Reattendance and complications in a randomised trial of prescribing strategies for sore throat: the medicalising effect of prescribing antibiotics

P Little, C Gould, I Williamson, G Warner, M Gantley, A L Kinmonth

See also editorial by Majeed

Primary Medical Care, Faculty of Health, Medicine, and Biological Sciences, Aldermoor Health Centre, Southampton University, Southampton SO16 5ST
P Little, *GP Wellcome training fellow*
C Gould, *research assistant*
I Williamson, *senior lecturer in primary care*
M Gantley, *anthropologist*
A L Kinmonth, *professor of primary medical care*
Nightingale Surgery, Romsey, Hants SO16 5ST
G Warner, *general practitioner*
Correspondence to: Dr Little.

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Abstract

Objective: To assess the medicalising effect of prescribing antibiotics for sore throat.
Setting: 11 general practices in England.
Design: Randomised trial of three approaches to sore throat: a 10 day prescription of antibiotics, no antibiotics, or a delayed prescription if the sore throat had not started to settle after three days.
Patients: 716 patients aged 4 and over with sore throat and an abnormal physical sign: 84% had tonsillitis or pharyngitis.
Outcome measures: Number and rate of patients making a first return with sore throat, pharyngitis, or tonsillitis. Early returns (within two weeks) and complications (otitis media, sinusitis, quinsy). Outcomes were documented in 675 subjects (94%).
Results: Mean follow up time was similar (antibiotic group 1.07 years, other two groups 1.03 years). More of those initially prescribed antibiotics initially returned to the surgery with sore throat (38% *v* 27%, adjusted hazard ratio for return 1.39, 95% confidence interval 1.03 to 1.89). Antibiotics prescribed for sore throat during the previous year had an additional effect (hazard ratio 1.69, 1.20 to 2.37). Longer duration of illness (> 5 days) was associated with increased return within six weeks (hazard ratio 2.90, 1.70 to 4.92). Prior attendance with upper respiratory conditions was also associated with increased reattendance. There was no difference between groups in early return (13/238 (5.5%) *v* 27/437 (6%)), or complications (2/236 (0.8%) *v* 3/434 (0.7%)).
Conclusions: Complications and early return resulting from no or delayed prescribing of antibiotics for sore throat are rare. Both current and previous prescribing for sore throat increase reattendance. To avoid medicalising a self limiting illness doctors should avoid antibiotics or offer a delayed prescription for most patients with sore throat.

Introduction

A systematic review showed only marginal benefit from antibiotics for sore throat,[1] which must be balanced against side effects, including "medicalisation"[2] —making people more likely to seek medical care for future illness. Assessing medicalisation requires open randomised trials.[3] We previously reported that antibiotic prescribing increases patients' belief in antibiotics and intention to reconsult, compared with either not prescribing or offering a delayed prescription.[3] Immediate prescribing should, therefore, increase reattendance. We report here a comparison of the complication and reattendance rates of patients given immediate prescriptions and those managed by other strategies and report other predictors of reattendance.

Method

The methods have been fully reported:[3] 716 patients with sore throat and an abnormal physical sign were randomised to three prescribing approaches supported by advice sheets. These approaches were: (*a*) a 10 day prescription of phenyoxymethylpenicillin, (*b*) no antibiotics, and (*c*) a 10 day prescription of antibiotics to collect if the sore throat had not started to settle after three days. Groups were well differentiated in reported antibiotic use, attitude, and intention.[3]

Outcome assessment

Notes review—All patients had their notes inspected in summer 1996 (follow up 2 months to 2.5 years after trial entry) for subsequent presentations. We counted all entries where sore throat, pharyngitis, tonsillitis, otitis media, or quinsy was noted either in the main complaint or in the clinical description. Attendances before randomisation were also noted, and whether antibiotics had been prescribed.

Observer bias—Details of the randomised episode were removed from photocopies of 75 randomly chosen sets of notes from the largest practice, the notes reassessed, and the data re-entered. The original assessment was compared with the blinded assessment.

