Decision-making in acute asthma

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SUMMARY. The management of an eight-year-old child with acute asthma was investigated by putting a semi-structured patient management problem (PMP) to 618 general practitioners. Of the 321 (52 per cent) who replied, 112 (35 per cent) would arrange for immediate admission to hospital and a further 154 (48 per cent) would have the child admitted after 30 minutes when initial home treatment appeared not to be working. Among those who would treat at home there was considerable variation in the type and intensity of treatment given. The more recently qualified were more likely to admit immediately or to treat vigorously at home (with intravenous steroids and/or aminophylline); no other characteristic of the doctor or the practice was related to admission decision or to treatment. Expectations concerning the immediate hospital management of the patient also varied widely. Comparison of the expected hospital management with actual management recorded in hospital case-notes suggested that general practitioners overestimate the use of intensive treatments (steroids, intravenous drip, oxygen) and investigations (blood gases, lung function tests, chest radiograph).

Introduction

THE continuing increase in admissions for childhood asthma, particularly self-admissions (Anderson *et al.*, 1980), has stimulated interest in the way acute episodes are managed by patients and their general practitioners. Data about pre-admission treatment by general practitioners are available from hospital records but tell us nothing about the clinical condition or treatment of patients managed at home and it is difficult to study the actual management of acute asthma in the setting of general practice. Patient management problems (PMP) (Harden *et al.*, 1979) permit the responses of a large number of doctors to be studied while the clinical characteristics of a case are controlled.

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Aims

We asked all the general practitioners of six London boroughs for their answers to a PMP dealing with acute asthma. The objectives of the survey were:

1. To examine the feasibility of the method.
2. To describe the current domiciliary management of acute asthma.
3. To describe the management general practitioners expect to be adopted in hospital.
4. To examine relationships between the stated management and characteristics of the general practitioner and the practice.

Methods

The age and clinical characteristics of a simulated patient, 'Jimmy Smith', were derived from a previous regional study of hospital case-notes of asthmatic children aged 5 to 14 years (Anderson *et al.*, 1980). The PMP was modelled on the modified essay question in the College Membership examination (Hodgkin and Knox, 1975). It was developed and piloted among 90 doctors who had attended an intensive course for general practice teachers (Freeling and Barry, 1982) and who did not live in the study area. The PMP was sent to all the doctors whose practices lay in three contiguous areas: Croydon; Merton, Sutton and Wandsworth; and Kingston and Richmond. Non-responders were not followed up. Data concerning the structure of the practice, the place and year of the general practitioner's registration and his or her qualifications were obtained from the *Medical Register* and *Medical Directory*.

Patient management problem—the case of Jimmy Smith

AT 21.30 on an October evening, Mrs Smith telephones a request for you to visit her eight-year-old son, Jimmy. The boy has had an asthmatic attack for the past 20 hours and

seems to be getting worse, despite receiving his usual treatment for attacks—2 mg of salbutamol four-hourly, as required.

You know Mrs Smith to be a reasonably sensible woman. You have never been asked by her for an evening visit for Jimmy before. Jimmy had his first episode of asthma when five-and-a-half years old. Since then he has had episodes on and off, usually at night, which have been easily controlled by the salbutamol you have prescribed for use at the mother's discretion.

Jimmy had one very troublesome episode of asthma 15 months ago. You started him on 'Intal' and prescribed it for a year, continuing to make sure that there was a supply of salbutamol at home. You realize that you have not seen Mrs Smith or Jimmy for the last four months, and Mrs Smith says she stopped the 'Intal' three months ago because Jimmy was so much better.

The family live in a comfortable, centrally heated, three-bedroom council flat. They have a car. Father is a garage mechanic. Mother used to be a hairdresser and is thinking of working part-time. Jimmy has one sister aged 11 years and a brother aged five years, both of whom are well.

Question 1. Would you ask for more information before deciding how to respond to the request?

The following further information is available, whether you elicit it on the telephone, at the Smiths' home or on your own premises.

Since Mrs Smith stopped the 'Intal', Jimmy had two episodes of wheezing at night, during the school holiday, easily controlled by a dose or two of salbutamol. Since returning to school he has had three or four more episodes and has had to sit out games on a number of occasions.

Last night Jimmy woke up with a quite severe attack, which settled with 2 mg salbutamol. He was a little wheezy this morning, but went to school. He was still wheezy when he came home and mother gave him 2 mg more of salbutamol. This reduced the wheezing for a few hours, but he was not himself and did not eat his tea or supper. Mother thinks Jimmy is now getting worse and says she has not seen him quite this bad since the episode 15 months ago. She is reluctant to have Jimmy admitted.

