Variation in general practitioners' referral rates to consultants

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SUMMARY. The variation in the number of patients general practitioners refer to hospital is a source of concern because of the costs generated and the implications for quality and quantity of care. This paper compares 32 general practitioners with high referral rates with 35 doctors with low referral rates drawn from a study of 201 doctors. The mean referral rate for all 201 doctors was 6.6 per 100 consultations — for those with high referral rates the mean was 11.8 and for those with low referral rates 2.9. Differences between doctors with high and low referral rates with respect to age, sex, social class and diagnostic case mix of patients consulting were small. Doctors with high referral rates referred more patients in all categories. There were also few differences between the two groups with respect to the characteristics of the doctors themselves or their practices. The findings are discussed in the context of proposals to provide general practitioners with information on their own referral rates compared with those of other doctors.

Introduction

VARIATIONS in general practitioners' rates of referral to hospital consultants have long been known to exist. Rates of referral vary between different regions of the country, between districts, between hospitals and between individual general practitioners. A paper recently presented by Sir Donald Acheson, Chief Medical Officer of the Department of Health and Social Security, highlighted the extent of the variation, expressing a sense of frustration that 'a phenomenon so gross can continue to defy analysis'[1,2] and this theme was taken up in the recent government green paper on primary health care.[3] Dr Acheson was concerned with the cost implications of the variations as well as the levels of care received by patients. In the current economic climate and with total hospital running costs standing at £7489 million,[2] any suggestion that general practitioners use hospital referrals inefficiently warrants careful examination. Are some doctors referring more often than is necessary and are the patients of doctors with low referral rates being denied the access to specialist care which they need?

A prerequisite to answering these questions, and ultimately to modifying behaviour where appropriate is an understanding of the nature of the variation and its sources. Since the early 1960s general practice studies have demonstrated considerable variation in general practitioners' use of consultants.[4-9] Not all these studies have identified the sources of variation. Those that have examined the relationship between patient and doctor characteristics and referral rates have found few differences.[5,6,9] Morrell and colleagues[6] concluded that the decision to refer reflected the doctor's perception of the need for hospital care, and Cummins and colleagues[9] concluded that doctors have unique referral thresholds. However, these studies were based on small numbers of general practitioners in single practices.

In this paper data from a large study of urban general practice have been used to try to establish whether there are differences in the patients seen or the characteristics of doctors when groups of general practitioners with high and low referral rates are compared.

Method

The results presented here are derived from two separate but linked studies of general practice carried out in the Manchester area between 1980 and 1982. The main findings of the studies and the methods employed have been described previously.[10-12] The studies were designed to describe urban general practice and to compare inner city and suburban areas.

Details of doctor and practice characteristics were derived from an interview survey of 397 general practitioners practising in five urban health districts. The same doctors were asked to participate in a study of the pattern of care in urban general practice — 201 completed a data collection exercise which involved recording information on all face to face doctor–patient contacts in a representative sample of 20 recording days. For each contact the patient's age and sex, the occupation of the head of household, the site of the consultation, whether the contact was initiated by the doctor or patient, the presenting problem, the provisional diagnosis and the action taken were recorded. Actions included referrals to consultants, which were recorded separately from referrals to nurses, social workers or other agencies. Doctors recorded all referrals to consultants including referrals to outpatient and inpatient departments and re-referral but no record was made of the speciality to which the patient was referred. Other 'actions' were prescriptions issued, laboratory tests or X-rays requested and whether the patient was discharged or asked to return.

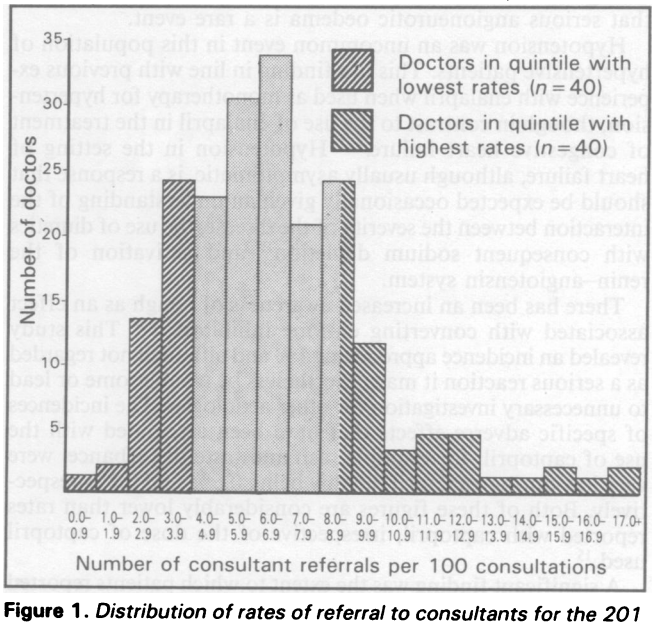

Figure 1. *Distribution of rates of referral to consultants for the 201 doctors participating in the study.*

Variations in rates of referral to consultants

Figure 1 shows the distribution of rates of referral to consultants for all 201 doctors. The mean referral rate was 6.6 per 100 consultations (standard deviation 3.2, median 6.2, range 0–24).

