

Upper respiratory tract infection: predisposing factors and duration of symptoms in patients over 12 years of age

S.P. BULLIMORE, MB
General Practitioner, Dewsbury, West Yorkshire

SUMMARY. *Some patients suffer greatly from upper respiratory tract infections, while others suffer much less. Various factors, such as allergy and nasal injury, have been suggested in the literature to predispose patients to infection. Predisposing factors and patterns of disease were examined in a prospective, controlled study of 238 patients attending two general practices. A questionnaire, designed to study the development and duration of upper respiratory symptoms and the occurrence of factors which predispose patients to disease, was completed for index and control patients when they presented with symptoms. A follow-up card was completed by index patients one month later.*

Family history of catarrh was found to be a significant predisposing factor to upper respiratory tract infection. However, no significant differences between index and control patients were found for any of the other generally accepted factors. Heavy smoking and increased age were associated with prolonged symptoms lasting 60 days or more.

It is concluded that traditional theories of the causes of upper respiratory tract infections may need to be revised.

Introduction

UPPER respiratory tract infection accounts for much of the morbidity seen in general practice. However, it is not known why some patients recover in a week without treatment while others suffer weeks of discomfort.

It is stated¹⁻³ that catarrhal illnesses usually start with a coryzal infection of viral origin and that factors such as allergy and structural abnormalities of the nose predispose patients to secondary bacterial infection. However, much of the literature on the subject concentrates on whether or not to prescribe antibiotics for a 'cold'.^{4,5}

In 1942 Jennison⁶ studied the distribution of droplets from coughs and sneezes and suggested that living or working in a confined space contributes to infection. Other studies have taken a careful look at the bacteriology and virology of upper respiratory tract infections.⁷ Kern⁸ divided sinus infections into acute (lasting 1-21 days), subacute (three weeks to three months), and chronic (three months or longer). Viral infections are normally considered to show symptoms for about seven days.⁹

This study attempted to determine the factors predisposing patients to upper respiratory tract infection, especially patients whose symptoms are prolonged.

Method

A prospective controlled study of general practice patients given a principal clinical diagnosis of upper respiratory tract infection was carried out between January and October 1985. Pa-

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tients under 12 years of age were excluded, because they have undeveloped sinuses¹ and because children show different patterns of infection from adults. Patients with otitis media or tonsillitis only were excluded.

Three general practitioners from two practices in Dewsbury, West Yorkshire were involved in the recruitment. Each practice comprises one part-time and two full-time partners and has about 6400 patients. Dewsbury is a mill town with some coal-mining and a fairly high rate of unemployment. Some of the patients attending the practices live in the surrounding rural areas.

Following the recruitment of each index patient the next patient of the same sex and age attending surgery with a different complaint was selected as a control. A questionnaire asking about the symptoms at the onset of illness and at the time of consultation and their duration was administered to both index and control patients. The questionnaire also asked about smoking habit, previous nasal injuries and operations, allergies and other factors likely to be related to respiratory problems. It was designed to be simple and quick to complete as this had to be done during a normal consultation and it generated only numerical and binary data which could be easily handled by computer.

Index patients were also sent a printed postcard which they were asked to return one month after the original consultation, stating when the infection had cleared up. They were also asked if they had had a further respiratory infection during that month. If the postcard was not returned the patient was reminded by telephone, in the surgery or by letter.

The patient's treatment was recorded. No modification of treatment was made for the purposes of the study.

Statistical analyses were carried out using McNemar's test for paired qualitative data. A signed rank test was used to compare the smoking habits of index and control patients. The effects of the variables on the duration of symptoms among index patients was assessed using the Mann-Whitney U-test. The effect of age on duration was calculated using a rank correlation test. The significance of differences between the two groups for quantitative data such as the mean age, numbers of children and house occupancy was determined by calculating the standard error. The results were analysed using a Commodore CBM 8296 DG microcomputer.

Results

Of the 119 index patients recruited 38 were male (32%) and 81 female (68%). In order to ensure that recruitment by a female part-time doctor had not resulted in this predominance of female patients the characteristics of patients recruited by a male full-time doctor were examined. He recruited 33% males and 67% females which was not significantly different from the figures for the three doctors combined. The average age of the index patients was 34.7 years and of the 119 control patients recruited 35.7 years. Information on social class was available for 74% of the index patients and the social class distribution was similar to that found in the general population.

