

The role of oak pollen in hay fever consultations in general practice and the factors influencing patients' decisions to consult

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SUMMARY

Background. Patients often consult for hay fever before significant counts of grass pollen are recorded, and this has prompted the question, 'Are symptoms already present or are patients consulting to obtain medication in anticipation?'

Aim. The study is concerned with the relationship between hay fever symptoms and pollens, and also with the impact of the media on patient consulting behaviour.

Method. Symptom questionnaires were presented to patients consulting with hay fever for the first time that year in 1994 in four Birmingham practices. The questionnaire concerned the nature and duration of symptoms and the influence of the media on their decision to consult. Incidence data collected over the spring and summer periods (1989–1995) in the Weekly Returns Service (WRS) were examined in relation to pollen counts reported by the Midlands Asthma and Allergy Research Association at Derby. Data are presented for oak, birch and grass pollen, but other pollen data including rape, nettle and other trees were also examined.

Results. Questionnaire data from 1994 were analysed in two periods starting from 4 April: early (day 1–60) and late (day 61–124). Out of the 364 subjects, 38% consulted in the early period and 62% in the late period. Altogether, 41% developed symptoms before the start of the grass pollen season. Overall, 91% of patients first consulting in the early period had already experienced symptoms compared with 99% late period and were not simply collecting prescriptions in anticipation. The influence of the media on consultation behaviour was very small, except in children, 23% of whom (or their parents) were reported to be influenced. The new episode data from the WRS examined over 7 years showed an early peak that was coterminous with oak pollen, and a later and higher peak with grass pollen.

Conclusion. The consistency of the relationship between oak pollen and the early peak of hay fever over the years examined suggests that oak pollen is a major cause of hay fever symptoms.

Keywords: oak pollen; hay fever; media; patient consulting behaviour.

Introduction

IN the UK, 1–2% of patients consult their general practitioner about hay fever each year.¹ Some 24–29% of adults are thought to suffer with this condition,^{2,3} although prevalence rates vary considerably depending on the method of study, the age range of the population surveyed and the period examined.

In some years, a substantial number of patients consult in the late spring and early summer when there is little grass pollen but abundant tree pollen. Tree pollens, particularly birch, are well recognized as being a major problem in causing hay fever in Scandinavian countries.⁴ Hay fever caused by cedar pollen is important in Japan,⁵ and cross-sensitivity between different tree pollens has been described.^{6,7} In a recent review of tree pollen allergens, Ickovic and Thibaudon⁸ from Paris commented, 'Over the last ten years it has become increasingly obvious that hypersensitivity to pollen grains from trees must be given greater attention in daily practice in allergology.' Tree pollens have also been implicated in asthma.⁹

A questionnaire survey was undertaken in order: to describe the nature and duration of symptoms experienced by patients that year before the first consultation with hay fever; to investigate factors influencing the patients' decision to consult; and to relate consultation patterns and symptoms reported to grass and tree pollen counts.

Method

Questionnaires were given to patients when consulting about hay fever for the first time that year at four south Birmingham general practice surgeries between 4 April 1994 (day 1) and 5 August 1994 (day 124). List sizes were as follows: practice A, 10 500; practice B, 8000; practice C, 7800; and practice D, 6500. Practices A and B capture morbidity data for the Weekly Returns Service of the Royal College of General Practitioners, and for these, the total number of persons reported as consulting with new episodes of hay fever during the study was known. Patients or parents of children were asked by their general practitioner to complete a brief questionnaire before leaving the surgery. This consisted of a series of mainly closed questions and of rating scales ('Appendix 1').

Hay fever consulters in practice A who were missed by this method were sent questionnaires by post at the end of each week and were identified using the practice computerized morbidity database. A total of 34 additional responses were obtained in this way: these were received on average about 11 days after initial consultation. In all, 10% of patients did not give their names.

Pollen data were provided by Midlands Asthma and Allergy Research Association (MAARA). Pollen counts per cubic metre were obtained by continuous sampling in Derby using a Burkard volumetric spore trap. The grass pollen season in 1994 was determined as starting on day 40 using the method described by Emberlin *et al* and referred to as the 98% method.¹⁰ This method is widely used and retrospectively identifies the day on which the cumulative amount representing 1% of the season's total catch

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was reached.

The questionnaire was concerned exclusively with hay fever in 1994 and the analysis was split into two periods separating the two peaks of consultation: early (days 1–60) and late (days 61–124). Day 61 was 3 June 1994, the Friday of week 22. Data on the influence of the media were analysed in three age bands: 0–14 years, 15–44 years and 45 years and over. The reported symptom of wheezing was also examined by age.