The upper and lower quintiles shown in Figure 1 represent groups of doctors with high and low referral rates. However, these 'observed' rates, based on a sample of consultations, are only an estimate of the actual rate for each doctor. In order to ensure a low probability of any overlap between the groups, a 95% confidence interval around the sample referral rate was calculated. Doctors were excluded from further analysis where confidence intervals overlapped between high and low referral rates. This left 32 doctors with high referral rates (mean 11.8 per 100 consultations) and 35 with low referral rates (mean 2.9 per 100 consultations) for whom it could be stated with a high degree of confidence that their referral rates were different.

Although a referral rate based upon the total number of consultations was most appropriate for this study, rates based upon the number of registered patients (using practice list size divided by the number of partners) were also calculated. There was no overlap in the observed rates calculated in this way for the doctors with high and low referral rates. The mean referral rate per 100 registered patients per annum was 34.0 for high referrers and 9.0 for low referrers.

Patient characteristics

The characteristics of all patients seen by high and low referrers and the characteristics of those referred to consultants by these two groups were examined in order to establish whether differences in referral rate might be a response to a different mix of patients. The doctors' provisional diagnoses were categorized using the *International classification of diseases*[13] and the diagnostic case mix of all patients seen by the doctors and of those referred to consultants were examined.

Doctor and practice characteristics

A wide range of doctor and practice variables were examined in order to identify those which might be related to patterns of referral behaviour. Since the research was conducted entirely in an urban area, it was not possible to examine rural/urban differences. However, it was possible to look at whether doctors with high referral rates were more likely to practice close to hospitals. Lastly, the relationship between referral rate and aspects of the doctors' behaviour — prescribing, use of laboratory and X-ray services and extent of follow-up work carried out — was examined.

Statistical analysis

Tests of statistical significance have been used in the presentation of the analyses, but they should be interpreted with some caution. Although the doctors participating in the study were representative of all general practitioners practising in the study area,[12] those included in the analyses were selected to provide a sharp contrast between high and low referrers. It was assumed that these doctors constitute representative samples of the populations of general practitioners with high and low referral rates.

Results

Patient characteristics

The consulting populations of doctors with high and low referral rates were very similar with respect to age, sex and social class of patient and whether the consultation was initiated by the patient or doctor (Table 1). The large number of consultations sampled gives rise to highly significant chi-square values, but the associations are very weak. The phi statistic (2 × 2 tables)

Table 1. Characteristics of all patients consulting and of those referred to consultants for general practitioners with high (32 doctors) and low (35 doctors) referral rates. The initiator of the consultation is also given.

	Number (%) of patients seen by				Percentage of those seen who were referred by	
	High referrers		Low referrers		High referrers	Low referrers
Age of patient (years)						
0–34	5808	*(42.5)*	6651	*(45.1)*	*9.4*	*3.0*
35–54	3120	*(22.8)*	3293	*(22.3)*	*12.2*	*3.2*
55–64	1893	*(13.9)*	1928	*(13.1)*	*11.1*	*2.2*
65+	2837	*(20.8)*	2868	*(19.5)*	*12.1*	*2.7*
	$\chi^2 = 20.9, P<0.001$, Cramer's V = 0.03					
Sex of patient						
Male	5304	*(38.7)*	6093	*(41.3)*	*12.0*	*2.8*
Female	8392	*(61.3)*	8657	*(58.7)*	*10.0*	*3.0*
	$\chi^2 = 19.6, P<0.001, \phi = 0.03$					
Social class of patient						
1	431	*(3.7)*	375	*(3.1)*	*12.1*	*4.0*
2	1986	*(17.2)*	2180	*(18.1)*	*11.6*	*3.2*
3N	1775	*(15.4)*	1686	*(14.0)*	*11.1*	*2.6*
3M	4003	*(34.8)*	4400	*(36.6)*	*10.7*	*2.6*
4	1772	*(15.4)*	1700	*(14.2)*	*10.1*	*2.8*
5	1547	*(13.4)*	1673	*(13.9)*	*8.9*	*2.5*
	$\chi^2 = 67.5, P<0.001$, Cramer's V = 0.05					
Initiator of consultation						
Patient	7342	*(55.5)*	8058	*(56.3)*	*10.0*	*2.5*
Doctor	5878	*(44.5)*	6257	*(43.7)*	*12.1*	*3.3*
	Not significant				All chi-square values significant ($P<0.001$)	

NB: Percentages are based on all cases for which there was valid information. For this reason totals vary slightly.

