Prevalence and management of asthma in a London inner city general practice

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SUMMARY. A study was set up to examine the prevalence and management of asthma symptoms in a London inner city general practice. All case records were examined and evidence of past or currently active asthma or wheezing illness was identified in 1032 out of 11 148 records (9.3%). This gave a cumulative prevalence of asthma or wheezing illness of 7.2% among adults and 19.5% among children aged 15 years or under. These figures are consistent with previous estimates of prevalence in the UK published since the mid 1960s.

In 92.5% of cases in which information was available, the initial diagnosis of asthma or decision to prescribe a bronchodilator was made in primary care. Only nine cases (0.9%) had evidence of recurrent wheezing without the benefit of bronchodilator therapy at any time. There was significant delay in diagnosis in children under five years compared with older children or adults. There was a significant association between a formal diagnosis of 'asthma' in the case notes and the inclination of general practitioners to monitor peak expiratory flow or offer inhaled bronchodilator or corticosteroid therapy. Of 111 asthmatics (83 adults and 28 children aged five to 15 years) with previously 'severe' disease who sought medical advice for their asthma over a 12 month period, 91.6% of adults and 92.9% of children received bronchodilator therapy; nevertheless, only 47.0% of adults and 14.3% of children received inhaled corticosteroids and only 12.0% of adults and 28.0% of children received inhaled cromoglycate. Only 59.0% of adults and 46.4% of children had at least one measurement of peak expiratory flow during the 12 months.

Although wheezing and asthma did not go unrecognized or untreated, there appeared to be delay in initiating treatment in young children, an overreliance on beta$_2$ agonists, a reluctance to prescribe inhaled prophylactic therapy and a suboptimal surveillance of lung function in this general practice population.

Introduction

RESEARCHERS in primary care have drawn attention to the large number of unreferred asthmatics in general practice populations and to the magnitude of the workload generated by asthma in general practice.[1,2] There is evidence to suggest that this workload may be increasing in the United Kingdom.[3-10] Fleming and Crombie[3] demonstrated a rise in numbers of men and women consulting for asthma in 19 British practices studied in two surveys in 1970–71 and 1981–82 and Burney's[8] study of national mortality statistics from 1974 to 1984 showed that mortality had risen annually by an average of 4.7% in the five to 34 years age group, with older age groups also affected. Although the evidence for this increase in the prevalence of the disease and in mortality have been challenged recently,[11] there is general agreement that the number of hospital admissions for asthma has increased in recent years[12] and that further surveys are needed.[4,8,11]

The potential workload generated by asthma in general practice means that general practitioners have particular responsibilities for diagnosis and management. Many people have indicated that they do not consider that these responsibilities are discharged efficiently in primary care and they have blamed general practitioners for the underdiagnosis and undertreatment of asthma, particularly in children.[7,13-18] There has been a call for surveys to address these failures in management.[7]

The present study was set up to examine the prevalence and management of asthma in a large, inner city, general practice population of mixed social class. The study was also designed to test the hypotheses (1) that the disease is underdiagnosed; (2) that, even when asthma is diagnosed, treatment may be inappropriate, with reliance on oral or inhaled bronchodilators and inadequate use of inhaled prophylactic drugs; and (3) that there is a failure of surveillance of patients with severe disease and suboptimal surveillance of lung function in general among asthmatics in primary care.

Method

Data was collected retrospectively in an undergraduate and postgraduate training practice.

Practice population

The population consisted of white people from social classes 2–5 and large Afrocaribbean and Asian minorities, living in some of London's most socially deprived inner city wards in areas administered by the Brent and Harrow, Camden and Islington and Kensington, Chelsea and Westminster family practitioner committees.

Identification of asthmatics

Case notes of asthmatic patients were identified when individuals presented to the practice and from a systematic search of the medical records of all patients registered with the practice.

A history of wheezing was considered the diagnostic criterion for asthma in this study; this approach is widely accepted.[11,15,19] Patients were included in the study if (1) a diagnosis of asthma had ever been made in general practice or hospital, whatever the presenting symptoms, (2) bronchodilator therapy had ever been administered for wheezing or bronchospasm even if a formal diagnosis of asthma was not made, or (3) wheezing or bronchospasm had been noted in the medical records on more than one occasion even if bronchodilator therapy was not given. Patients with a clinical diagnosis of irreversible chronic airflow limitation, chronic bronchitis or emphysema were excluded from the study unless a trial of systemic corticosteroid therapy had, in the view of the prescribing physician, led to significant reversibility of the airflow limitation.