Sample size calculation (for 80% power, 95% confidence using the EPI INFO program)—For the principal comparison (the initial antibiotic group versus the other two groups) a 40% relative increase in reattendances[2] —or a 15% absolute increase (antibiotics 40%, others 55%; hazard ratio 1.38)—required 417 patients, or 596 allowing for 30% loss to follow up.

Data entry and analysis—Data were entered and analysed on an intention to treat basis using SPSS and STATA for windows. Cox proportional hazard

regression was used to estimate hazard ratio of first return to the surgery for sore throat, pharyngitis, or tonsillitis (a "failure"), data being censored then or at the end of follow up. We tested predictive features in the model using the likelihood ratio χ^2 test by forward selection of significant terms (at the 5% level), terms being retained if there was no evidence of significant multi-collinearity. The proportional hazards assumption—that the effect of regressors does not vary with time—was assessed using interaction terms according to three follow up periods (0-45, 46-179, >179 days) defined by tertiles of the distribution of returns to the surgery.

Results

Notes were reviewed for 675 (94%) subjects. Results are presented for the intial antibiotic group versus the other two groups. Group characteristics (table 1) and mean follow up time were similar (1.07, 1.03 years respectively, P = 0.2). Prescribing antibiotics increased return to the surgery (38% versus 27%), with an additional effect from previous prescribing (see table 2). A longer duration of illness increased the return rate, confined to the first follow up period (hazard ratios for 0-45, 46-179, and >179 days respectively 2.86, 0.83, 1.13, likelihood ratio χ^2 (2 df) 11.05, P = 0.0004); 23 of these 34 returns (68%) occurred within two weeks and 17/34 (50%) within eight days. Increasing prior attendance with upper respiratory illness was also associated with future reattendance for sore throat (z test for trend 2.03, P = 0.04); this effect was not confounded by the frequency of sore throats, as reported by patients in the end of study questionnaire. There was no difference between the antibiotic and other groups in the proportion of early returns (respectively 13/238 (5.5%) v 27/437 (6%)) or complications (otitis media, sinusitis, quinsy: 2/236 (0.8%) v 3/434 (0.7%)). Sociodemographic or psychosocial factors measured at the index consultation did not predict future reattendance (table 3).

Table 1 Characteristics of randomised group and of those where notes were available to be reviewed. Values are numbers (and percentages)

	Immediate antibiotic group	Other groups	Total	χ^2 (P value)†
Age >12 years				
Randomised group	187/246 (76)	354/466 (76)	541/712 (76)	0; P=1.0
Reviewed	182/238 (76)	328/435 (75)	510/673 (76)	0.03; P=0.8
Sex (male)				
Randomised group	95/246 (39)	164/469 (35)	259/715 (36)	0.8; P=0.6
Reviewed	94/238 (39)	154/437 (35)	248/675 (37)	1.0; P=0.3
Prior duration > 3 days				
Randomised group	82/242 (34)	183/464 (39)	265/706 (37)	1.9; P=0.2
Reviewed	80/234 (34)	168/432 (39)	248/666 (37)	1.2; P=0.3
Pharyngitis				
Randomised group	155/246 (63)	309/468 (66)	464/714 (65)	0.5; P=0.5
Reviewed	148/238 (62)	289/436 (66)	437/674 (65)	1.0; P=0.3
Cervical glands				
Randomised group	127/246 (52)	238/468 (51)	365/714 (51)	0.1; P=0.9
Reviewed	123/238 (52)	224/436 (51)	347/674 (51)	0; P=1.0
Reviewed only (no information for randomised group)				
Longer duration (>5 days)	70/209 (33)	141/365 (39)	211/579 (36)	1.8; P=0.2
Antibiotics for sore throat in previous year	44/238 (18)	79/437 (18)	123/675 (18)	0.0; P=1.0
Cough	141/214 (66)	238/365 (65)	379/579 (65)	0.0; P=0.9
Further education*	85/211 (40)	135/358 (38)	220/569 (39)	0.3; P=0.6

Denominators vary due to missing data.
*Further education: vocational qualification or higher degree.
†χ^2 refers to differences between antibiotic and other groups on the same line of the table.

