RESPIRATORY MEDICINE (1999) **93**, 16–20

RESPIRATORY MEDICINE

# Prevalence of asthma and 'probable' asthma in the Asian population in Blackburn, U.K.

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Local research had shown increased asthma admission rates in the Asian ethnic group in Blackburn, U.K. Patients also reported that asthma seemed to develop some years after first arrival in the U.K. A community prevalence survey of respiratory symptoms and asthma was undertaken in three practices with no special asthma interest. The questionnaire was administered by a Health Visitor and language link worker. Of the Asian patients in the practices, 96·6% were studied. The age distribution was similar to that of the local 1991 census. Of the patients, 181/1783 (10·2%) had diagnosed asthma but positive responses to individual questions suggested underdiagnosis of asthma. Asthma prevalence was higher in males up to age 20 (14·6% *vs.* 8·2%), and aged over 50 (16·5% *vs.* 10·5%), but higher in females aged 20–49 (5·6% *vs.* 9·2%). There were no correlations with social class or Jarman index, and no effect of country of origin or duration in the U.K. by multivariate analysis. The prevalence of diagnosed asthma at ages 5–9 and 10–14 was higher than in previous studies. Diagnosed asthma prevalence rates fell in the 20–49 age band but rose again in the over-50s. In all age groups the prevalence of asthma is probably underestimated. Asthma prevalence was not related to social factors. The data show that those born in the U.K. are more likely to describe regular symptoms and to be on regular treatment, but that for those born abroad there was an increasing rate of symptoms and medication use with increasing duration in the country. These observations confirm patient views but are explained by the age/sex distribution of those born in the U.K. compared to immigrants.

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## Introduction

Local research into asthma admissions in 1987 (1) showed increased asthma admission rates in the Asian population in Blackburn, U.K. compared with the white population for all ages between 1 and 44 years, those for the 5–14 and 30–44 age groups being significantly increased. The same study showed that the re-admission rates for the two ethnic groups were the same. Higher prevalence of asthma in the Asian population was therefore thought to be the most likely explanation.

Various estimates of the prevalence of asthma and wheezing in the Asian population in the U.K. over the last 25 years have given conflicting results. Some studies published between 1975 and 1983 (2–4) have higher asthma prevalence rates for Asians than whites, but others (5–7) gave lower prevalence rates. Some of the studies were performed 20 years ago and mainly in children, and there has undoubtedly been an increase in asthma prevalence in general over that time. The most recently reported studies from London in 1986 (8) and Southampton in 1989–1990 (9) gave similar prevalence figures for Asian and white school-children.

Received 16 January 1998 and accepted in revised form 24 September 1998.
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We undertook a prevalence survey of respiratory symptoms and diagnosed asthma in three of our local GP practices with significant numbers of Asian patients. This covered all ages, not just school-children, and included details of place of birth and duration in the U.K., since the thoracic physicians were regularly told by recent arrivals that they had no asthma in India/Pakistan but that it had developed after being in the U.K. for several years. The results of this survey are reported below.

## Methods

All Asian patients (10) registered with three local practices with no special interest in, or provision for, asthma were sent letters in their own language, inviting them to participate in a respiratory questionnaire. Those who agreed were visited at home and the questionnaire administered, between September 1990 and May 1991, by a Research Health Visitor (PM) and a language link worker fluent in the language spoken by the family. Questions were put either in English if the respondent, or mother in case of a child, was fluent in English, and if not in their own language (Urdu, Gujerati, Punjabi) by a link worker. The questionnaire was similar to that used by Hill *et al.* (11). Age, sex, country of birth and ethnic group, whether U.K.-born or not, and duration of residence in the U.K. were all

0954-6111/99/010016+05 $12.00/0

recorded. Social class (from the Registrar General's classification) and the Jarman index (12) for the council ward were also recorded. The respiratory questions asked were: smoking history; the presence/absence of wheezy attacks of breathing; night-time cough; daily cough with sputum; morning chest tightness; wheeze after exercise; cough after change of air temperature; and whether time of work/school or housework had been limited by wheeze/shortness of breath in the preceding year. Wheeze and dyspnoea are distinct words in Urdu, Gujerati and Punjabi. Recurrent symptoms were defined as two or more episodes in the previous year. Respondents were asked if they were taking any regular medication, and if yes whether this included any type of oral/inhaled bronchodilators, or inhaled corticosteroid, disodium cromoglycate, antihistamine or antibiotic. Respondents were also asked if they were currently diagnosed as having asthma by either their GP or the hospital, and those with a history of allergic rhinitis or eczema were also recorded.