Table 2. Diagnostic case mix of all patients consulting[a] and of those referred to consultants for general practitioners with high (32 doctors) and low (35 doctors) referral rates.

ICD category[b]	Number (%) of patients seen by High referrers (*n* = 13 058)		Low referrers (*n* = 13 939)		Percentage of those seen who were referred by High referrers	Low referrers
I Infective and parasitic	967	(7.4)	1141	(8.2)	4.9	1.7
II Neoplasms	196	(1.5)	168	(1.2)	29.7	9.5
III Endocrine, nutritional and metabolic	222	(1.7)	252	(1.8)	8.7	3.9
IV Blood diseases	105	(0.8)	84	(0.6)	8.7	2.6 NS
V Mental disorders	915	(7.0)	890	(6.4)	7.4	2.0
VI Nervous system and sense organs	954	(7.3)	1007	(7.2)	12.3	3.6
VII Circulatory system	1294	(9.9)	1272	(9.1)	11.7	1.8
VIII Respiratory system	2366	(18.1)	2875	(20.6)	5.3	0.9
IX Digestive system	667	(5.1)	708	(5.1)	18.2	4.2
X Genitourinary system	614	(4.7)	554	(4.0)	17.0	6.7
XI Pregnancy, childbirth and puerperium	52	(0.4)	42	(0.3)	21.2	0.0
XII Skin and subcutaneous tissue	654	(5.0)	741	(5.3)	12.2	3.1
XIII Musculoskeletal and connective tissue	1124	(8.6)	1207	(8.6)	12.7	2.8
XVI Signs, symptoms and ill-defined conditions	327	(2.5)	337	(2.7)	11.3	3.1
XVII Injuries and adverse effects	732	(5.6)	807	(5.8)	13.3	3.4
XVIII Supplementary[c]	1869	(14.3)	1854	(13.3)	9.9	3.6
	$\chi^2 = 69.9, P<0.001$, Cramer's V = 0.05				All remaining chi-square values significant ($P<0.001$)	

n = number of patients. NS = not significant.
[a]Patients for whom no diagnosis was made have been excluded. [b]Excludes categories XIV and XV, congenital anomalies and perinatal morbidity. [c]Includes prevention procedures, family and social problems.

and Cramer's V measure the strength of association and range between 0 (no association) and 1 (perfectly related).

Table 1 also shows the rates of referral to consultants for different groups of patients. For all patient groups, the doctors with high referral rates referred between three and four times as many patients as those with low rates. They referred slightly more older patients and males, but these differences were minor compared to the large differences between their referral rates and those of the doctors with low rates. Both groups referred a higher proportion of patients in higher social classes, but Cummins and colleagues[9] have shown that this gradient is reversed when allowance is made for the higher consultation rates of patients in the lower social classes.

Table 2 shows the diagnostic case mix seen by doctors with high and low referral rates. The overall case mix of the two groups was very similar. In every category the high referrers were more likely to make a referral to a consultant than the low referrers (Table 2). There was no evidence that differences in the overall referral rate might be accounted for by concentrations of referrals in particular diagnostic groups. However, such crude categories might conceal important differences within groups. On examining the 20 diagnoses which generated most referrals for each group, considerable overlap was found in the most commonly referred diagnoses but there were some interesting differences. Ischaemic heart disease was the fourth most common category for the doctors with high referral rates, with a rate of 22% compared with only 1% for the doctors with low rates. For osteoarthritis, the doctors with a high rate referred 22 patients from 239 consultations (9%), and those with a low rate made no referrals from 237 consultations. Lastly, referral rates for asthma were 18% for doctors with high rates and 1% for those with low rates. However, there was no difference in the characteristics of patients with these diagnoses consulting high and low referrers.

Doctor and practice characteristics

Doctors with low referral rates included a relatively high proportion of women doctors and inexperienced general practitioners, but the differences were not statistically significant (Table 3). There is no support for the view that young inexperienced doctors tend to have high referral rates because they are more uncertain. There was also no indication that membership of the Royal College of General Practitioners or holding a hospital appointment were related to referral rate. The modal partnership size for both groups was a practice of four or more doctors. Although more doctors in single-handed and two-doctor practices had low referral rates, the differences were not statistically significant. A large proportion of high referrers had large lists but an equally large proportion had lists below 2000.