The influence of the media on persons consulting in the three age groups and the influence of information from different media in those consulting in the early or late periods were examined using a chi-squared test.

Data from the RCGP Weekly Returns Service¹¹ 1989 (recording population 425 000) to 1995 (recording population 710 000) were examined by recording week in each of 7 years and compared with pollen counts reported from Derby. This examination was undertaken firstly to relate results from the questionnaire survey to the WRS network of practices, and secondly, to consider the results in the survey year (1994) in relation to those from other years.

Results

Survey sample

A total of 364 questionnaires was available for analysis: 205 from practice A, 56 from practice B, 70 from practice C and 33 from practice D. Questionnaires were obtained from 75% of hay fever sufferers who consulted in practice A and 24% in practice B. The proportions in practices C and D are not known. Some patients did not answer every question. For example, age data were provided by 350 respondents: 89 in age group 0–14 years; 233 in age group 15–44 years; and 28 aged 45 years and over. Mean age was 24.7 years. Patients had experienced hay fever for a mean of 9 years (315 responses). Altogether, 56% of respondents were female with a mean age of 26.9 years and 44% were male with a mean age of 21.6 years (353 responses). Results in practice A were very similar to those in the other practices, and thus, are not reported separately.

Hay fever season

The weekly distribution of first recorded consultations of the 364 respondents is compared with the average daily pollen counts (grains per cubic metre) for grass, oak and birch in Figure 1. The graph of WRS new episodes of hay fever for that year is also shown and demonstrates a very similar trend across the season. Two peaks of consultation are shown: the larger one was concurrent with grass pollen and a subsidiary earlier peak was evident when oak pollen was prevalent. A total of 137 (38%) patients consulted in the early period and 227 (62%) in the late period. Altogether 20% consulted before day 40. The mean age of those attending in the early period was 24.2 years and 25.0 years in the late period. Overall, 43% of those attending in the early period and 44% in the late period were males.

Onset of symptoms

The mean duration of symptoms before consultation was 23 days; median 14 days (339 responses). This time lag between symptom onset and consultation was less in the patients consulting in the early period (Table 1). Mean duration of symptoms in patients consulting before day 40 was 11 days. In all, 41% reported developing symptoms before day 40 and 64% before day 61.

Symptoms experienced

At the time of consultation, 349 (96%) out of the 364 respon-

dents had already experienced symptoms that year (91% of those in the early period and 99% of those in the late period). Some 89% of those consulting before day 40 had already experienced symptoms. A total of 13 out of the 15 asymptomatic patients consulted in the early period. Analysis of symptoms reported in the questionnaires is given in Table 2. Those consulting in the late period reported more symptoms, which might be expected because their duration of exposure to pollen would be longer. The commonest of the 'other symptoms' reported were sore/irritable throat (6%), respiratory problems (4%) and headache (3%). The incidence of wheezing or asthma was similar in all three age groups: 0–14 years, 30%; 15–44 years, 31%; and 45 years and over, 32%.

Factors influencing decision to consult

Patients were asked to rate the factors influencing their decision to consult on that particular day. The proportion reporting high ranks (3 or 4 on a scale of 0–4) is given in Table 3. Approximately three-fifths of persons consulting in the early period reported that their decision to consult was influenced by current symptoms, but four-fifths rated highly 'expectation of worsening symptoms'. These figures were reversed among those consulting in the late period. The influence of television, newspapers and radio combined on consulting behaviour was examined in the three age groups, the results showing that the proportion of high ratings decreased significantly as age increased: 23, 9 and 7%, respectively (overall chi-squared=12.44, $P<0.005$; chi-squared for departures from a linear trend=2.29, $P>0.01$). The percentage of patients indicating a high degree of media influence were: television, 15%; radio, 3% and newspapers, 5%. A

Table 1. Percentage of persons consulting for the first time in three time periods representing the delay between the onset of symptoms and consultation.

| | Time period (days) | | |
|-------|--------------------|-------|-----|
| | 0–14 | 15–28 | 28+ |
| Early | 71 | 19 | 10 |
| Late | 41 | 25 | 35 |

Table 2. Percentage of patients reporting specific symptoms before consultation.

