

PRACTICE OBSERVED

Practice Research

Some patterns of prescribing by urban general practitioners

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Abstract

To detect the differences in patterns of prescribing between general practitioners with high and low costs, the costs in prescribing seven symptomatic and seven systematic drug groups were studied in 23 practices with low costs and 23 with high costs in the Belfast area. This was done by extracting information about the individual practices from the Department of Health and Social Services (Northern Ireland) information technology unit's database on prescribing. General practitioners in practices with high costs issued prescriptions more often and for larger quantities of medicine than did their colleagues in practices with low costs for all of the drug groups studied. There was a lower patient to doctor ratio in the practices with high costs (1786:1 *v* 2039:1). The prescribers with high costs offered more surgery sessions than their colleagues with low costs, amounting to an average of 6.5 extra surgery sessions per 1000 patients per month.

Half as many more patients with heart disease, asthma, diabetes, and thyroid disease seemed to be treated by doctors in practices with high costs than in practices with low costs. A higher rate of prescribing symptomatic drugs by these same doctors was also seen, and further study is recommended in view of the risks associated with these drugs.

Introduction

It should be possible to show differences in the mode of operation of general practitioners whose prescribing costs are high and those whose costs are low. Obviously, the prescribers with high costs must prescribe more often,¹ in greater quantity, or more expensively, or in a combination of these ways. Does this hold for most groups of drugs or only some, and are other aspects of activity in

practices also different? Previous investigators have considered how doctors differ in their prescribing of individual groups of drugs.²⁻⁴ Using a computerised database, I attempted to relate several known determinants of general practitioners' prescribing to see whether patterns could be observed across a wide variety of the groups of drugs commonly used in general practice.

Methods

STRUCTURE OF PRACTICES AND PATTERNS OF ORGANISATION

The 23 practices with the highest costs and the 23 with the lowest costs in the greater Belfast urban area were selected from the total of 98 practices according to the average net ingredient cost per patient for all drugs prescribed in November 1983. Those practices with unusual features, such as a small list size or responsibility for hospices, were excluded from the study. November 1983 was chosen because it predated both the government's introduction of the limited list and other (local) efforts to regulate prescribing costs. November is a good month for such studies because it avoids the peaks and troughs in prescribing of winter and summer, respectively, and the effects of doctors' and patients' holidays.

With the permission of the Northern Ireland General Medical Services Committee and after guaranteeing absolute confidentiality I extracted data about individual practices from the database on prescribing of the Department of Health and Social Services (Northern Ireland) information technology unit. These were the number of principals in each practice; the number of patients per principal—that is, the ratio of patients to general practitioners; the prescribing cost per patient per month as a percentage of the regional average cost in Northern Ireland; and the percentages of patients aged 65-74 and 75 and over, which was the only available measure of the distribution of age.

All 46 practices to be studied were then asked to give the monthly number of all consulting sessions, including general sessions and sessions devoted to antenatal and postnatal care, immunisation, and screening. All practices readily complied. From this figure the number of consulting sessions per general practitioner per month and the number of consulting sessions per 1000 patients per month were calculated for each practice. Clearly, these values offer only rough measures of consultation rates as they do not distinguish between types of consulting session; do not define the length of each session, the number of patients seen, and whether the session was booked; and do not include consultations by practice nurses, etc. They do, however, add a dimension of "availability," however approximate, to this study. No information about the social class structure of the practices

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studied was available, but purely from looking at a map I saw no clustering of practices with high or low costs or any areas of the city that were not represented. In several cases practices with high and low costs were located in the same health centre.

