
5. the use of analgesics, sedatives and tranquillizers for asthma;
6. knowledge of nebulized bronchodilators.

The results were analysed and expressed as numbers or percentages of those who responded.

Results

EXPERIENCE WITH THE MANAGEMENT OF ASTHMA

During the 3 month study, 51% of House Officers managed one to three asthmatics a month, 25% between one to three per week and 24% had no experience of the management of asthma. Of those who had managed patients with asthma, 82% were satisfied with the results of their management, 11% were not sure and 7% were unhappy.

ASSESSING THE SEVERITY OF ASTHMA

In assessing the severity of asthma, 88% of House Officers looked for cyanosis, 69% for pulsus paradoxicus, 63% for a rapid pulse rate, 60% for difficulty in talking, eating and walking, 36% for the degree of anxiety of the patient, 25% for the intensity of wheeze and 57% elicited history regarding the duration of the attack. Only 63% indicated they used peak expiration flow to determine the severity of asthma.

DRUGS USED FOR MANAGING ACUTE ASTHMA

The results are summarized in Table 1. Bronchodilators were the most popular drugs used for both mild-to-moderate and severe asthma; 36% would even consider prescribing Franol, a drug which 63% knew contained ephedrine and theophylline, and only 43% knew contained phenobarbitone. Steroids, especially by inhalation, were least popular, except for severe acute asthma. House Officers seldom used oxygen for mild-to-moderate acute asthma, and not all used it for severe asthma.

Table 1 Drugs which House Officers would use in the management of acute asthmatic attack

	No. (%) of House Officers	
	Moderate asthma	Severe asthma
Salbutamol inhaler	39 (54)	17 (24)
Aminophylline injection	39 (54)	68 (94)
Franol tablets	26 (36)	5 (7)
Oxygen	20 (28)	53 (74)
Hydrocortisone injection	12 (17)	59 (82)
Nebulized bronchodilators	15 (21)	21 (29)
Aminophylline tablets	9 (13)	1 (1)
Steroid inhaler	11 (15)	6 (8)
Prednisolone tablets	10 (14)	18 (25)
Adrenaline injection (1:1000)	8 (11)	17 (24)
Salbutamol tablets	7 (10)	2 (3)
Salbutamol injection	4 (6)	8 (11)
Others	3 (4)	6 (8)

Table 2 Drugs which House Officers would use in the maintenance treatment of chronic asthma

	No. (%) of House Officers
Salbutamol tablets	47 (65)
Salbutamol inhaler	46 (64)
Franol	39 (55)
Ketotifen	25 (35)
Prednisolone	21 (29)
Aminophylline tablets	16 (22)
Steroid inhaler	14 (19)
Others	16 (22)

If the patient failed to improve after initial management, 46% of House Officers referred them to a specialist, 33% increased the dose of the first-line drug, 14% continued management as before and 8% added steroids if these were not used initially. Ten per cent of respondents did not know what to do next for such patients.

DRUGS USED FOR THE CONTINUING MANAGEMENT OF ASTHMA

The choice of drugs for the continuing management of asthma is shown in Table 2. Bronchodilators were again more popular than anti-inflammatory agents. As many as 44% of House Officers continued with bronchodilators for patients whose asthma attacks became more frequent, while 21% were not sure what to do for such individuals.

Table 3 House Officers' choice of drugs for acute asthma which they considered to be most effective with minimal side-effects

	No. (%) of House Officers
Hydrocortisone injection	29 (40)
Prednisolone tablets	5 (7)
Aminophylline injection	47 (66)
Salbutamol inhaler	19 (26)
Franol tablets	4 (6)
Salbutamol tablets	5 (7)
Adrenaline (1:1000) injection	9 (12)
Aminophylline tablets	0 (0)
Steroid inhaler	6 (8)
Nebulized salbutamol	26 (36)
Salbutamol injection	1 (1)
Theophylline injection	3 (4)

DRUGS CONSIDERED MOST EFFECTIVE AND WITH MINIMAL SIDE-EFFECTS

These are shown in Table 3. Aminophylline (iv) was considered the drug of choice followed by hydrocortisone (iv), nebulized salbutamol and salbutamol inhaler. Although 44% of House Officers knew that steroid inhalers were available in Ghana, only 8% considered them to be effective and to have only minimal side-effects. Ninety-two per cent knew of the availability of salbutamol inhaler in Ghana but only 26% indicated that it was effective and safe. In contrast, 90% of those who used nebulized salbutamol considered it effective and safe, compared with 67% of those who used aminophylline (iv).