| | Sneeze | Blocked nose | | Lethargy | Asthma/wheeze | | Others |
|-------|--------|--------------|----|----------|---------------|----|--------|
| | | Eye | | | | | |
| Early | 89 | 79 | 80 | 25 | 29 | 20 | |
| Late | 96 | 86 | 95 | 34 | 34 | 27 | |

Table 3. Percentage of patients with a high response to the question: 'Which factors have influenced your decision to see the doctor today about your hay fever symptoms?'

| | Experiencing symptoms at present | | Expecting symptoms to get worse | | Newspaper |
|----------|----------------------------------|-------|---------------------------------|-------|-----------|
| | Television | Radio | Television | Radio | |
| Early | 59 | 81 | 9 | 3 | 5 |
| Late | 76 | 67 | 19 | 3 | 4 |
| <i>n</i> | 327 | 327 | 246 | 193 | 202 |

high rating for television influence was reported by 9% in the early period and 18% in the late period ($\chi^2=3.6, P<0.1$). Comparison of the early and late groups showed that roughly equal, but small, numbers were influenced by radio and newspapers. Other factors influencing consultation were previous experience (5%), medicines cheaper on prescription (1%) and exams (1%).

Data from other years

Weekly Returns Service data on hay fever and pollen data from Derby for 6 of the last 7 years are shown in Figure 2. Data for 1994 are shown in Figure 1. The early peak of consultations correspond with oak pollen and the late peak of consultations with grass pollen. Examination of the 7 years' data showed that the midpoint of the birch pollen season occurred on average 22 days (range 16–30 days) before the midpoint of the oak pollen season.

Discussion

Questionnaire survey design

Recruitment in the four practices varied, but the results from the practice making the largest contribution were very similar to those in all practices combined, suggesting that bias in recruitment did not affect the overall results. The main strength of the survey was that, except in the small number (9%) recruited by post, responses were given on the actual day on which the patient consulted. It is extremely unlikely that a patient could

complete more than one questionnaire; 90% gave their names and doctors were briefed to give the questionnaires to patients attending for the first time that year. Data from the questionnaire survey and the WRS do not include information on repeat prescriptions.

Relationship of onset of symptoms and consultation date to pollen counts

The results of the questionnaire survey show that, in England and Wales, what is described as hay fever often develops before grass pollens are present. One-fifth of the patients consulted before the start of the grass pollen season, and the vast majority were already symptomatic. A total of 38% consulted in the early period before any substantial amount of grass pollen was found. Two-fifths (41%) reported developing symptoms before the start of the grass pollen season, again in the period when tree pollens were prevalent.

In the early period, the rise in consultations coincided with a rise in oak pollen counts, and this is demonstrated for the other years examined. The close relationship between the timing of consultations and the grass pollen count in the late period indicates that people present when grass pollen counts are high even if they have experienced symptoms earlier. In explanation of the early peak of consultations, it is possible that a few patients may simply be sensitive to very low levels of grass pollen, but most importantly, the bimodal pattern of consultations indicates that most of the early consulters were sensitive to earlier pollens. It is generally accepted that grass pollens are the chief cause of hay fever in the late period; these data suggest that oak pollen is the chief cause in the early period. Birch pollen counts had fallen by the time any substantial increase in consultations occurred. There were only very low levels of other pollens (including oilseed rape) early in the hay fever season in the last 7 years.

Taudorf and Moseholm¹² found that the response to a given birch pollen impulse decayed exponentially with a decay half-life of between 1 and 2 days. Loth¹³ found a similar relationship between hay fever symptoms and exponential grass pollen counts with a half-life of 1–2 days. Therefore, it is extremely unlikely that the early peak could be a delayed response to birch pollen.

In a study of adults in a London general practice, Sibbald and Rink² found that 57% of subjects with seasonal rhinitis had evidence of allergic reaction to tree pollen on skin-prick testing compared with 76% with reactions to grass pollen, but did not specify which trees. Ickovic and Thibaudon⁸ felt oak pollen to be a weaker allergen than birch pollen, but commented on several patients who were sensitive to oak pollen both *in vivo* and *in vitro*. Interestingly, 29% of those attending in the early period had already experienced wheezing or asthma and similar allergic triggers in hay fever are likely to be relevant in asthma.

Which factors influence patients decisions to consult?

Only 15% of patients reported that television information on hay fever had a major influence on their decision to consult; most patients did not consider the media as having much influence except in the young or their parents who may have filled in the questionnaire on their behalf. Television was perceived as having less influence on those consulting in the early period rather than in the late period, again suggesting that persons consulting in the early period are responding to symptoms and not to media influence. The increased influence of television later in the season may be a cumulative effect of media coverage. For some patients, consultation is partly anticipatory, but a large number consult because they have significant symptoms.