Sampling of surgeries during the study period showed that on average two patients per surgery were missed from recruit-

ment during a busy period when staff were ill. When the age and sex of these patients was compared with the index patients it was found that again females predominated but the average age was a little higher. The numbers were insufficient for statistical comparison.

After reminders 87% follow-up at one month was achieved. The average duration of symptoms for the index patients was 31 days. The majority (74%) had recovered within 40 days but 26% of the patients had symptoms for between 41 and 100 days. Eighteen index patients (15%) had a second respiratory infection during the follow-up period.

The 13 index patients who had symptoms for more than 60 days were compared with the rest of the index group. There was a higher proportion of heavy smokers (more than 20 cigarettes per day) among those with a longer duration of symptoms, three out of 13 compared with three out of 106 ($P < 0.05$). In addition the average age of the group with prolonged symptoms (41.5 years) was greater than the average age of all index patients (34.7 years) ($P < 0.001$) and was nearer to the average age of the total surgery population (42.8 years).

Fourteen control patients had upper respiratory symptoms and the average duration of these symptoms up to the time of consultation was five days. However, as follow-up data was not obtained from these patients their symptoms could not be directly compared with those of the index patients.

The 119 index patients had a total of 572 upper respiratory symptoms (mean 4.8 per patient) at the time of consultation and the 14 control patients who had upper respiratory symptoms had a total of 34 (mean 2.4 per patient).

The characteristics of the patients and the various factors commonly believed to predispose to infection were compared for the index and control patients (Table 1).

Of the 50 patients who reported nasal injury or surgery additional information was available on 23. Eleven index and nine control patients had undergone surgery, chiefly adenoidectomy. Three index patients had suffered injuries; all were women — one had had four nasal fractures, one had had two fractures and the other one.

The allergies listed by index patients were similar to those suffered by control patients, with similar proportions of allergies which affect the respiratory system.

Table 1. Comparison of characteristics of index and control patients.

Characteristic	Index patients (n = 119)	Control patients (n = 119)
Non-smoker	80	73
Smoker	39	46
History of nasal injury or surgery	30	20
Family history of catarrh ^a	62	34***
Occupational exposure to		
Dust	31	29
Fumes	12	4
Hay/grass	4	8
Other irritant	4	3
History of allergy	30	36
Had been swimming < five days before consultation	7	3
Mean number of children	1.9	1.9
Mean occupancy of house (rooms/person)	1.7	1.6

*** $P < 0.001$. ^aBlood relatives suffering frequently from colds and catarrhal illnesses.

Discussion

Patients who consult doctors with upper respiratory tract infections are generally suffering from severe and prolonged symptoms. More women than men consult with these infections probably because most men are at work and find it more difficult to get to surgery.

The theories¹⁻³ which have been put forward about the aetiology of upper respiratory tract infections are not entirely born out by this study. However, only patients consulting with symptoms and controls attending the surgery were interviewed and the numbers involved were not large. Therefore general conclusions relating to the whole population cannot necessarily be made.

Nevertheless it is interesting that only family history of catarrh proved a significant risk factor (Table 1). There are probably many reasons for this. Contact with relatives is likely to be important and the tendency to allergies and atopy is familial. However, the incidence of allergies in index and control patients was similar. A further possibility is that facial bone structures which obstruct outflow from sinuses may run in families.

The long duration of symptoms experienced by some patients was also striking. Significant factors in the group who had symptoms for more than 60 days compared with other index patients were increased age and heavy smoking. It is likely that advancing age impairs the body's ability to fight infection; the immune system may be less efficient, the mucosal cilia less powerful and the blood supply less abundant. Each successive infection causes further damage to the nasal structures and with increasing age the damage is likely to be greater. Nicotine is known to paralyse cilia activity, thus compounding the problem.

It can therefore be concluded that the accepted theories¹⁻³ about the causes of upper respiratory tract infections may need to be questioned.

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Acknowledgements

I thank Drs J. Hicks and G. Rathbone for their help in recruiting patients; Professor I.M. Stanley of the University of Leeds for advice and encouragement and Dr D.W. Bullimore for the computer programs.

Address for correspondence

Dr S.P. Bullimore, Savile Centre, The Town, Thornhill, Dewsbury WF12 0QY.