Although the principal analysis compared the initial antibiotics groups with the other two groups, the "delayed" group had the lowest rates of reattendence (hazard ratio of reattendence: delayed 1.00, no antibiotic 1.3 (95% confidence interval 0.86 to 1.97), antibiotic 1.61 (1.09 to 2.38)).

General practitioners' attitude to prescribing antibiotics at the end of the study (very, moderately, slightly, not at all comfortable prescribing antibiotics immediately) did not significantly predict reattendence (hazard ratio 1, 1.24, 0.77, 0.90; z trend -0.88, P = 0.39).

Outcome documentation bias—We minimised possible bias from general practitioners' relabelling episodes of

Table 2 Clinical factors predicting return to surgery with sore throat (sore throat, pharyngitis, tonsillitis). Values are numbers (and percentages)

	Returned	Did not return	Crude hazard ratio (95% CI)	Adjusted hazard ratio§	Likelihood ratio test§ (P value)
Antibiotics					
Initial antibiotics in trial	90/210 (43)	148/466 (32)	1.41 (1.07 to 1.85)	1.39 (1.03 to 1.89)	4.50; P=0.03
Prior antibiotics for sore throat	62/210 (30)	61/465 (13)	1.94 (1.45 to 2.62)	1.69 (1.20 to 2.37)	8.36; P=0.004
Number of prior attendances*					
0	108/210 (51)	320/465 (69)	1.00	1.00	4.51; P=0.11
1	51/210 (24)	89/465 (19)	1.56 (1.12 to 2.18)	1.09 (0.68 to 1.75)	
⩾2	51/210 (24)	56/465 (12)	2.04 (1.46 to 2.85)	1.66 (1.02 to 2.71)¶	
Features of index illness					
Longer duration (>5 days) after consultation	70/161 (44)	127/373 (34)	1.43 (1.05 to 1.94)		
Follow up period (days)					
0-45			2.86 (1.68 to 4.85)	2.90 (1.70 to 4.92)	11.13; P=0.004
46-179			0.83 (0.46 to 1.48)	0.84 (0.47 to 1.50)	
180-900			1.13 (0.65 to 1.96)	1.14 (0.66 to 1.97)	
Days ill prior (>3 days)	61/206 (30)	187/461 (41)	0.66 (0.49 to 0.89)	0.80 (0.57 to 1.12)	1.74; P=0.19
‡Breese score > 25†	84/159 (53)	190/356 (53)	1.14 (0.83 to 1.56)	1.15 (0.79 to 1.68)	0.52; P=0.47
3/5 of complex‡	29/116 (25)	61/279 (22)	1.18 (0.77 to 1.80)	1.25 (0.82 to 1.90)	0.99; P=0.32

*Attendance in the previous year with sore throat, pharyngitis, tonsillitis, otitis media, sinusitis, "upper respiratory tract infection," cold.
†Breese score of >25 (calculated using 9 factors, each weighted according to likelihood of predicting a positive throat swab: a score of less than 25 is associated with a very low prevalence of positive swabs.[4]
‡Complex (3 out of 5 of: high temp (> 37.5°), tender nodes, purulent tonsils, no cough, dysphagia) more likely to be associated with a positive throat swab.[4-7]
§Adjusted for randomised antibiotic group, prior antibiotics, and illness duration.
¶ z trend 2.03, P=0.04.

