Antibiotic prescribing for dental conditions: general medical practitioners and dentists compared

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Objective To compare the level of prescribing and types of antibiotics prescribed for dental problems by general medical practitioners and dentists.

Design Secondary analysis of standard consultation data and prescription records from four different settings.

Setting 30 participating general practices in the General Practice Morbidity Database for Wales in 1996.

Subjects 1,185 attendances for tooth-related problems, at 30 participating practices in the General Practice Morbidity Database for Wales in 1996. Standard consultation records from a GDP emergency dental rota, and two weekend emergency dental clinics: one in a health centre, the other in a dental hospital.

Results More than two thirds (68%) of attendances at general medical practices for tooth-related problems resulted in a prescription for antibiotics. In contrast less than a third (28%) of patients seen by a GDP rota, about half (52%) of patients at a weekend emergency clinic in a health centre, and just more than a third (38%) of patients attending the dental hospital clinic received antibiotics. General medical practitioners were also more likely to prescribe broad-spectrum antibiotics than dentists.

Conclusion For acute dental problems general medical practitioners are more likely to prescribe antibiotics than dentists. There also appear to be inter-professional differences in the tendency to prescribe broad spectrum antibiotics. Initiatives to rationalise prescribing for dental conditions may need to target doctors as well as dentists.

The recent publicity surrounding antimicrobial resistance has justifiably renewed efforts to rationalise antibiotic prescribing for many conditions. The recent report on anti-microbial resistance by the Standing Medical Advisory Committee noted that dentists account for 7% of antimicrobial prescribing,¹ and national prescribing data for Wales shows that antibiotics accounted for 76% of items prescribed by dentists.² Yet it has been shown that antibiotic therapy alone is largely ineffective for acute dental problems related to the dental pulp, and other dental infections such as abscesses are more effectively treated by surgical means.³ An additional concern is that some people seek treatment for dental problems from their general medical practitioner (GMP) rather than a dentist.^{4,5} Little is known about the care received by these patients. We therefore investigated the scale and type of antibiotic prescribing by GMPs for dental conditions, and compared this with other locally available data about prescribing by dentists in emergency settings.

The General Practice Morbidity Database (GPMD) is an aggregation of data which are routinely collected by participating medical practices across Wales, and has existed since 1992. The data are essentially patient record data with the details of any consultations (such as the reason for attendance, or the prescriptions given) attached to each patient record. The 1996 dataset represents more than a million and a half attendances by the populations registered at 30 general medical practices. It offers an ideal opportunity to analyse in detail the level and type of antibiotic prescribing by GMPs, even for relatively small diagnostic groups such as dental conditions.

Methods

Data were analysed from the Welsh General Practice Morbidity Database. In 1996 this database represented a registered population of 313,284 (or 10.7% of the population in Wales), with an age-structure similar to that of the overall population in Wales, and who made 1,650,882 attendances during the year.⁶ The data analysed represented all 30 of the participating practices in the database for 1996. Data extraction and validation from the computers in the medical practices was performed as previously described.⁷

Diagnoses were classified using the Read Clinical Classification System.^{5,8} Attendances where the Read codes indicated a problem of the teeth hard tissues as the sole reason for attending were selected for analysis (Read codes starting: 'J01' and 'J02'). These codes include pulp and periapical tissue disease such as acute dental abscesses, but do not include tooth development or eruption disorders such as teething syndrome. Where specific dental conditions were coded as 'examination/signs' (for example, code 2542 — dental caries) or 'history/symptoms' (for example, code 1913 — bad teeth caries) they were reallocated to the appropriate disease category. This produced the sub-set of 1,185 attendances for hard tissue diseases of the teeth. Any drugs prescribed were recorded either as Read codes, but more usually as the full drug name. These were grouped into categories according to the typology used in the *British National Formulary*.⁹

Prescribing by GMPs was then compared with the level of prescribing by dentists in three different settings: by GDPs in an emergency dental service rota; by GDS and Community Dental Service (CDS) dentists in a health authority (HA) weekend emergency dental clinic; and by dentists at a dental hospital weekend emergency clinic. None of the routinely recorded data from these services are directly comparable so the important differences are shown in Table 1. Data describing the type of antibiotic prescribed was only available for GMPs, and from the Wales Prescription and Pricing Service for all community (non-hospital) prescribing by dentists dispensed in Welsh pharmacies.² All data were analysed using SPSS for Windows (version 6.0).