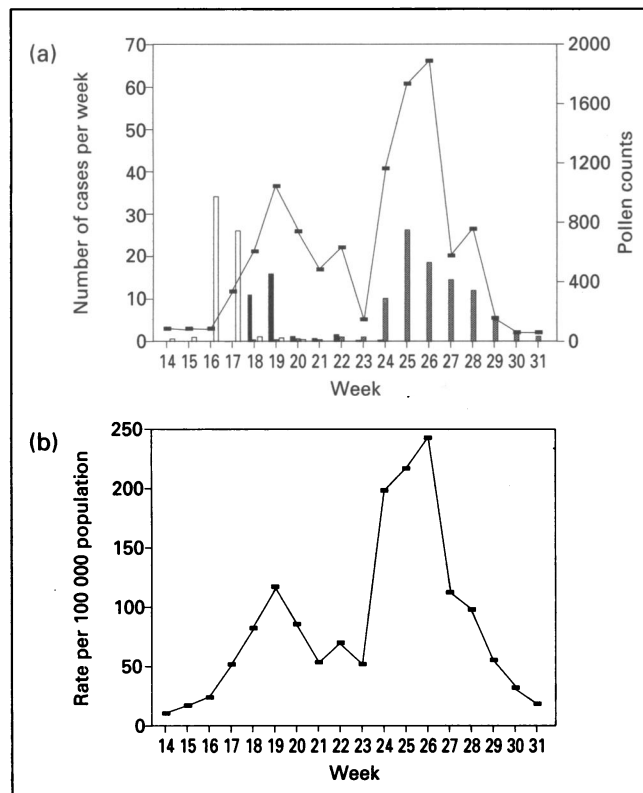


Figure 1. Comparison between weekly consultations from questionnaire and hay fever rates from the Weekly Returns Service (WRS): (a) Weekly consultations from questionnaire compared with weekly pollen count 1994; and (b) WRS hay fever, weeks 14–31, 1994. Key: (—) hay fever; (■) oak pollen; (■) grass pollen/2; (□) birch pollen/4.