PATTERNS OF PRESCRIBING

With no similar previous research for reference I decided empirically to compare the way in which general practitioners with low and high costs prescribed "symptomatic" and "systematic" drugs. Symptomatic treatment was defined as the pharmacological relief of symptoms without much expectation of altering the pathological process, whereas systematic treatment would not have been prescribed without a firm diagnosis and the expectation that the drug would alter the pathophysiology in the patient's favour in a specific and well understood manner. Although this classification was by no means uncontroversial, the drugs used in general practice were categorised after discussions with many experienced general practitioners as being used predominantly in a symptomatic or systematic way. Symptomatic drugs were hypnotics, minor analgesics, antacids, laxatives, cough medicines, antirheumatics (non-steroidal anti-inflammatory drugs), and vitamins. Systematic drugs were heart preparations; diuretics; antihypertensive, anti-asthmatic, and hypoglycaemic drugs; and thyroid and eye preparations. It is true that hypnotics, antacids, antirheumatics, and vitamins are pharmacologically active agents capable of modifying disordered physiology, but probably most are prescribed on a symptomatic basis in general practice in the United Kingdom.

With the permission again of the General Medical Services Committee (Northern Ireland) I extracted from the information technology unit's prescribing database information about the following prescribing habits for each of the 23 low and high cost practices.

(1) The range of preparations used, to give some measure of each practice's working formulary and the extent to which the doctors were aware of a variety of preparations, formulations, and routes of administration in managing therapeutic problems. Not only different drug names but also different presentations of the same drug were counted as separate items.

TABLE I—Differences in structure and organisation of general practices with high and low prescribing costs. Values are medians (ranges)

	Practices with low costs (n=23)	Practices with high costs (n=23)	Significance (p value)*
No of principals in each practice	2 (1-6)	2 (1-6)	>0.05
Patient to general practitioner ratio	2039 (1329-4820)	1786 (1040-2415)	0.018
% Of elderly patients:			
Aged 65-74	7.8 (4.3-13.7)	10.1 (4.5-13.9)	>0.05
Aged ≥75	4.9 (1.8-11.3)	6.0 (2.7-12.1)	>0.05
Prescribing costs/patient/month (% of regional average cost)	-16.7 (-5.7 to -60.6)	+24.9 (16.7-43.2)	
No of consulting sessions/ general practitioner/month	26 (15-66)	35 (13-48)	>0.05
No of consulting sessions/1000 patients/month	12.5 (6-34)	19 (6-38)	0.003

*By Mann-Whitney U test.

TABLE II—Differences in prescribing of systematic drugs between practices with low and high costs. Values are medians (ranges)

Drug group	Type of practice (cost)	No of prescriptions/1000 patients/month	Significance (p value)*	Amount of drug issued/1000 patients/month					
				No of tablets and capsules	Significance (p value)*	Volume (ml)	Inhalers	Significance (p value)*	
Heart preparations	{ Low High }	{ 30.4 (13.1-53.6) 50.6 (26.1-69.8) }	0.0006	{ 2852 (1456-4990) 4352 (718-7117) }	0.0006				
Diuretics	{ Low High }	{ 19.8 (9.44-1) 30.2 (14.6-69.8) }	0.0006	{ 1527 (542-3207) 2634 (1089-4261) }	0.0004				
Antihypertensives	{ Low High }	{ 6.2 (3.6-15.5) 9.9 (3.9-21.4) }	0.006	{ 667 (229-1524) 1094 (437-1949) }	0.004				
Antiasthmatics	{ Low High }	{ 26.8 (12.5-41.2) 36.9 (22.7-49.7) }	0.0001	{ 947 (281-1778) 1554 (791-2519) }	0.0001	{ 401 (130-2182) 994 (74-3782) }	0.04	{ 20 (10.5-38) 25 (5-41) }	0.017
Hypoglycaemics (including insulin)	{ Low High }	{ 3.1 (0.8-3.6) 4.3 (1.5-9.3) }	0.047	{ 163 (45-425) 221 (62-465) }	0.04	{ 80 (14-216) 147 (13-269) }	0.027		
Thyroid and antithyroid preparations	{ Low High }	{ 2.9 (1.2-5.4) 4.6 (1.8-9.5) }	0.002	{ 311 (116-871) 559 (173-860) }	0.006				
Eye preparations	{ Low High }	{ 11.5 (5.6-18.1) 13.9 (6.7-20.6) }	0.003						

*By Mann-Whitney U test.

(2) The number of prescriptions issued in each drug group. For comparison this value was converted to the number of prescriptions per 1000 patients per month.