Jimmy does not seem to have a respiratory infection: there has been no preceding cold or cough. There is no other health problem apart from mild flexural eczema.

You do have the opportunity to examine Jimmy, who is a thin, pale boy, average in height for his age. He is sitting up on the settee in the sitting room. He is quiet—quieter than usual, according to Mrs Smith. Pulse rate is 120/min, he is afebrile, and has a respiratory rate of 30–40/min. There is indrawing of the intercostal muscles and Jimmy has a little difficulty in speaking. There is no cyanosis. There is an expiratory wheeze over all areas of the chest, but there are no wet sounds. There is evidence of flexural eczema.

Question 2. After receiving full information (history, social circumstances and physical examination) would you admit or treat at home?

Question 3. If treating at home, what treatment would you give?

Question 4. If treating at home, given there was little or no improvement after 30 minutes, would you admit or continue to treat at home?

Question 5. Irrespective of decisions as to admission, what treatment would you expect were Jimmy to be admitted to hospital?

Table 1. Drugs given at home by doctors who did not admit immediately, by admission decision after 30 minutes.

	Admission decision after 30 minutes		
Category of drug	Admit ($n=154$) (percentage)	Not admit ($n=55$) (percentage)	Total ($n=209$) (percentage)
Adrenergics (all)*	51	69	57
β-Adrenergic*	38	55	43
Other adrenergic*	14	29	18
Xanthines (all)	61	62	61
Intravenous*	30	15	25
Steroids (all)*	42	58	46
Intravenous	16	9	14
All intravenous steroids or xanthines*	36	22	33
Anticholinergic	1		
Sodium cromoglycate*	12	22	16
Antibiotics	12	20	14
Sedatives	8	11	9
Antihistamines	14	25	17
Other	5	25	10

*χ^2 admit after 30 minutes v. continue to treat at home. $P<0.05$.

Results

Six hundred and eighteen general practitioners were approached and 321 (52 per cent) responded with completed PMPs. Of these, 77 (24 per cent) would have wanted further information before deciding how to respond to the request. Only 13 (4 per cent) responders would have asked for the child to be brought to the surgery: the remainder would have visited at home.

Overall, 112 (35 per cent) of the general practitioners would immediately admit Jimmy to hospital, and a further 154 (48 per cent) would decide to admit after 30 minutes if there had been little or no response to their treatment. There was no significant association between the decision to admit and the area of practice; the doctor's sex, year, and the place or type of qualification, or whether single-handed or group practice. Among those who decided to admit, immediate admission was associated with more recent qualification (χ^2 trend 4.28, $P<0.05$), but no other characteristic of the doctors or their practices showed a significant association.

Decisions on treatment are shown in Table 1. About half of the doctors proposed giving more than three forms of treatment. As might be expected, those who did not admit Jimmy after 30 minutes recorded most forms of treatment more frequently than those who did admit, yet they were significantly less likely to use the intravenous route, particularly for xanthines. Intra-

Table 2. Doctors' expectation of hospital treatment, by decision to admit.

Category of drug	Immediate admission (n=112) (percentage)	Admission decision after 30 minutes: Admit (n=154) (percentage)	Admission decision after 30 minutes: Not admit (n=55) (percentage)	Total (n=321) (percentage)
Adrenergics	61	55	44	55
Xanthines (all)	58	46	45	50
Intravenous	31	27	27	28
Steroids (all)	67	75	62	70
Intravenous*	37	44	36	40
Sodium cromoglycate	13	14	7	13
Antibiotics*	42	27	24	32
Sedatives	13	12	11	12
Antihistamines	11	11	16	12
Other	-	2	2	1

*χ^2 df=2, $P<0.05$.

Table 3. Investigations and non-drug management expected on admission if patient were to be admitted to hospital, by admission decision.

Investigation or management	Immediate admission (n=112) (percentage)	Admission decision after 30 minutes: Admit (n=154) (percentage)	Admission decision after 30 minutes: Not admit (n=55) (percentage)	Total (n=321) (percentage)
Oxygen*	57	78	55	67
Humidifier	65	71	64	68
Intravenous drip*	29	53	44	43
Lung function test	49	58	45	53
Lung function monitoring	58	62	44	58
Chest radiograph	69	72	60	69
Blood gases	53	58	49	55
Full blood examination	31	32	36	33
Sputum for bacteriology	41	34	44	38

*χ^2 df=2, $P<0.05$.

venous therapy with steroids or xanthines was significantly associated with more recent qualification (χ^2 trend 4.25, $P<0.05$) and with single-handed practice (χ^2_4 5.07, $P<0.05$).