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Collection of data

Case records were analysed by only one researcher (ARG) to prevent inter-observer bias. After being studied records were flagged to prevent inadvertent restudy at a later date. The following information was collected in each case: age on 1 March 1985, sex, date of onset of symptoms, past medical history, and current treatment.

During one 12-month period from 1 March 1985 to 28 February 1986 (referred to hereafter as the 'study year'), the number of consultations was recorded together with details of frequency of measurement of peak expiratory flow. Data on prevalence of asthmatic symptoms was collected retrospectively commencing on 1 March 1986 and finishing on 1 March 1989; prevalence data was based on all individuals diagnosed with asthma before March 1985 plus those asthmatics who joined the practice or were born between March 1985 and March 1989. Obviously asthmatics recognized after the start of the study year were not included in this part of the study. If no information was available from the records for any class of data, this was noted.

Statistical analysis

Data were analysed using non-parametric statistics since most of the data were not normally distributed. Group comparisons of quantitative data were made using the Mann-Whitney U test, and four-fold tables were analysed using the chi-square statistic. The data are shown with 95% confidence intervals.[20]

Results

Demographic details and prevalence of asthmatic symptoms

Out of 11 148 case records examined by March 1989, 1032 patients fulfilled the criteria for asthma or wheezing illness described above, giving a lifetime prevalence of 9.3% in the total population: 7.2% of the adult population (aged 16 years or more) and 19.5% of the child population (aged 15 years or less) (Table 1). The male:female ratio in the asthmatic population was 0.91, similar to the ratio of 0.88 in the practice as a whole.

Eventually 79.5% of the 1032 individuals fulfilling the criteria for inclusion in the study were given a formal diagnosis of asthma; 19.7% received treatment with bronchodilators but were not formally diagnosed as asthmatic and 0.9% (nine cases) had had more than one episode of wheezing recorded but had never been given a bronchodilator.

Of the 717 individuals with asthmatic symptoms who were in the practice before 1 March 1985, the start of the study year, nearly half were defined as having 'active' asthma because they consulted with asthma during the study year (Table 1). Presentation with active asthma was more frequent in females among adults and in males among children: male:female ratio of 0.65 among adults and 1.58 among children ($P<0.001$) (Figure 1).

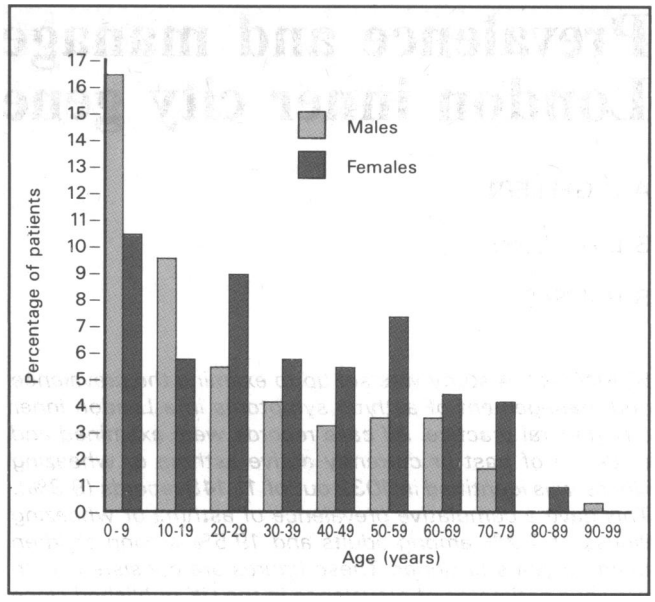

Figure 1. *Distribution of age at 1 March 1985 among 317 asthmatics presenting with active symptoms during the year 1 March 1985 to 28 February 1986.*

Age of onset of symptoms

Among those individuals for whom the age of onset of symptoms was known (423 males, 454 females), the mean age of onset of symptoms in males was 13.8 years (range one month to 88 years), significantly less than 21.1 years (range one month to 92 years) in females ($P<0.001$) (Figure 2).