(3) The amount of drug given in each drug group. Rather than attempting to calculate the defined daily dose (fraught with uncertainty unless the original prescriptions are available for scrutiny) I decided simply to express quantity as tablets or capsules, or both, per 1000 patients per month or volume in ml per 1000 patients per month. This has the merit of simplicity though it gives no measure of strength or frequency of dosage.

(4) Average cost of each prescription in each drug group.

(5) The number of prescriptions issued in each drug group expressed as a percentage of all prescriptions issued by the practice in the month of survey. From this I hoped to show whether there were large differences of emphasis in drug use in the practices with high and low costs.

(6) The mean rate of issue of prescriptions for each consulting session was calculated in an attempt to show whether the doctors with high costs were different in that respect. Unfortunately, it was impossible with existing data to measure repeat prescribing, rendering this calculation imperfect (as repeat prescriptions are variously estimated as 30-50% of all general practitioners' prescribing).^{5,6}

Results

STRUCTURE OF PRACTICES AND PATTERNS OF ORGANISATION

Table I shows the median values for the structure of the 23 practices with low costs and the 23 with high costs and their patterns of organisation. Because of the small numbers and possible distributional problems group comparisons were made in terms of the mean ranks with the Mann-Whitney U test. The practices with high costs had, on average, 253 fewer patients to each general practitioner, and the doctors were more available to the extent of 6.5 extra consulting sessions per 1000 patients per month (about 3.5 days' extra consulting per 1000 patients). The average number of doctors in each practice was similar in both high and low cost practices. Encouragingly, no significant difference was found in the number of consultation sessions per doctor per month. The decreased availability of doctors in the practices with low costs seemed to be due to their larger list sizes rather than to less rigorous work schedules.

PATTERNS OF PRESCRIBING

Table II shows the median number of prescriptions and amounts of drugs issued per 1000 patients per month for all seven of the groups of systematic drugs. As before, group comparisons were made in terms of the mean ranks with the Mann-Whitney U test. Table III shows the corresponding median values for the groups of symptomatic drugs.

Without exception for both the systematic and symptomatic drugs the doctors in the practices with high costs issued more prescriptions and ordered larger quantities of drugs than did those in the practices with low costs.

Range of preparations used—In neither symptomatic nor systematic drug groups was any significant difference detected between the two types of practices in the ranges of preparations used.

Rate of prescribing per consulting session—With one exception (hypnotics), no significant difference was detected for any of the drugs in the rate of

TABLE III—Differences in prescribing of symptomatic drugs between practices with low and high costs. Values are medians (ranges)

Drug group	Type of practice (cost)	No of prescriptions/1000 patients/month	Significance (p value)*	Amount of drugs issued/1000 patients/month			
				Tablets and capsules	Significance (p value)*	Volume (ml)	Significance (p value)*
Hypnotics	{Low	20.4 (6.8-39.5)	0.0006	962 (231-1749)	0.0005		
	{High	38.6 (17.4-57.3)		1826 (895-2925)			
Minor analgesics	{Low	42.6 (21.1-84.2)	0.008	3014 (962-5326)	0.0005	467 (60-2560)	>0.05
	{High	67.2 (22.0-158.3)		5010 (1205-7122)		587 (169-4961)	
Antacids	{Low	15.4 (7-23.8)	0.0008	554 (193-2629)	0.0016	4667 (2318-6823)	0.0025
	{High	19.7 (8.7-36.5)		769 (274-5445)		6592 (1302-11036)	
Laxatives	{Low	11.4 (4.5-19.1)	0.0003	416 (214-1114)	0.0166	1538 (403-4824)	0.0008
	{High	17.1 (9.6-32.6)		548 (286-2660)		3766 (1549-5659)	
Cough medicines	{Low	54.2 (26-96.9)	0.024			14452 (5410-26942)	0.0027
	{High	73 (36.5-131.9)				20257 (8998-37584)	
Non-steroidal anti-inflammatory drugs	{Low	22.5 (11.6-46.7)	0.0005	1686 (951-3848)	0.0006		
	{High	33.6 (21.2-51.8)		2673 (1334-4046)			
Vitamins	{Low	14.6 (6.9-44.6)	0.0003	593 (317-2851)	0.0009	465 (140-1577)	>0.05
	{High	25.7 (7.7-53.8)		1214 (574-2082)		602 (200-2245)	