Results

Of the 1,650,882 attendances in the 30 participating practices during 1996 only 4,891 (0.3%) were for oral or dental problems. Of

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Table 1 Data sources

Service	30 GMP practices in Wales	GDP rota	Dental hospital clinic	HA weekend clinic
Staffed by:	GMPs	GDPs and some CDS dentists	Hospital dentists	GDS and CDS dentists
Intended clients		Registered and unregistered	Unregistered	Unregistered
Brief description of data	GPMD database of computerised attendance records at 30 medical practices	Two Local Dental Committee rotas offering telephone advice or attendance at surgery of on-call dentist. Standard data-sheet for recording contact details.	Saturday morning emergency clinic within dental hospital. Standard treatment recording in attendance book.	Sunday morning emergency dental clinic in health centre. Standard recording form.
Basis of attendance	Fixed location, walk-in or with an appointment	When dentist considers urgent treatment is required	Fixed location walk-in clinic	Fixed location walk-in clinic
Data period	1996 calendar year	Selected weeks* in a 3 month period (Nov '96 – Jan '97)	1997 calendar year	1996/97 financial year
All attendances for oral problems	4,891	300 attendances, (from 625 calls)	811	889
Patient contacts analysed	Read codes starting 'J01' or 'J02' in general practice database ('tooth-related problems')	The recalled attendances resulting from all calls to an LDC emergency dental service	All Saturday attendances	Attendances for oral problems (excluding lost restorations, post-operative complications or problems with dentures)
Drug formulary	Unrestricted	<i>Dental Practitioner's Formulary</i>	Unrestricted	<i>Dental Practitioner's Formulary</i>
Attendances for tooth-related problems	1,185	277 attendances, (from 625 calls)	811	884

*Those weeks in which the on-duty dentist legibly and reliably recorded the treatment provided (8 weeks data from the West rota, 6 weeks data from the East rota)

these 1,185 related solely to hard tissues diseases of the teeth (classified according to Read codes) and prescription data for these attendances was available for analysis.

Just more than two thirds (67.7%) of the attendances for hard-tissue disease at the medical practices resulted in a prescription for antibiotics (Table 2). In contrast, less than a third (28%) of patients seen by GDPs received antibiotics (representing less than an eighth (12%) of all callers to the emergency rota). Just more than a third (38%) of attendances at the dental hospital emergency clinic resulted in an antibiotic prescription, and in the health authority emergency clinic more than half (52%) of attending patients received antibiotics. It should be noted however, that some attenders in this setting were already receiving antibiotics for their dental problem when they attended.

Although the likelihood of being prescribed antibiotics was generally higher for people seeing their GMP, there was considerable inter-practice variation. Three medical practices prescribed antibiotics in more than three quarters of tooth-related attendances ($n = 55$, $n = 45$, and $n = 38$), but two others prescribed antibiotics in less than a quarter of attendances ($n = 44$ and $n = 47$).

With regard to the types of antibiotic prescribed for these conditions, the prescribing of penicillin V and erythromycin was comparable between GMPs and dentists (Table 3). However, doctors prescribed more broad-spectrum antibiotics for tooth-related problems (61% of all antibiotics prescribed) than did dentists (49%) for all presenting problems. This difference may be related to dentists prescribing more metronidazole, which accounted for

19% of the antibiotics they prescribed.

Discussion

With any secondary analysis of routinely collected consultation data the validity and reliability of the information should be carefully considered. First, for various reasons, the case-mix of patients may vary between the different settings. For example it might be the case that patients with dental injuries or lost restorations (ie not requiring antibiotics) are much less likely to seek care from general medical practitioners. In some settings there might also be a higher proportion of patients re-attending who are already receiving antibiotics from a prior contact with a doctor or dentist.¹⁰ Unfortunately, with the data sets available to us we were unable to take account of these possible differences in case-mix or other factors.

Another potential source of bias in the General Practice Morbidity Database is the reliability and accuracy of consultation codings. Most doctors have not been specially trained in the diagnosis of dental conditions, and there has been no training or calibration to ensure that the coding system has been used in the same way by different GMPs or different practices. Finally, the completeness and reliability of all routine care records in any of the settings is difficult to assure.

Even given these limitations, our findings suggest that people seeing their doctor with a dental problem are considerably more likely to receive an antibiotic than patients seeing a dentist for broadly similar conditions. Among dentists the highest levels of prescribing were in the health authority weekend clinic (staffed by a

Table 2 Proportion of attendances leading to an antibiotic prescription

	30 GMP practices in Wales	GDP rota	Dental hospital clinic	HA weekend clinic
Attendances for oral or dental problems	4,891	277	811	889
Attendances for tooth-related problems	1,185 (100%)	277 (100%)	811 (100%)	884 (100%)
Resulting in antibiotic prescription	801 (67.6%)	78 (28.2%)	308 (38%)	462* (52%)

Data sources: as Table 1

*This percentage is an upper limit since a small proportion of the prescriptions recorded in this setting will be for strong analgesics rather than antibiotics