Presenting symptoms and initial diagnosis

Details of initial presenting symptoms were recorded in the case notes of 732 of the individuals in the study. Cough alone was the presenting symptom in 45.4% and wheezing, with or without cough, in 48.4%. Nocturnal symptoms were recorded in 15.7%. Presenting nocturnal symptoms were recorded in the case notes of 20.5% of 424 children aged 15 years or less, significantly more often than in 9.2% of 305 adults aged 16 years or more ($P<0.001$).

Details of initial diagnostic labels chosen were available in the case notes of 765 of the individuals in the study. An immediate diagnosis of 'asthma' was made in 32.8%, 'wheezy bronchitis' was the initial diagnosis in 6.3%, 51.5% were labelled as 'bronchospasm' or 'wheezy' and the rest were given descriptive labels to reflect their presenting symptomatology. The initial label was 'wheezy bronchitis' in 10.8% of 297 children aged four years or less, a significantly greater proportion than in 0.1% of 135 children aged five to 15 years ($P<0.001$).

Table 1. Prevalence of asthmatic symptoms in the practice population and proportion consulting with 'active' symptoms during the study year 1 March 1985 to 28 February 1986.

	No. of records examined	No. of patients with asthmatic symptoms	Percentage prevalence of asthmatic symptoms (95% CI)	No. with symptoms recognized before start of study year	No. (%) consulting with 'active' symptoms during study year
Total	11 148	1032	*9.3 (8.8–9.8)*	717	317 *(44.2)*
Adults	9264	665	*7.2 (6.7–7.7)*	484	201 *(41.5)*
Children	1884	367	*19.5 (17.7–21.3)*	233	116 *(49.8)*

CI = confidence intervals.

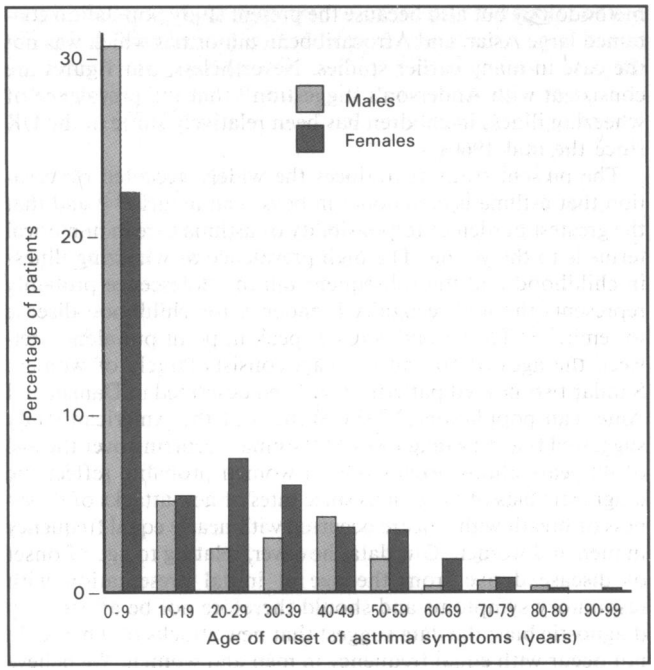

Figure 2. *Distribution of age at first onset of asthmatic symptoms among 877 patients.*

In 751 cases details were available in the medical records to indicate whether the initial diagnostic label was chosen in primary care or in hospital. In 695 (92.5%) an initial diagnosis of asthma or the initial decision to prescribe a bronchodilator drug was taken in primary care. Of 558 cases who were eventually formally recognized as asthmatic, it was known that 500 had originally presented in primary care and 47 in hospital. Asthma was the initial diagnostic label in 211 (42.2%) of those initially diagnosed in general practice, significantly less than in 32 (68.1%) initially diagnosed in hospital ($P<0.01$).

Delay in diagnosis

The mean number of consultations between presentation and recognition of the problem was 2.5 (range 1–35) in 312 adults presenting aged 16 years or more and 2.4 (range 1–38) in 133 children aged five to 15 years, significantly less than 3.2 (range 1–25) in 297 children aged four years or less ($P<0.002$). There was a tendency for bronchodilator therapy to be prescribed more often at the first consultation among adults than children; 58.7% of adults were treated at the first consultation compared with 52.3% of children aged 15 years or less ($P<0.1$). Significantly more children aged five to 15 years than children aged four years or less received bronchodilator treatment at the initial consultation (63.9% versus 47.1%, $P<0.01$).