*By Mann-Whitney U test.

prescribing per consulting session between the two types of practice. For hypnotics the rate for the practices with high costs was significantly greater than that for the practices with low costs (median 2.3 (range 0.7-4.1) prescriptions per consulting session v 1.7 (0.5-2.9) respectively; $p=0.02$).

Cost per prescription—With only two exceptions (hypoglycaemic drugs including insulin, and cough medicines) there was no significant difference in any drug group in the cost per prescription between the practices with high and low costs. For hypoglycaemic drugs and cough medicines the cost per prescription was significantly higher in the practices with high costs (hypoglycaemic drugs median cost £12.38 (range £4.56-£35.23) v £9.87 (£3.79-£23.07), $p=0.049$; cough medicines £1.52 (£1.12-£2.72) v £1.28 (£0.92-£1.56), $p=0.0002$).

Balance or emphasis of prescribing—The mean and median percentage (and range) of a practice's total prescribing that was accounted for by all the systematic and symptomatic groups surveyed, except hypnotics, were similar in practices with high and low costs. In practices with high costs the median value for hypnotics was 4.5%, the mean 4.2%, and the range 2.2-5.8%; for practices with low costs the median was 3.2%, the mean 3.4%, and the range 1.2-5.8% ($p=0.01$).

Discussion

General practitioners in practices whose prescribing costs were high tended to have smaller lists of patients and to be more available for consultation than their counterparts in practices with low costs. This finding is different from that of Taylor, perhaps because his variables were less specific—for example, list size rather than the ratio of patients to each general practitioner.¹

Doctors in practices with high costs seem to treat about 50% more patients with heart disease, diabetes, asthma, thyroid disease, and eye trouble. As many of these diseases require active screening for their early diagnosis the smaller list sizes and greater consulting availability may allow more time for this time consuming process. This finding agrees with that of Jones *et al*,⁷ Dunnell and Cartwright,⁸ and Elmes *et al*.³ It is also possible, though less likely, that there is greater morbidity in the practices with high costs or that disease processes in those practices are more severe or advanced. Those interested in quality of care will wish to know the true explanation of these findings, particularly the general practitioners themselves, who alone can provide sufficiently accurate morbidity data to allow investigation of morbidity rates in different practices. (The data in this preliminary feasibility study did not allow any estimation of morbidity or of possible differences in the distribution of age, sex, or social class between the practices with high and low costs.)

Patients in the practices with high costs were given double the quantity of sleeping pills; 50% more minor analgesics, anti-rheumatics, vitamins, cough medicines, and laxatives; and 40% more antacids than patients in the practices with low costs. This startling finding may owe more to the doctor-patient interaction than to morbidity.^{9,12} It should be investigated further as all these

drugs have attendant risks, some of them serious. Up to one third of the drugs may be prescribed as repeat prescriptions²; I could not measure repeat prescribing with the Northern Ireland prescription pricing database, nor would it be possible with the computerised systems for England and Wales. Perhaps it should be.

My results indicate that a larger study analysing the prescription pricing and other data for an entire region for one year would probably create a reliable basis from which to provide general practitioners with comparisons of their individual prescribing patterns; I am often asked for such information. Further elucidation of this issue is possible only by general practitioners themselves acting in concert and taking into account new and review consultation rates, data on repeat prescribing, diagnostic codes, rates of laboratory usage, and hospital outpatient referrals. It also needs some measure of doctors' attitudes to treatment with drugs, their tolerance of patients' symptoms, and their ability to resist inappropriate demands for treatment with symptomatic drugs. There is no logistical reason why such a study should not be done, and it should provide good indices of clinical activity, clinical response, and possibly cost effectiveness in this aspect of general practice.

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