Table 3 Type of antibiotic by GMPs and dentists

Drug type	30 GP practices in Wales (1996)		All Wales by dentists* (July–December 1996)	
Amoxycillin/ampicillin	441	(54%)	48,594	(49%)
Augmentin	54	(7%)	—	—
Erythromycin and other macrolides	79	(10%)	8,370	(8%)
Metronidazole (and tinidazole)	42	(5%)	18,937	(19%)
Penicillin V	147	(18%)	20,311	(20%)
Flucloxacillin	27	(3%)	—	—
Other antibiotics	28	(3%)	3,751	(4%)
All prescriptions of antibiotics	818†	(100%)	99,963	(100%)

* All community (non-hospital) prescribing by dentists dispensed in Welsh pharmacies.² † ≠ 811 because some GMPs prescribed more than one type of antibiotic for individual patients

mixture of CDS and GDS dentists), but even here the likelihood of a patient getting an antibiotic was about a quarter less than for patients seeing their GMP. The reasons for the marked difference in prescribing levels between dentists in this setting, and the dentists on the emergency dental rota are unclear. It may be that the health authority emergency clinic, with Sunday morning sessions and advertised as being for unregistered patients, see more 'true emergencies' than the GDP rota. Also, in the weekend emergency clinics a large number of patients are seen in succession. This may restrict the level of surgical intervention which is attempted, or encourage treatment options which are perceived to relieve the immediate symptoms pending full treatment at a later date.

It is worthy of further investigation that although GMPs prescribe about the same range of antibiotics for dental problems, compared with prescribing by dentists² they seem to prefer broad-spectrum antibiotics. This finding contrasts with the only available comparative study of doctors' and dentists' prescribing intentions for acute dental conditions, in which broad spectrum antibiotics were recommended slightly more often by dentists.¹¹ A more recent audit of prescribing in Liverpool showed that while amoxycillin accounted for 65%, metronidazole accounted for only 22% of antibiotic prescriptions by general dental practitioners.¹² The picture is therefore mixed, possibly reflecting that published recommendations on antibiotics for acute dental infections are divided about the comparative benefits of metronidazole and amoxycillin.^{13,14} The scope for unnecessary prescribing by dentists is possibly reduced by the restricted drug formulary available to them. Also, the prescription of antibiotics such as metronidazole for prophylactic purposes may partly explain the lower proportion of broad-spectrum antibiotics prescribed by dentists. In one study there was evidence that GMPs prescribed higher doses,¹¹ but our data could not provide reliable evidence on this point.

It is known that doctors' prescribing decisions are influenced by a complex range of factors.¹⁵ In particular, evidence suggests that when faced with uncomfortable prescribing decisions — where the doctor is aware of only marginal effectiveness — many prescriptions are made primarily to preserve the doctor-patient relationship.^{16,17} Patients attending their GMP with dental problems are not only likely to be in pain, but in many cases will only get effective pain relief through surgical treatment. It is in such situations, when there is uncertainty surrounding the best treatment, and when the patients are distressed, that Weiss and Fitzpatrick suggest doctors feel a greater need to 'do something'.¹⁶ It may also be the case that patients who go to their doctor with dental problems do so because they have a stronger relationship with them, than with their dentist for example. This is supported by our analysis of the medical practice morbidity data, in which the dental attenders had visited their GMP twice as often (median of eight visits per year) as the average patient (median of four visits).⁴ GMPs therefore might be making

more efforts to preserve relationships with these 'regular' patients.

Conclusion

The findings presented above suggest that the level of antibiotic prescribing for tooth-related conditions varies substantially between different primary care settings. Doctors appear to prescribe antibiotics for tooth-related conditions more readily than dentists. The levels of prescribing will partly reflect differences between each of the services in the types of dental problem which present, the drug formulary available, and that doctors and dentists are unlikely to make and record oral diagnoses in the same way. Even so, the revealed difference in the level of antibiotic prescribing is large, and there are some probable differences between doctors and dentists in their tendency to prescribe broad-spectrum antibiotics.

Although patients presenting with acute dental problems represent only a small proportion of all attendances, a crude extrapolation of the Welsh data suggests that GMPs in the UK make around 150,000 antibiotic prescriptions for tooth-related problems each year. Although GMPs in general are more likely to prescribe antibiotics than dentists, patients attending particular medical practices appear much more likely to receive antibiotics for their dental problem. The dental profession is currently developing guidelines for antibiotic prescribing,¹⁷ but their effectiveness in changing prescribing behaviour is still in question. The value of devoting similar resources to educating GMPs about prescribing for dental conditions should be balanced against other efforts to make dental care more accessible and acceptable to the public — and thereby minimise attendances in those settings where they are unlikely to see a dentist.

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