All respondents, whatever their decisions as to their own management, recorded what they expected would happen in hospital if Jimmy were admitted (Tables 2 and 3). There were few differences between the expectations of doctors who would have admitted Jimmy early, after 30 minutes or not at all. Most noticeable was the greater number expecting intravenous steroids, intravenous drip and oxygen among those who would have admitted after 30 minutes treatment at home without response. The general practitioners expected the hospital to monitor Jimmy's pulse and respiration at intervals varying from quarter-hourly to 4–6 hourly with about half of them expecting a half-hour interval or less. The expectation for peak-flow monitoring varied from half-hourly to 4–6 hourly. There was no association between these expectations and admission decisions.

Since the simulated case of Jimmy Smith was based on the average characteristics of school-age children admitted to hospital with asthma in the South West Thames Region, which includes the area under study, it was possible to compare roughly the expectations of general practitioners about immediate management in hospital with what is known to occur (Table 4). The general practitioners tended to overestimate the use of steroids, sedatives, intravenous drip, oxygen and humidifier, while being about right for xanthines, antihistamines and antibiotics. The underestimate of the use of adrenergics seems reasonable as Jimmy had already received them. The general practitioners greatly overestimated the frequency with which hospitals employed blood gas measurements, chest radiographs and lung function tests, but underestimated the frequency with

Table 4. Comparison of expected immediate management in hospital with data obtained by regional survey of hospital records of children admitted with asthma aged 5–14 years* (Anderson *et al.*, 1980).

Management	Simulated case ($n=321$) (percentage)	Case-note survey ($n=210$) (percentage)
Adrenergics	55	98
Xanthines	50	54
Intravenous	28	28
Steroids	70	47
Intravenous	40	22
Cromoglycate	13	35
Antibiotics	32	40
Sedatives	12	1
Antihistamines	12	12
Intravenous drip	43	20
Oxygen	67	13
Humidifier	68	9
Blood gases	55	5
Chest radiograph	69	6
Blood test	33	58
Bacteriology	38	71
Lung function test	53	34

*Mean characteristics on admission (sex, age, pulse, respiration, duration of symptoms) were the basis of the simulated case.

which blood examinations and bacteriology were carried out.

Discussion

PMPs have been used to 'challenge' general practitioners throughout Britain on problems important in their day-to-day work (Harden *et al.*, 1979), and other simulations have demonstrated general practitioners' decision-making in cases of sore throats (Howie, 1974). The PMP used in this study differed from both of these in that clinical factors were held constant. We cannot be certain that the response to our PMP resembled the individual doctor's behaviour in real life. However, there is evidence (Chaput de Saintonge and Hathaway, 1981) that the diagnostic and therapeutic responses evoked by simulations are similar to those in reality.

The structure of the PMP appeared to give little difficulty. The response rate of 52 per cent, which was similar to that obtained in other questionnaire surveys among general practitioners (Cartwright and Anderson, 1979), must be regarded as unsatisfactory for the purpose of obtaining a representative picture. Nevertheless, certain conclusions may be drawn.

There is substantial variation between general practitioners in their tendency towards hospital admission and treatment at home. The recently qualified are more likely to admit immediately or, if they treat at home, to treat vigorously. No other characteristic of doctor or practice was associated with treatment decisions except for a greater readiness among single-handed general practitioners to use intravenous aminophylline. The behaviour of single-handed general practitioners did not otherwise differ from that of those who worked in groups, which contests the frequent assumption that single-handedness is associated with poorer quality of care (*Report of a Study Group on Primary Care in Inner London,* 1981).

Doctors also varied considerably in their expectations of hospital management of the child. An unexpected finding was that this variation was not closely associated with admission decisions. The comparison between expected and actual hospital management suggests that general practitioners are not altogether familiar with current hospital practice. The way this affects admission decisions is a matter for conjecture.

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Falls in old age

An analysis of falls experienced by a stratified population sample of 553 subjects, 65 years and over, was performed. It is estimated that one third of people 65 years and over experience one or more falls in a year.

Source: Campbell, A. J., Reinken, J., Allan, B. C. *et al.* (1981). Falls in old age: a study of frequency and related clinical factors. *Age and Ageing,* **10,** 264-270.