Peak expiratory flow recordings

There were 850 individuals in the study who were aged five years or more at 1 March 1985 and could therefore be expected to cooperate with peak expiratory flow measurements. Six hundred and eighty were given a formal diagnosis of 'asthma'; of these 62.1% had at least one recording of peak expiratory flow in their case records, significantly more than the 18.9% of 169 individuals not formally recognized as 'asthmatic' ($P<0.001$).

Treatment

Treatment was studied in 317 individuals (201 adults, 65 children aged five to 15 years, and 51 children aged four years or less) who presented with asthma or wheezing illness during the study year.

Inhaled therapy. The numbers of adults and children receiving treatment with inhaled therapy are given in Table 2. Children aged four years or less were not included in comparisons between adults and children since very few children aged four years or less can be expected to cooperate with the use of inhalers. Only four children aged four years or less were receiving a $beta_2$ agonist by pressurized inhaler, five were receiving a $beta_2$ agonist by dry powder inhaler, and eight were receiving sodium cromoglycate by either pressurized inhaler or dry powder inhaler.

Table 2. Differences in inhaled therapy between adults and children presenting with active asthmatic symptoms during the study year.

	Percentage of patients	
Inhaled therapy	Adults 16+ years ($n=201$)	Children 5–15 years ($n=65$)
Inhaler[a]	*71.6*	*41.5*
Dry powder[b]	*5.0*	*16.9*
$Beta_2$ agonist	*76.6*	*55.4*
Corticosteroid	*32.3*	*7.7*
Cromoglycate	*7.5*	*20.0*

[a] Any pressurized metered dose inhaler. [b] Any dry powder inhaler.

Only two children aged one year and six months and two years, and three adults aged between 67 and 72 years were being treated with a spacer device; five children aged between four months and eight years and three adults aged between 40 and 66 years were being treated with a home nebulizer.

Of all 317 individuals who consulted for asthma related symptoms during the study year, 286 (90.2%) had been formally recognized as 'asthmatic': 67.1% of those recognized were receiving inhaled $beta_2$ agonists, compared with 16.1% of those not recognized ($P<0.001$); 24.8% of those recognized as 'asthmatic' were receiving inhaled corticosteroids compared with none of those not recognized ($P<0.01$).

Oral therapy. Numbers of adults and children receiving treatment with oral $beta_2$ agonists or theophylline derivatives are given in Table 3. Only one child and 13 adults were currently receiving systemic corticosteroid therapy.

Severe asthmatics

Among the 1032 individuals in the study 248 were considered to be suffering from potentially 'severe' asthma, defined as at least one previous admission to hospital for asthma or previous treatment with either systemic corticosteroid drugs or with a nebulized bronchodilator as an emergency for asthma related symptoms — 23.3% of the 665 adults aged 16 years or more, 26.5% of 185 children aged five to 15 years and 24.2% of 182 children aged four years or less.

Table 3. Differences in oral therapy between adults and children presenting with active asthmatic symptoms during the study year.

	Percentage of patients		
Oral therapy	Adults 16+ years ($n=201$)	Children 5–15 years ($n=65$)	Children <5 years ($n=51$)
$Beta_2$ agonist	*19.4*	*36.9*	*66.7*
Theophylline	*24.9*	*15.4*	*13.7*

Of the 'severe' asthmatics who had been diagnosed before the start of the study year only 67.5% of the 123 adults, 66.7% of the 42 children aged five to 15 years and 75.0% of the 28 children aged four years or less were seen by their general practitioner for their asthma during the year. Among the 83 adult asthmatics who were seen during the year, at least one peak expiratory flow measurement was recorded during the year for 59.0% but this was not significantly different from 47.5% of 118 adult asthmatics in the 'non-severe' group. Among asthmatic children over five years who were seen during the year, there was a tendency for more 'severe' than 'non-severe' asthmatic children to have at least one recording of peak expiratory flow measurments: 46.4% of 28 versus 21.6% of 37 children ($P<0.1$).