TABLE 1. Age distribution of study and district population

| Age (years) | Study sample | | 1991 Census | |
|---|---|---|---|---|
| | *n* | (%) | *n* | (%) |
| 0–4 | 309 | (17·3) | 3256 | (13·6) |
| 5–9 | 275 | (15·4) | 3664 | (15·3) |
| 10–14 | 215 | (12·1) | 3421 | (14·3) |
| 15–19 | 160 | (9·0) | 2539 | (10·6) |
| 20–24 | 158 | (8·9) | 2041 | (8·5) |
| 25–29 | 144 | (8·1) | 1549 | (6·5) |
| 30–39 | 273 | (15·3) | 3627 | (15·1) |
| 40–49 | 88 | (4·9) | 1673 | (7·0) |
| 50–59 | 101 | (5·7) | 1361 | (5·7) |
| 60–69 | 42 | (2·4) | 590 | (2·5) |
| 70 plus | 18 | (1·0) | 178 | (0·8) |
| Total | 1783 | | 23 899 | |

## STATISTICAL METHODS

Comparison of proportions between pairs of groups was by the chi-squared test with Yates' continuity correction. Averages were compared using the two-sample *t*-test. Multiple linear logistic regression was used to assess the relationship between binary variables (e.g. asthma/no asthma) and sets of potential predictor variables.

# Results

In the three practices, 1845 Asian persons were registered and eligible for study. Thirty-five declined and 27 were not traceable as they had moved and their new address was not known by the GP or the FHSA. Questionnaires were available for analysis in 1783 (96·6%) of the study population. The age distribution of the subjects is given in Table 1, where it is compared with the age distribution of the Asian population of Blackburn Borough obtained in the 1991 census.

For place of birth, 959 persons were born in the U.K., 269 in Pakistan, 383 in India, 139 in East Africa and 33 in other countries. For Social Group, 66 persons were in Social Group I, 100 in Group II, 640 in Group IIIM, 246 in Group IIIN, 415 in Group IV and 242 in Group V. Of the 984 aged over 15 years, 834 (85·2%) were non-smokers, 118 were current smokers and 28 ex-smokers.

Table 2 shows the proportion of subjects responding positively to individual questions. It also summarizes the demographic features of the positive respondents to each question and by comparing those responding 'yes' and 'no' to each question in turn, gives the univariate significance of the association of each question. All of the symptoms were associated to some degree with greater age, and for half of these symptoms this association was highly statistically significant. Immigrants to the U.K. reported significantly higher rates of daily cough and sputum, morning chest tightness, and wheeze after exercise. Smokers reported much higher rates of daily cough and sputum than non-smokers and also, to a lesser degree, significantly higher rates of night-time wheeze and cough after exercise. The sex of the patient was only associated with symptoms through the higher proportion of male smokers. Social class and Jarman index as an indicator of social deprivation interestingly had virtually no correlations with any symptoms or form of treatment.

Univariate analysis of the factors associated with a definite diagnosis of asthma found no statistically significant predictors. However, examination of possible interactions between the potential predictors showed a significant age by sex interaction, indicating that the age-specific prevalence differs between men and women. The prevalence rates were higher in men up to the age of 20 (14·6% *vs.* 8·2%), lower in those aged between 20 and 49 (5·6% *vs.* 9·2%) and higher thereafter but based on small numbers (16·5% *vs.* 10·5%). There was no significant association between asthma prevalence and the duration in the U.K. This lack of association persisted even after adjustment for the effects of age and sex.

Although 181 (10·2%) persons had a diagnosis of asthma, the positive response to individual questions [wheezy attacks of breathing ($n$=231: 12·9%); night-time cough ($n$=157: 8·8%); morning chest tightness ($n$=127: 7·1%); wheeze after exercise ($n$=152: 8·5%); and cough with change of air temperature ($n$=170: 9·5%)] suggested that there was underdiagnosis of asthma. For each of these symptoms, the associations with the place of birth, duration in the U.K. and smoking status became non-significant after the effects of age and sex were allowed for in a multiple logistic regression. Those with positive responses to one or more of the above questions, who were non-smokers but who had not been identified as asthmatic, were classified as 'probable asthma'. In contrast, daily cough with sputum ($n$=72: 4%) retained a highly significant association with smoking, and was excluded from the definition of probable asthma.