USE OF ANALGESICS, SEDATIVES AND TRANQUILLIZERS FOR MANAGING ACUTE ASTHMA

Forty-six per cent of House Officers did not give any form of analgesic, sedative or tranquillizer for the management of acute and severe asthma. Twenty-three per cent gave diazepam and 11% phenobarbitone. Eighteen per cent were not certain whether to use these drugs or not. One person indicated recourse to pethidine and another to chlorpromazine for the treatment of severe asthma. The drugs named were administered for various reasons including alleviation of anxiety, direct treatment of asthma, induction of sleep and relaxation of the patient. Twenty-eight per cent of those who gave such drugs did not indicate the rationale for their use.

NEBULIZATION OF BRONCHODILATORS

Seventy-one per cent of House Officers indicated that nebulization of β-adrenergic agonists was effective in the treatment of asthma, 28% did not know what this was, 69% thought nebulization did not require expensive equipment, and 54% indicated that only piped oxygen was required. This is compared to 40% who knew about the availability of nebulized β-adrenergic agonists at KBTH.

INTRAVENOUS ADMINISTRATION OF AMINOPHYLLINE

With regard to the intravenous administration of aminophylline, the survey revealed the following: (i) 24% of House Officers did not know the loading dose of aminophylline; (ii) 44% gave this drug at the dosage of 5 mg kg^{-1} body weight; (iii) 76% gave an initial dose of 250 mg in an adult; and (iv) 32% did not know the recommended duration for injection of the loading dose – 3% injected the loading dose over 5 min, 56% over 10 min and 10% did so over 20 min. Thirty-three per cent of those surveyed reduced the loading dose of aminophylline for patients with renal failure, 19% for chronic alcoholics, 15% for smokers, 60% for patients with impairment of liver function and 33% for patients on oral xanthines. Approximately half the number of House Officers (55%) did not know when to modify the loading dose of aminophylline.

THE PEAK FLOW METER

Thirty-three per cent of House Officers indicated they did not know about the peak flow meter and 7% thought it was expensive. Only 10% did not regard it as necessary for managing asthma.

Discussion

With reference to the international guidelines for the management of asthma (2), this survey reveals that only 25% of House Officers surveyed managed asthma patients properly. Fifty per cent have insufficient knowledge of asthma, and 25% have little or no knowledge of managing the disease. This is disturbing and probably contributes to the high morbidity and mortality of the disease in Ghana. It also reveals possible deficiencies in the basic medical training programme that must be addressed.

The initial assessment of the severity of asthma is crucial to proper and adequate management of the disease and to its future course. It is worrying therefore that many House Officers did not know the early symptoms and signs important for the proper assessment of the severity of the disease. Most would wait for gross and late signs, such as pulsus paradoxicus or cyanosis, and some would not even recognize such signs. Few knew about assessing the severity of the disease by peak expiratory flow equipment. This is not surprising, as this inexpensive equipment is not readily available in Ghana. This is therefore one of

the major contributory factors to the poor management of the disease.

Based on the pathophysiology of the disease, corticosteroids are introduced early in the treatment of acute asthma, especially in those refractory to bronchodilators or with severe forms of the disease (2,9). From this study, most House Officers for instance, reserved hydrocortisone (iv) for critical emergencies. They also preferred hydrocortisone (iv) to prednisolone tablets, suggesting they did not know prednisolone was as effective as hydrocortisone for most cases of acute asthma, which is well established (2,10). It is indicative of the lack of knowledge of the pathophysiology of the disease that many House Officers preferred bronchodilators to steroids. Another reason for this could be that House Officers were not aware that the effects of steroids manifest at least 4 h and sometimes days after administration (9–11). Certainly, this would explain why many did not describe steroid inhalers. It is also possible that House Officers do not prefer steroids as they are not aware that the short term use of systemic steroids is without significant long term side-effects.

Use of aminophylline for managing acute asthma is still controversial. Indeed, its use within the first 4 h of treatment in hospital has not been recommended (2). Among House Officers, however, aminophylline was the drug of choice for severe asthma. Two reasons may be adduced for this. Firstly, it is likely that most House Officers choose this drug because few side-effects are known from its use locally, compared with observations elsewhere. This observation by itself is of research interest, suggesting genetic differences in response to the drug. Secondly, it is more readily available, relatively inexpensive and is recommended in the *Ghana National Formulary* (13).

Nebulized β-adrenergic agonists which are known to have few side-effects and to be effective in managing asthma were used by only a few House Officers. This is because they are not readily available. From the survey, House Officers who used them confirmed that they were valuable and effective. If this form of treatment was readily available in the hospitals, many more House Officers would use it and the management of asthma would improve even where knowledge of the pathophysiology of the disease is poor. Asthmatics would benefit greatly, as oxygen is also included in this method of management. It should be noted that most House Officers surveyed would not give oxygen in asthma because they did not appreciate that there is some level of hypoxia even in mild asthma. As many as 25% did not use oxygen even for severe asthma.