Among 'severely' affected individuals seen during the study year 47.0% of adults received treatment with inhaled steroids, compared with 14.3% of children aged five years or more ($P<0.01$). There was a tendency for more children than adults to receive sodium cromoglycate (28.6% versus 12.0%, $P<0.1$), although similar proportions received bronchodilator therapy with either inhaled or oral beta$_2$ agonists, or oral theophyllines (92.9% versus 91.6%).

Of 21 individuals (10 children and 11 adults) admitted to hospital during the study year, only eight (one child and seven adults) received inhaled steroids during or after the year and only one child and two adults received inhaled cromoglycate.

Discussion

We have demonstrated a cumulative, lifetime prevalence of asthma and wheezing illness of 7.2% among adults aged 16 years or more and 19.5% among children aged 15 years or less in this inner city London population. It is accepted that comparisons of prevalence estimates between studies using different methodology, diagnostic criteria and sample sizes are open to many criticisms and that the most accurate reflections of changes in prevalence would be obtained from planned serial prevalence surveys in a given population;[11,21] nevertheless, as serial surveys have not been performed in the United Kingdom, reliance must be placed on studies using differing methodology.[11]

The retrospective design of the present study suffers from some weaknesses. Inclusion criteria are softer than in a prospective survey. There are difficulties in interpreting entries in records made by general practitioners, with diagnostic and therapeutic criteria which vary within as well as between practitioners over time. Reliance on the accuracy and correct interpretation of past records is weaker at detecting changes over time than documenting events and responses when they happen and in accordance with previously agreed criteria. It should be acknowledged, therefore, that the present study may be at its weakest in testing the hypothesis that asthma is underdiagnosed. Although a retrospective study does not easily allow measurement of population changes in class, race, sex and age, that might alter the prevalence of the disease, it does have the advantage of being able to study large numbers of patients over a long period of time while also allowing detailed study of one year prevalence of active asthma; the design was chosen for this reason.

Anderson has recently reviewed prevalence studies of childhood asthma and wheezing in the UK published over a 22 year period.[11] Examination of the quoted prevalence rates, none of which included children under five years, shows a median value for cumulative lifetime prevalence in eight studies of 17.6% (range 9.9–24.9%), similar to our figure of 19.5%; in the seven studies which distinguished between 'wheezing' and 'asthma', the median of the combined lifetime prevalence rates was 22.0% (range 14.1–28.0%). Comparisons between the prevalence figures from the present study and those from previous studies must be cautious not only because of between-study variations in methodology but also because the present study population contained large Asian and Afrocaribbean minorities which was not the case in many earlier studies. Nevertheless, our figures are consistent with Anderson's suggestion[11] that the prevalence of wheezing illness in children has been relatively static in the UK since the mid 1960s.

The present study reproduces the widely accepted observation that asthma is commoner in boys than in girls[22-27] and that the greatest burden of responsibility of asthma care in numerical terms is to the young. The high prevalence of wheezing illness in childhood and the subsequent fall in adolescence probably represents the well recognized tendency for childhood disease to remit.[27-29] The second, smaller peak in point prevalence between the ages of 50 and 60 years consists largely of women. Similar two-peaked patterns have been described in Danish and American populations;[2,28] the authors of the American study suggested that new diagnoses of 'asthma' occurring over the age of 40 years almost exclusively in women probably reflect the diagnostic bias of physicians since rates of new attacks of shortness of breath with wheeze occurred with nearly equal frequency in men and women. Our data, however, relating to age of onset of disease derive from the age at initial presentation with respiratory symptoms and should therefore not be affected by diagnostic bias; the data suggest that new attacks of wheeze do not occur with equal frequency in men and women. We believe that the difference in age-related incidence of disease in men and women probably reflects a real difference in the behaviour of asthma and wheezing illness between the sexes. Why this should be the case is not known but it is a question which may merit further attention in the future.