TABLE 2. Questionnaire response in relation to demographic variables

| Question | Positive responders (*n*) | Mean* age (years) | % U.K.† born | Mean* duration U.K. (years) | % Current† smoking (age 16+) |
|---|---|---|---|---|---|
| All subjects | 1783 | 21·2 | 53·8 | 11·9 | 12·3 |
| Wheezy attacks of breathing | 231 | 24·0[a] | 51·5 | 12·7 | 14·5 |
| Night-time cough | 157 | 21·8 | 55·4 | 12·2 | 19·2[a] |
| Daily cough and sputum | 72 | 30·4[c] | 30·6[c] | 15·1[c] | 28·0[c] |
| Morning chest tightness | 127 | 31·8[c] | 29·1[c] | 15·0[c] | 14·7 |
| Wheeze after exercise | 152 | 28·5[c] | 40·1[c] | 14·6[c] | 17·4[a] |
| Cough with change of air temperature | 170 | 23·9[a] | 47·7 | 13·1 | 14·9 |
| Time off work/school | 107 | 25·5[a] | 48·6 | 13·5[a] | 10·3 |
| On regular Rx | 223 | 28·9[c] | 39·0 | 14·2[c] | 12·3 |
| Oral bronchodilator | 52 | 15·2[b] | 69·2[a] | 9·0[b] | 18·8 |
| Inhaled bronchodilator | 89 | 28·0[c] | 42·7[a] | 15·6[c] | 12·5 |
| Oral corticosteroid | 4 | 39·8[a] | 25·0 | 19·8[a] | 25·0 |
| Inhaled corticosteroid | 31 | 24·2 | 54·8 | 14·0 | 6·3 |
| Antihistamine | 29 | 27·3 | 44·8 | 16·2[b] | 9·5 |
| Oral theophylline | 14 | 25·5 | 57·1 | 11·9 | 33·3 |
| Antibiotic | 12 | 20·1 | 50·0 | 10·5 | 40·0 |
| Diagnosed asthma | 181 | 21·3 | 59·7 | 12·6 | 11·8 |
| Rhinitis/eczema | 164 | 23·6 | 48·2 | 13·4[a] | 12·1 |

*Average in positive responders to each question compared with average in negative responders by *t*-test.
†Percentage in positive responders to each question compared to percentage in negative responders by chi-squared test.
[a]$P<0{\cdot}05$, [b]$P<0{\cdot}01$, [c]$P<0{\cdot}001$.

TABLE 3. Prevalence of asthma, probable asthma, and non-asthmatic by age/sex

| Age (years) | Men: Diagnosed asthma *n* (%) | Men: Probable asthma *n* (%) | Men: Non-asthmatic *n* (%) | Women: Diagnosed asthma *n* (%) | Women: Probable asthma *n* (%) | Women: Non-asthmatic *n* (%) |
|---|---|---|---|---|---|---|
| 0–4 | 14 (10·0) | 13 (9·3) | 113 (80·7) | 14 (8·3) | 12 (7·1) | 143 (84·6) |
| 5–9 | 25 (18·8) | 7 (5·3) | 101 (75·9) | 6 (4·2) | 10 (7·0) | 126 (88·7) |
| 10–14 | 21 (17·4) | 10 (8·3) | 90 (74·4) | 13 (13·8) | 3 (3·2) | 78 (83·0) |
| 15–19 | 9 (11·3) | 6 (7·5) | 65 (81·3) | 7 (8·8) | 2 (2·5) | 71 (88·8) |
| 20–24 | 3 (4·6) | 2 (3·0) | 61 (92·4) | 4 (4·4) | 6 (6·5) | 82 (89·1) |
| 25–29 | 4 (6·4) | 2 (3·2) | 57 (90·5) | 9 (11·1) | 7 (8·6) | 65 (80·3) |
| 30–39 | 9 (6·4) | 4 (2·8) | 128 (90·8) | 13 (9·9) | 26 (19·7) | 93 (70·5) |
| 40–49 | 1 (2·9) | 1 (2·9) | 33 (94·3) | 7 (13·2) | 8 (15·1) | 38 (71·7) |
| 50–59 | 9 (16·7) | 7 (13·0) | 38 (70·4) | 5 (10·6) | 13 (27·7) | 29 (61·7) |
| 60+ | 5 (16·1) | 4 (12·9) | 22 (71·0) | 3 (10·3) | 3 (10·3) | 23 (79·3) |

