Relationship between the number of partners in a general practice and the number of different drugs prescribed by that practice

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SUMMARY. The objective of this study was to assess whether practice size, as measured by the number of doctors, had any bearing on the range of drugs prescribed. All practices in the northern and western health boards in Northern Ireland were included in the study — a total of 132 practices (362 doctors) serving a population of 628 249. Prescribing data, obtained from the Department of Health and Social Services (Northern Ireland) information technology unit database, were analysed retrospectively for the month of January 1989. The number of different preparations prescribed in each of 22 therapeutic groups were counted. Hence a measure of the range of prescribing was assessed. A significant correlation was found between the number of different preparations prescribed and the number of general practitioners working in the practice. However, no correlation was found between the number of different drugs prescribed and the mean prescribing cost per patient or the mean list size of the doctors in each practice. The use of a practice prescribing policy was found to have no influence on the range of drugs prescribed, nor on the prescribing costs. The inference is that formal therapeutic policies may be difficult to implement within group practices.

These results are of importance to general practitioners since the greater the number of different drugs prescribed the greater will be the risk of side effects and dangerous interactions.

Keywords: partnership size; prescribing patterns; drug choice.

Introduction

MOST prescribing in the National Health Service occurs in general practice[1] and general practitioners have been shown to use a broader range of drugs than hospital specialists.[2] As approximately 3600 different drugs, proprietary and non-proprietary, are listed in the *British national formulary*, making a rational choice for a particular patient may be difficult.[3] In a group practice each doctor will prescribe depending on his or her individual preferences and therapeutic knowledge. In a large practice this will almost certainly result in a very wide range of drugs being used unless a formally agreed prescribing policy operates within the practice.

The prescribing information unit of the Department of Health and Social Services (Northern Ireland) has provided practice-specific prescribing feedback to all practices in Northern Ireland since 1976 and during the course of this work it was noted that larger group practices did appear to prescribe a greater assortment of preparations than smaller practices. The aim of this study was to ascertain whether practice size as measured by the number of doctors, had any bearing on the range of drugs prescribed.

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Method

All practices in the northern and western health boards in Northern Ireland were included in the study — a total of 132 practices (362 doctors) serving a population of 628 249. The area covered by these two health boards includes a large town with a population of approximately 84 000, seven towns with populations ranging from 12 000 to 30 000, many smaller towns and more remote rural areas. Twenty nine practices (22%) were single handed, while the remaining 103 (78%) worked in groups of between two and seven partners (Table 1). As only two practices had seven partners, these were combined with the six partner group for the purposes of analysis. The mean list size of the 362 doctors was 1844 (range 1033–3363). There was no significant relationship between the number of general practitioners in a practice and the size of each doctor's list.

Prescribing data for the practices for the month of January 1989 were extracted from the DHSS(NI) information technology unit database. The range of prescribing was assessed by counting the number of different preparations in each of 22 different therapeutic groups prescribed by each practice. Each therapeutic group of drugs was also classified under the headings symptomatic,[4] systematic[4] or intermediate, as appropriate.

Symptomatic drugs. These relieve symptoms without much expectation of altering the pathological process: hypnotic drugs, minor analgesics, antacids, laxatives, vasodilators/vasoconstrictors, expectorants/cough suppressants, anti-inflammatory drugs, vitamins, antihistamines. Hosiery was also included in this group.

Systematic drugs. These alter the pathophysiology of disease and are usually prescribed after a definitive diagnosis, often involving a consultant opinion and hospital investigations: antidepressant drugs, heart preparations, for example antiarrhythmic drugs and antiplatelet drugs, diuretic drugs, antihypertensive drugs, anti-asthmatic drugs, hypoglycaemic drugs and thyroid/antithyroid drugs.

Intermediate drugs. These can alter the pathophysiology of disease, but are often used symptomatically or with only a presumptive diagnosis being made before treatment is commenced: sedatives/tranquillizers, H_2-receptor blockers, penicillins, antifungal drugs, antiviral drugs and topical skin preparations.

There will inevitably be debate as to which therapeutic groups are to be categorized as symptomatic and intermediate drugs. The selection for this study was agreed by a group of experienced general practitioners to reflect the ways in which they and their colleagues viewed these commonly used treatments.

In determining the range of preparations prescribed, different presentations, for example, tablets and syrup, counted as a single item but generic and proprietary preparations were counted as separate items on the basis that most doctors use either the

generic or proprietary name when prescribing and rarely alternate the two.