Considerable attention has been given to potential problems in the management of asthma in primary care in recent years: failure or delay in making the diagnosis in children,[7,13,18] the infrequent recording of peak expiratory flow rates[30] and delay or failure in the prescription of bronchodilator treatment.[5,17] We found that there was a significantly longer delay between initial presentation and prescription of a bronchodilator among children aged four years or less when compared with older children, that fewer children aged four years or less received bronchodilator treatment at the initial consultation and more were diagnosed as suffering from 'wheezy bronchitis' compared with older children. These findings support those of Levy and Bell[18] who observed frequent delay in making a diagnosis of asthma in children under four years. It is possible that this delay reflects a reluctance on the part of doctors to label children as 'asthmatic' and an unwillingness on the part of parents to accept the diagnosis because of social stigmas. The importance of making the correct diagnosis has already been emphasized by Speight and colleagues from North Tyneside[17] and Jones and colleagues from New Zealand,[5] who showed that failure to apply the correct label may be associated with failure to prescribe appropriate bronchodilator therapy. Our observation that a formal diagnosis of 'asthma' in the case records was associated with a greater likelihood that the general practitioner would offer both bronchodilator and inhaled corticosteroid therapy supports their earlier findings. However, the fact that we only identified nine individuals who had wheezed repeatedly and yet had never received a bronchodilator suggests that wheezing illness only remained unrecognized on rare occasions in this inner city population, even when 'asthma' was not diagnosed. Reluctance to diagnose 'asthma' is not peculiar to primary care: even in hospital practice, 31.9% of individuals who were eventually diagnosed as asthmatic were not labelled as 'asthmatic' at their first contact with the hospital. It is possible that the reluctance of hospital doctors to label individuals as 'asthmatic' stems from similar prejudices encountered by their general practitioner colleagues.

Our findings concerning the low use of prophylactic therapy with inhaled corticosteroids are similar to those of Horn and Cochrane[31] who studied a similar London general practice population. The figures reflect overreliance on bronchodilators and a reluctance to prescribe inhaled corticosteroids in general and to children in particular. Horn and Cochrane[31] suggested that this is in sharp contrast to the central role of inhaled steroids in regimens prescribed from hospitals. The denial of such therapy to potentially high risk individuals is worrying, first, because nearly all of the patients required bronchodilator therapy with inhaled or oral beta$_2$ agonists or theophyllines and, secondly, because attention has recently been focussed on the potential hazards of overreliance on sympathomimetic therapy; such overreliance has been highlighted in studies of asthma deaths and it has been suggested that it could also be contributing to hospital admissions for asthma.[12] However, advice to general practitioners caring for asthmatics to increase their prescribing of inhaled prophylactic agents should be cautious as the study did not gather data on adequacy of control. Nevertheless, it is possible to speculate that, at least in those with 'severe' asthma, control was suboptimal; 21 individuals required hospital admission during the study year and only eight of these received inhaled corticosteroids before or after the admission. Reasons for avoiding inhaled prophylactic therapy in primary care must remain speculative; it is possible that doctors avoid inhaled corticosteroids in children because of fears of systemic effects, particularly affecting growth, and in adults because of inadequate awareness of the potential benefits of therapy.

The importance of measurements of peak expiratory flow in the management of asthma and in the recognition of potentially severe attacks has become widely accepted in recent years. We found that 52.2% of adults and 32.3% of children aged five years or more who consulted for asthma during the study year had at least one recording of peak expiratory flow made during the year; both figures are higher than the overall rate of 26% among individuals aged five to 55 years reported from a New Zealand general practice in 1986.[30] In the present study, significantly more individuals who were formally recognized as 'asthmatic' were offered measurement of peak expiratory flow at some time; it seems, therefore, that the word 'asthma' appearing in general practice records is associated not only with a greater willingness on the part of general practitioners to prescribe prophylactic therapy but also to monitor lung function.

In conclusion, as far as comparison with earlier studies allows, the present study is consistent with the view that the prevalence of asthma and wheezing illness has probably not altered significantly in the UK since the mid 1960s. It is possible that factors such as a change in the behaviour or severity of the disease rather than an increase in its prevalence may account for the recently reported increase in mortality and increase in numbers of hospital admissions. We also conclude that wheezing illness rarely remains unrecognized and untreated in this general practice population; nevertheless, there is delay in initiating treatment particularly in young children, overreliance on beta$_2$ agonists, reluctance to use prophylactic therapy and suboptimal surveillance of lung function. It is likely that the inadequacies in management identified in this population exist in other general practice populations in the UK; an awareness of such inadequacies may allow improvements in care.

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