Table 3 shows the prevalence of asthma, 'probable asthma' and non-asthmatic by age and sex. The proportion with 'probable asthma' shows a similar pattern with regard to age and sex as was seen for diagnosed asthma. An exception was the higher prevalence in the older women. Multivariate analysis of definite or 'probable' asthma showed the significant age by sex interaction described previously, but with no significant effects of country of origin, duration in the U.K. or social class. A reduced prevalence of asthma in smokers was observed but this is explained by the definition of 'probable' asthma, which excluded smokers in case their respiratory symptoms were caused by smoking.

## Discussion

This prevalence survey, in an unselected general practice population covering all ages, had a very high (96·6%) response rate, and an age distribution very close to that of the local Asian population from the 1991 census data. The high response rate and accuracy of the data was obtained by home administration of the questionnaire by a Health Visitor assisted by a language link worker fluent in the language of the household. This home administration also elicits more accurate details for children as mothers are more likely to report symptoms than fathers (13), 45% of the reported survey being aged under 15 years.

Asthma prevalence in this survey of Asians was not related to social factors, such as social class as assessed by the occupation of the head of household, or the Jarman Index of the council ward, in keeping with the findings of Clifford (14).

The data show that those born in the U.K. were more likely to describe regular symptoms and to be on regular treatment, but that for those born abroad there was an increasing rate of symptoms and medication use with increasing duration in the country. These observations confirm patients views, but are explained by the age/sex distribution of those born in the U.K. compared to immigrants.

The prevalence of diagnosed asthma at ages 5–9 (11·3%) and 10–14 (15·8%) is much higher than the 6·2% described in 274 7–11 year olds in Southampton in 1989–1990 (9). it is also higher than the prevalence of 2·5–6·4% described by Melia in 1988 (15) in various Asian groups. Hill (11) included 400 Urdu questionnaires in Nottingham but did not specifically comment on the asthma rate in this subpopulation. Differences between our data and those of other British groups can be explained methodologically. The Southampton group (9) used a parent-completed questionnaire, was performed in 1989–1990, had a response rate of 82·3%, and translation into a native language was only available on request in response to the initial approach. Melia (15) derived data in 1983, in 20 unspecified inner-city wards in England, had a response rate of 69% in Urdu speakers and >70% in other, and was a parent-completed questionnaire in their own language. These contrast with a research/link worker-administered questionnaire with a >96% response rate, for our own data. Hill (11) in 1985 used a parent-completed questionnaire, with Urdu only available on request. Of 400 requested, only 55% responded, Hill did not specifically comment on the asthma rate in this subpopulation, but suggested significant under diagnosis of asthma since 9% of wheezers were on asthma treatment but were not labelled as asthmatic (11).

The diagnosed asthma prevalence rates fall in the 20–49 age band, but rise again in the over-50s, although the numbers are smaller. In all age groups the prevalence of asthma is probably underestimated. If those with one or more positive responses to bronchial reactivity by symptoms, who are non-smokers and not diagnosed as having asthma, are regarded as having 'probable asthma', the total asthma prevalence rises substantially. Even if the 'total asthma' prevalence is an overestimate, there is clear evidence of underdiagnosis, and that the true asthma prevalence is higher than that for diagnosed asthma.

Although this survey was not designed as a comparison between Asian and white asthma prevalences, it is clear that, certainly in children, that the prevalence of asthma in the Asian ethnic group is at least that of the white ethnic rap, and that this could also be true of older age groups as well. The reasons for the high prevalence are not shown by this survey but do not appear to be social. Clinicians should have an awareness of the high prevalence of asthma in the Asian community so that they do not contribute to its underdiagnosis.


## Acknowledgements

We would like to thank Drs M. K. and S. Datta, R. C. Rautray and R. Virdi for allowing us to study their patients; Equality at Work, Blackburn College for supplying interpreters; and Allen and Hanburys Ltd for funding the study.


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