Of the doctors with high referral rates 22% were in practices within a one mile radius of a district general hospital, but 37% of those with low rates were equally close to a hospital.

Doctors with high and low referral rates demonstrated the full range of behaviour in terms of prescribing, use of laboratory and X-ray services and extent of follow-up work carried out. Thus, for example, 53% of the high referrers were also high prescribers, but 34% were low prescribers. Similarly, 49% of the low referrers were high prescribers and 20% low prescribers. Of the high referrers 28% were high utilizers of hospital laboratory services, but so were 31% of the low referrers. The data do not suggest a systematic interrelationship between referral and these aspects of behaviour.

Discussion

The doctors involved in this study showed a similarly wide range of referral behaviour to that reported in other studies[4,5,7] but the mean rate of referral was somewhat higher than reported elsewhere. This may reflect real differences between the participating doctors, but it may also result from the more inclusive definition of referrals used in this study.

The findings presented here have largely failed to provide an explanation for referral rate variation. General practitioners with high and low referral rates saw broadly the same range of pa-

Table 3. Doctor and practice characteristics of general practitioners with high and low referral rates.

Doctor/practice characteristics	Percentage of high referrers ($n = 32$)	Percentage of low referrers ($n = 35$)
Sex		
Male	*87*	*80*
Female	*13*	*20*
No. of years as doctor		
0–4	*19*	*34*
5–9	*28*	*20*
10+	*54*	*46*
MRCGP		
Yes	*25*	*26*
No	*75*	*74*
Hospital work		
Yes	*25*	*26*
No	*75*	*74*
No. of doctors in practice		
1	*19*	*26*
2	*19*	*26*
3	*22*	*11*
4+	*41*	*37*
List size		
⩽2000	*38*	*31*
2001–2500	*25*	*40*
2501+	*38*	*29*

All chi-square values not significant ($P > 0.3$)

n = number of doctors.

tients with the same range of presenting problems. Referral rates could not therefore be seen as demand led. But neither was the variation explicable in terms of the characteristics of the doctors which might be thought to be associated with different styles of practice. Although this study has highlighted what differences there were in both patient and doctor characteristics, none of these was sufficient to account for the extent of variation in referral rates.

Clearly referral rate variation is an important issue in studies of the interface between primary and secondary care. Current political concerns tend to emphasize the potential savings to the National Health Service of a reduction in 'unnecessary' referrals. Thus, it is tempting to focus attention on doctors with high referral rates, and to contemplate the savings that might be achieved by reducing their rates closer to the mean. It is less attractive to contemplate the need to increase referrals from doctors with low rates.

The government's green paper suggests that '... doctors need to be given information on their referral rates and how these compare with other doctors'.[3] This statement follows a reference to the extent of variation in referral rates, suggesting that the provision of such information is intended to reduce this variation in the same way as comparisons of prescribing levels have aimed to reduce variation in prescribing. However, for prescribing the aim has been a general reduction based upon agreement between the profession and the DHSS that levels of prescribing are too high. General practitioners might be forgiven for assuming that the provision of comparisons of referral rates was motivated by the same objective. But this would depend upon a consensus of what was an appropriate referral rate and the ability to make meaningful comparisons between general practitioners.

In comparison with single practice studies and those employing small numbers of volunteers, the study reported here provides one of the largest and most representative data sets available in urban general practice. The results show that doctors with high and low referral rates are far from homogeneous groups. Other studies, usually involving small numbers of general practitioners, have concluded that referral rate variations reflect diagnostic uncertainty,[6] the unique referral thresholds of individual doctors[9] or attitudes to hospital care and temperament.[14] None of these explanations seem very satisfactory.

The lack of straightforward explanations should result in the development of more sophisticated models of the referral decision and the possible sources of variation. Dowie has started to develop an alternative approach in a study of referrals to medical outpatient departments,[15] and her model of the referral decision offers a framework for further research. It should be noted that Dowie employed small scale qualitative methodology to research the problem. Such an approach is essential to the development of sophisticated models capable of explaining the complex phenomenon of the referral decision. In the light of this, it is difficult to see how the routine collection of necessarily crude information on general practitioners' referral rates could be helpful. Such information will provide no basis for general practitioners or health authorities to form judgements about how variations arise or what sorts of changes in behaviour might be desirable.

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