Each practice involved in the study was sent a short questionnaire asking if they used a practice formulary or had a verbally agreed prescribing policy, that is an informed policy as agreed between doctors.

The data were analysed by the statistical package for the social sciences *(SPSS)* on a Compaq 386/20 microcomputer using stepwise multiple regression analysis and Pearson's correlation analysis. To determine whether there was a significant relationship between the number of drugs prescribed and the use by a practice of a verbally agreed prescribing policy or a formulary, an analysis of covariance was performed where the number of drugs prescribed was the dependent variable, the use of a prescribing policy was the independent factor and the number of general practitioners in the practice was a covariable.

Results

A significant linear correlation was found between the number of different preparations prescribed and the number of general practitioners in a practice (n = 132, r = 0.854, $P<0.001$) (Figure 1). This held true for each of the three drug classes. The mean number of preparations increased linearly from single handed practices through to practices with six or more partners, as is shown by the slope of the regression line and the large positive correlation (r = 0.854). For symptomatic preparations this represented an increase of 77.3%, while the number of systematic and intermediate preparations increased by 88.7% and 111.0%, respectively (Table 1).

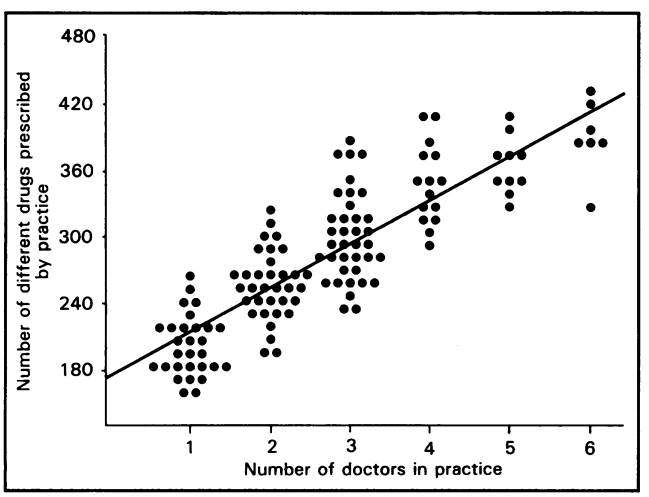

Figure 1. *Relationship between number of drugs prescribed and the number of general practitioners in a practice. The straight line is the regression line.*

A stepwise multiple regression analysis indicated that the number of general practitioners in a practice explained 71% of the variability in the number of preparations prescribed. List size accounted for only 5% of the variability.

A consistent trend existed throughout the drug classes; namely that doctors who prescribed less than the mean number of different preparations in one drug class displayed a similar trend in each of the other two classes, and likewise for those prescribing more than the mean number of preparations. This is demonstrated by the following correlation coefficients: symptomatic and systematic, r = 0.804; symptomatic and intermediate, r = 0.792; systematic and intermediate, r = 0.792.

The correlation between the number of different preparations prescribed and the mean list size of the general practitioners in each practice was not significant (n = 362, r = 0.163). Nor was there any significant correlation between the mean prescribing cost per patient and the number of different drugs prescribed or the mean list size (Table 2).

A total of 95 practices returned the questionnaire (72% response rate). Of these 20% used a formulary, 34% had a verbally agreed policy and 46% had no agreed policy. The use of a formulary or a verbally agreed prescribing policy did not have any significant association with the number of different drugs prescribed; neither did it result in any significant reduction in prescribing costs (Table 3). There was no significant correlation between the use of a prescribing policy and the number of general practitioners in the practice.

Discussion

The results of this study show a direct relationship between the number of doctors working together as a group and the range of drugs they prescribe. While this may appear to be intuitively obvious, this is the first published study to document such a relationship.

The number of different drugs prescribed by practices claiming to operate a formulary or a verbally agreed prescribing policy was not significantly different from that found among practices with no such policy. This may be because not all partners comply with the formulary or because the formularies contained a narrow range of drugs and were therefore difficult to comply with. Alternatively, the formularies used may contain a wide range of drugs, perhaps including all the preferred preparations of each general practitioner. Ideally, formularies should cover the drugs for 90% of conditions presenting to a general practitioner, but studies indicate that the actual percentage of prescrip-

Table 1. Mean list size of the practices, and the relationship between the mean number of different drugs prescribed over one month and the number of general practitioners in a practice.