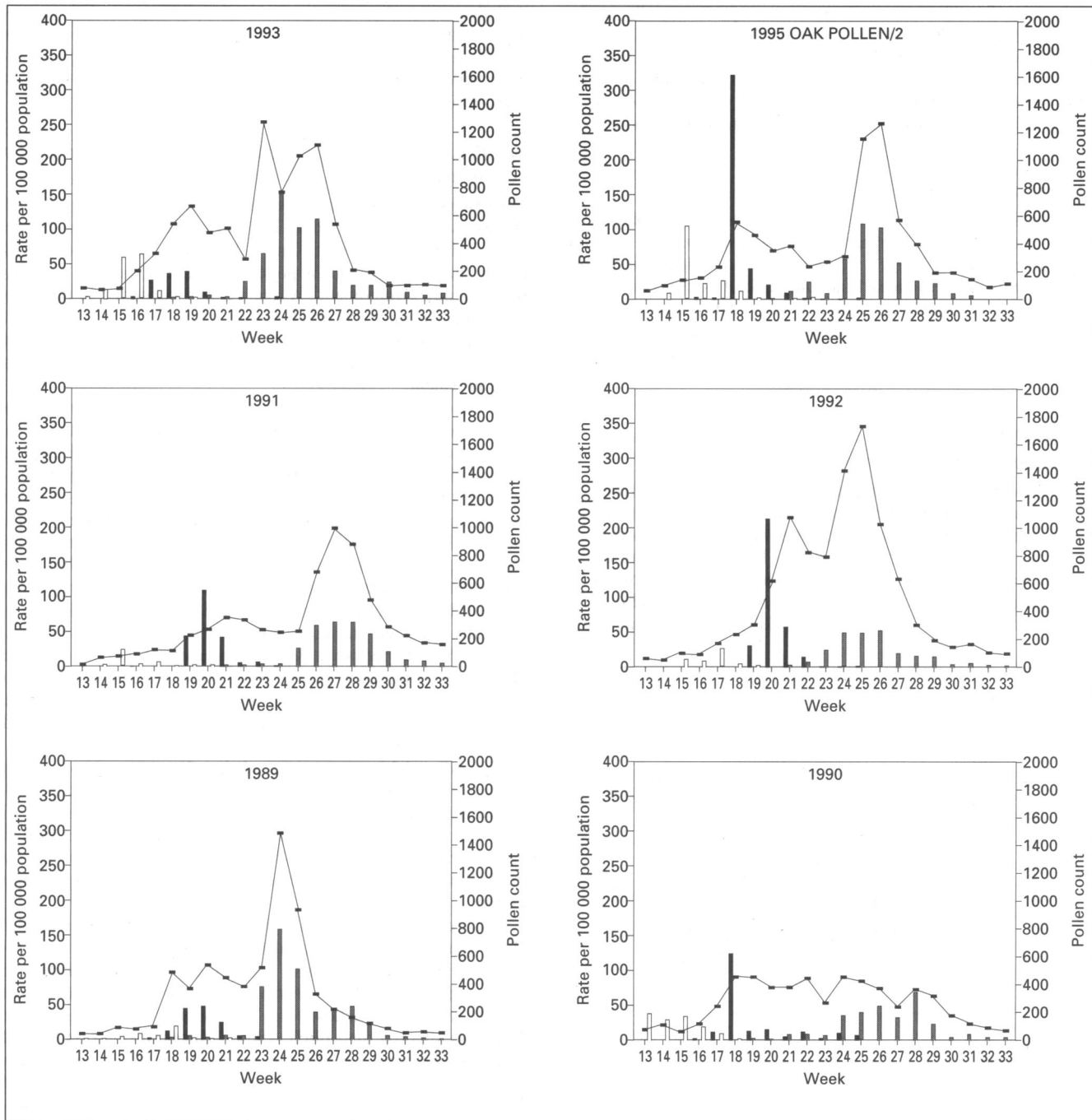


Figure 2. Weekly Returns Service new episodes of hay fever for 1989–93 and 1995 (→). Comparison with weekly grass pollen counts divided by 2 (■), and weekly birch pollen counts divided by 4 (□) and oak pollen counts divided by 2 (●)(oak divided by 2 for 1995 only).

In summary, most patients consulting with hay fever have already experienced symptoms that year. The media do not appear to have a major impact on the early consultations, and the questionnaire survey demonstrates that the early peak of hay fever consultations is a true response to symptoms. The timing of the early peak in the questionnaire survey in 1994 corroborated by WRS data for that and for other recent years provides strong evidence to link the early presentations of hay fever symptoms with oak pollen. We believe this is a new finding and we suggest this association represents cause and effect.

Appendix 1

Dr Zuckerman and Partners

Dr Andrew Ross is conducting a survey into the reasons why patients consult their doctor with hay fever symptoms and would be grateful if you could help him by filling in this short questionnaire. The answers you give will be confidential and you will not be identified in any report.

1. Date
2. Have you experienced symptoms of hay fever so far this year?
 YES
 NO Please indicate with an X

If 'No' go to Question 5

3. If you answered 'Yes' to (2) above, please indicate which symptoms you have experienced so far this year.

| | | |
|---------------------|--------------------------|--------------------------|
| Sneezing? | <input type="checkbox"/> | |
| Blocked nose? | <input type="checkbox"/> | |
| Sore or itchy eyes? | <input type="checkbox"/> | Please indicate with a X |
| Lethargy? | <input type="checkbox"/> | |
| Wheezing or asthma? | <input type="checkbox"/> | |

Others? Please specify

4. How long ago did your symptoms start this year, e.g. 3 days ago, one week ago etc.?

5. Which factors have influenced your decision to see the doctor today about your hay fever symptoms? Please indicate by circling the appropriate number for each of the following.

| | No influence | Great influence | | | |
|--|--------------|-----------------|---|---|---|
| (a) Experiencing symptoms at present | 0 | 1 | 2 | 3 | 4 |
| (b) Expecting symptoms to get worse | 0 | 1 | 2 | 3 | 4 |
| (c) Information on hayfever from the following | | | | | |
| (i) Television | 0 | 1 | 2 | 3 | 4 |
| (ii) Radio | 0 | 1 | 2 | 3 | 4 |
| (iii) Newspapers | 0 | 1 | 2 | 3 | 4 |
| Any other reason? Please specify:- | | | | | |
| | 0 | 1 | 2 | 3 | 4 |
| | 0 | 1 | 2 | 3 | 4 |

Number of years experienced hay fever?

Date of birth

Male/female

Name, if possible

Please write your name/ If you do not wish to do so, leave blank.

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