Table 3 Sociodemographic and psychosocial factors predicting return to surgery with sore throat. Values are numbers (and percentages)

	Returned	Did not return	Crude hazard ratio (95% CI)	Adjusted hazard ratio*	Likelihood ratio test† (P value)
Sociodemographic					
Age >12	154/210 (73)	357/464 (77)	0.84 (0.62 to 1.14)	0.83 (0.59 to 1.17)	1.05; P=0.31
Sex (female)	133/210 (63)	295/466 (63)	1.03 (0.78 to 1.36)	0.97 (0.71 to 1.32)	0.05; P=0.83
Further education	73/162 (45)	159/374 (43)	0.90 (0.66 to 1.24)	0.92 (0.67 to 1.27)	0.26; P=0.61
Psychosocial					
Satisfaction:					
Very	114/161 (71)	265/381 (70)	1.00	1.00	2.58; P=0.46
Moderately	35/161 (22)	93/381 (24)	0.91 (0.63 to 1.34)	0.95 (0.64 to 1.41)	
Slightly	6/161 (4)	19/381 (5)	0.75 (0.33 to 1.71)	0.80 (0.35 to 1.82)	
Not at all	6/161 (4)	4/381 (1)	2.17 (0.95 to 4.93)	2.11 (0.84 to 5.29)	
Legitimation of illness for work or school*:					
Very important	57/161 (35)	130/378 (34)	1.00	1.00	1.05; P=0.79
Moderately	42/161 (26)	92/378 (24)	1.01 (0.68 to 1.50)	1.10 (0.74 to 1.65)	
Slightly	16/161 (10)	43/378 (11)	0.83 (0.47 to 1.44)	0.92 (0.53 to 1.61)	
Not at all	46/161 (29)	113/378 (30)	0.91 (0.62 to 1.34)	0.89 (0.60 to 1.32)	

†Adjusted for randomised antibiotic group, prior antibiotics, and illness duration.
*Work legitimation: Importance of seeing the doctor to be able to take time off work or school.

sore throat by assessing the main text of the consultation and not just the problem summary. If relabelling bias was significant the difference between antibiotic and other groups should have disappeared when all other upper respiratory illnesses were included (sore throat, pharyngitis, tonsillitis, quinsy, and other upper respiratory labels—URTI, cold, otitis media, sinusitis—where no sore throat was documented), but it did not (respectively 106/238(45%) and 146/437 (33%)).

Observer bias—Only 5/73 (7%) disagreements occurred between the unblinded and blinded assessment of notes (agreement 68/73 (93%), κ 0.83), all in the no antibiotics or delayed group, and there was no evidence of systematic bias (three attendances coded unblinded as no sore throat became sore throat, and two were recoded in the opposite direction).

Discussion

This trial confirms that complications of sore throat are rare, and that prescribing antibiotics increases reattendance.[2 8] We have shown that trial groups were similar, well differentiated,[3] and that selection,[3] non-response, relabelling, general practitioners' attitude, and outcome assessment variation are not likely to bias the results.

Consultations for respiratory conditions in British general practice have increased by 14% in 10 years.[9] Since the pathogenic basis is not likely to be changing,[1 10 11] psychosocial factors may explain changes in attendance—for example, patient expectations, altered social support networks, employers' attitudes, or changes in doctors' behaviour.[12] This study suggests that an effective way of counteracting increased consulting is for general practitioners not to prescribe antibiotics—or delay prescribing them—for self limiting illness in individuals who are not very ill and where complications are rare.

Prolonged duration of sore throat also increased the rate of return within six weeks of the original illness, and half the subjects with a longer duration of illness who returned did so within eight days. This suggests that explanation of the natural history—that the average duration is five days after consultation and that almost 40% of people have a sore throat for longer than five days—may reduce expectations and possibly alter subsequent attendance behaviour. General practitioners should consider careful counselling in subjects who have attended with upper respiratory illness twice or more in the past year, as this is a marker for reattendance.