No. of general practitioners in practice	Number of practices	Mean list size (SD)	Mean no. of different drugs prescribed (SD)			
			Symptomatic drugs	Systematic drugs	Intermediate drugs	All drugs
1	29	2013 (454)	62.6 (10.3)	62.6 (10.4)	74.6 (12.0)	199.4 (26.9)
2	34	1765 (385)	75.4 (12.9)	80.0 (10.5)	98.7 (12.9)	254.1 (31.4)
3	37	1776 (333)	85.4 (14.9)	92.0 (13.2)	117.7 (21.4)	295.0 (41.3)
4	15	1825 (261)	101.3 (11.9)	106.3 (13.8)	138.4 (19.0)	346.0 (35.9)
5	10	1905 (300)	103.7 (10.9)	113.7 (8.8)	150.9 (13.5)	368.9 (26.1)
6+	7	1841 (318)	111.0 (10.8)	118.1 (13.8)	157.4 (18.0)	386.6 (34.3)
Overall	132	1844 (373)	82.1 (19.4)	87.1 (20.8)	110.0 (30.4)	279.0 (66.8)

SD = standard deviation.

Table 2. Relationship between the mean prescribing cost per patient and the number of different drugs prescribed by a practice over one month, and the mean list size of doctors.

	Number of practices	Mean prescribing cost per patient (£) (SD)
Number of drugs prescribed by practice		
<200	18	4.54 (0.92)
200–219	10	4.82 (0.73)
220–239	12	4.87 (0.72)
240–259	18	4.32 (1.35)
260–299	25	4.59 (0.81)
300–339	22	4.92 (0.51)
340–379	16	5.26 (0.91)
380+	11	4.95 (0.61)
Overall	132	4.75 (0.89)
Mean list size of doctors in practice		
<1250	2	4.87 (0.28)
1250–1499	22	4.83 (0.88)
1500–1749	38	4.67 (1.03)
1750–1999	27	4.84 (0.91)
2000–2249	26	4.76 (0.73)
2250–2499	11	4.70 (0.77)
2500–2749	3	4.63 (0.78)
2750–2999	2	4.75 (1.10)
3000–3250	1	4.59 (0.00)
Overall	132	4.75 (0.89)

SD = standard deviation.

Table 3. Relationship between use of a prescribing policy and the mean number of different drugs prescribed, and the mean prescribing cost per patient.

Use a prescribing policy	Mean number of different drugs prescribed (SD)	Mean prescribing cost per patient (£) (SD)
Yes (*n* = 51)	284 (62.2)	4.81 (0.77)
No (*n* = 44)	270 (63.7)	4.67 (1.01)
No reply (*n* = 37)	283 (76.4)	4.77 (0.90)

SD = standard deviation. *n* = number of practices.

tions that are for formulary items range from 70% to 78% for non-repeat drugs and approximately 60% for repeat items.[1,5]

Use of a formulary has been shown to alter prescribing habits and to reduce costs by approximately 11%.[1] However, no such cost reduction was found in this study. This, together with the fact that the range of drugs was not altered by the use of a formulary, suggests that many practices with a formulary may not implement it. The figure of 20% of practices using a formulary is considerably higher than the 4% of doctors who reported using a formulary in 1988 (DHSS survey). Unfortunately, we were unable to explore in greater detail the nature of formularies being used and a further study to investigate how different formularies affect the range of drugs prescribed would be of interest.

An advantage of using a limited range of drugs is that the doctor will become more familiar with drug dosage, contraindications, interactions, and so on, and, therefore, the incidence of side effects and dangerous interactions should be reduced. In an earlier study a group of general practitioners was found to use a mean of 116 different drugs (range 84–175).[6] While this may appear to compare favourably with our figure of 199 drugs for single-handed practitioners, this research was among only 12 doctors and there may have been some under-reporting of prescriptions issued.

Several excellent formularies are available in the United Kingdom.[7-9] The number of drugs they contain varies from 137 to 343. It is of interest to note that Swedish guidelines recommend detailed knowledge of the 50 most commonly used drugs in general practice and competent familiarity with a further 150 drugs used to treat less common conditions.[2] Only limited knowledge of all other drugs would be expected. Their goal is to promote rational use of drugs by improving the knowledge of prescribers.

The findings of this study are of importance to general practitioners as the greater the number of different drugs prescribed, the greater will be the risk of side effects and dangerous interactions. The Drug Utilization Research Unit at the Queen's University of Belfast has proposed that the number of different drugs prescribed should be reported in future prescribing feedback to general practitioners in Northern Ireland.

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