Stepcare or stepwise approach to the therapeutic management of asthma is recommended in the international guidelines (2). Fortunately, many House Officers follow this practice and would either increase the dosage of drug used or refer difficult cases to a specialist. This is good practice and should still be emphasized in the educational programme of medical schools in the Third World in particular.

Although the mainstay of modern maintenance management of chronic asthma is with anti-inflammatory agents, particularly inhaled agents, only a minority of House Officers used such treatment. Several factors may explain this. The first is again the lack of knowledge of the pathophysiology of the disease, another reason is that anti-inflammatory agents known to be available in Ghana by the House Officers were also the ones they indicated were not effective or safe. Due to their inexperience, the House Officers were probably not aware of the beneficial effects of the early introduction of inhaled corticosteroids (12). Inhaled corticosteroids were not well known by the House Officers, while other prophylactic agents, such as sodium cromoglycate and nedocromil sodium, were thought not to be available in Ghana. The relatively higher cost of inhaled prophylactic agents compared with oral bronchodilators was also contributory to their low usage.

The fact that Franol was commonly used underscores the problem of poor knowledge of asthma and of the drugs available for its management. This drug, which is a combination of ephedrine (11 mg), theophylline (120 mg) and phenobarbitone (8 mg), is very popular with Ghanaian patients, not only because of its addictive properties but also because it is very cheap. In most countries the sedative component has been removed but this is not so for Ghana and for many other developing countries. The drug is still popular with House Officers though nearly all did not think highly of it. The data clearly showed that the danger of sedation in asthma is not recognized by a significant majority.

The problems raised by the results of this survey are considerable. Since these doctors received medical education in many parts of the world, the deficiencies found may be more widespread than this study indicated. There is firstly a great need for adequate education of newly-qualified doctors on asthma and its management. Here, the international guidelines in the management of asthma should be stressed. Secondly, teaching hospitals should have the essential equipment for managing asthma adequately. This should help inculcate good practice in House Officers for their future contribution to asthma health

education and care. Thirdly, in Third World countries, where financial resources are scarce, drugs imported or manufactured for asthma should be limited to those which are effective, inexpensive and have minimal side-effects. Lastly, the wide variation in the practices of these doctors indicates a need for guidelines for asthma management in developing countries such as Ghana. These guidelines should take cognizance of local circumstances, such as drug availability, cost and any variability in the response to various drugs.

References

1. Jeffery PK, Wardlaw AJ, Nelson FC, Collins JV, Kay AB. Bronchial biopsies in asthma: an ultrastructural, quantitative study and correlation with hyperreactivity. *Am Rev Respir Dis* 1989; **140:** 1745–1753.
2. National Heart, Lung and Blood Institute. International Consensus Report on Diagnosis and Treatment of Asthma. Bethesda, MD: US Department of Health and Human Services, 1992 (NIH publication No. 92–3091).
3. Johnson AJ, Nunn AJ, Sommer AR, Stableforth DE, Stewart CJ. Circumstances of death from asthma. *BMJ* 1984; **288:** 1870–1872.
4. Sears MR, Rea HH, Rothwell RPF *et al.* Asthma mortality: comparison between New Zealand and England. *BMJ* 1986; **293:** 1342–1345.
5. Speight ANP, Lee DA, Hey EN. Underdiagnosis and undertreatment of asthma in childhood. *BMJ* 1983; **286:** 1253–1258.
6. Spitzer WO, Suissa S, Ernst P *et al.* The use of β-agonists and the risk of death and near death from asthma. *N Engl J Med* 1992; **326:** 501–516.
7. Weiss KB, Wagener DK. Changing patterns of asthma mortality – identifying target populations at high risk. *JAMA* 1990; **264:** 1683–1687.
8. Mayo PH, Richman J, Harris HW. Results of a program to reduce admissions for adult asthma. *Ann Intern Med* 1990; **112:** 864–871.
9. Haskell RJ, Wong BM, Hansen JE. A double-blind randomized clinical trial of methylprednisolone in status asthmaticus. *Arch Intern Med* 1983; **143:** 1324–1327.
10. Ratto D, Alfaro C, Sipsey J *et al.* Are intravenous corticosteroids required in status asthmaticus? *JAMA* 1988; **260:** 527–529.
11. Britton MG, Collins JV, Brown D, Fairhurst NPA, Lambert RG. High dose corticosteroids in severe acute asthma. *BMJ* 1976; **2:** 73–74.
12. Haahtela T, Järvineu M, Kava T *et al.* Comparison of β_2-agonist, terbutaline, an inhaled corticosteroid, budesonide, in newly diagnosed asthma. *N Engl J Med* 1991; **325:** 388–392.
13. Republic of Ghana Ministry of Health. *The Provisional Essential Drugs List and National Formulary of Ghana*, 1988.