Key messages

- Sore throat is one of the commonest presentations of upper respiratory illness in primary care and attendence is increasing
- Complications are rare with no, or delayed, antibiotic prescription
- Prescribing antibiotics increases reattendance for future episodes
- Unless patients are very ill general practitioners should consider exploring concerns, explain the natural history, and avoid or delay prescribing antibiotics

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Finance, not learning needs, makes general practitioners attend courses: a database survey

T S Murray, L M Campbell

See editorial by Toon

West of Scotland Postgraduate Medical Education Board, Glasgow G12 9LX

T S Murray, *director of postgraduate general practice education*

L M Campbell, *assistant director of postgraduate general practice education*

Correspondence to: Professor Murray.

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The 1990 contract for general practitioners in Britain includes a postgraduate education allowance which is paid as part of the statement of fees and allowances.[1] We reviewed the attendance of general practitioners in the west of Scotland at accredited meetings over five years since the allowance was introduced.

Methods and results

In the west of Scotland a database records all courses and attendances at accredited meetings.[2] General practitioners can also join an educational scheme for one annual payment which entitles them to attend as many courses as they wish for no extra cost.[2] We abstracted data on all doctors attending accredited sessions between 1 April 1991 and 31 March 1996 and on who provided each meeting.

There were 1832 general practitioners in the region. The mean number of sessions attended was highest in 1990-1 at 14.2 and fell to 12.7 in 1995-6. This reduction was almost entirely accounted for by a reduction in health promotion sessions.

The number of doctors subscribing to the scheme where one annual fee is paid fell from 1130 in 1991 to 796 in 1996. Subscribers attended more educational sessions than non-subscribers (table 1). The greatest difference was in courses on service management. The pharmaceutical industry provided 121 courses in 1991-2, rising to 328 in 1995-6. During this period there was a 21% drop in the number of meetings accredited (from 1514 to 1193). Attendance at meetings sponsored by the pharmaceutical industry rose from 1.0 to 2.1 for subscribers and from 1.5 to 4.8 for non-subscribers.

Comment

The number of general practitioners subscribing to the annual fee scheme fell over the study and currently accounts for just under half of the doctors in the region. Subscribers attended more courses than their peers, and the reduction in the number of subscribers resulted in fewer courses being provided by the scheme. However, there was a large increase in the number of courses provided by the pharmaceutical industry. Courses provided by the pharmaceutical industry meet the same accreditation standards as other courses but are mainly lectures. Most are on disease management in areas where the provider has a commercial interest. These meetings are provided at no cost to those attending.

In 1995 pharmaceutical meetings made up almost half of non-subscribers' educational attendance. The level was much lower for subscribers, which may be because their attendance is more likely to be related to their learning needs. Once general practitioners have subscribed to the scheme their decision to attend a course has no further financial implications; cheaper and free courses may seem more attractive to non-subscribers, who pay as they go. A recent study in Northern Ireland showed that sponsored meetings attracted more participants than non-sponsored meetings.[3]

One of the aims of the postgraduate education allowance was that general practitioners would buy courses suited to their needs and that providers would arrange courses in response to these market forces. A centrally organised scheme where there is a guaranteed provision of the required number of sessions with the opportunity to attend additional sessions at no charge seems to have attractions as the costs are limited.

The uptake of continuing medical education in general practice was greatly affected by the educational changes in the 1990 contract.[4,5] These changes stimulated a considerable interest in education and resulted in an increased variety of courses. Our evidence suggests that financial considerations, rather than potential learning gain, may be affecting doctors' choice of courses. A change in the system whereby expenses for education would be directly reimbursed would improve education by removing financial considerations.

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Table 1 Mean number of half day accredited sessions attended by subscribers and non-subscribers to educational scheme

	Subscribers		Non-subscribers	
Year	Total sessions	Drug company sponsored sessions	Total sessions	Drug company sponsored sessions
1991-2	13.7	1.0	10.6	1.5
1992-3	13.7	1.2	11.6	1.8
1993-4	13.3	1.6	11.6	4.3
1994-5	13.3	2.0	11.1	5.1
1995-6	13.2	2.1	10.1	4.8