

An observational study of variation in GPs' out-of-hours emergency referrals

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ABSTRACT

Out-of-hours organisations are responsible for the care of patients 70% of the time, and their GPs act as gatekeepers to secondary care services. This observational study identifies the variations in GPs' out-of-hours referral rates to secondary care and factors that could explain these variations. One hundred and forty-nine GPs who worked in one UK general practice out-of-hours cooperative which served 19 practices with 167 000 registered patients. Data on patients who accessed the out-of-hours service over 3 years (2001–2004) were examined. Factors thought to be predictors of variation in referral rates were investigated using logistic regression analysis. There was a fivefold difference in referral rates between the lowest and highest referring quartiles of GPs (OR [odds ratio] = 4.56, CI [confidence interval] = 3.86 to 5.38). The sex (female) of the clinician, the time of the consultation (11 pm to 7 am), and the place of the consultation (home visit) accounted for some, but not all, of the increased referral rates. A doctor working out-of-hours disproportionately influences the fate of the patient, the number of hospital admissions, and extra costs to the health service. There is a need for follow-up studies to investigate the factors associated with referral behaviour, and how the variation relates to patient factors and the resources available. These findings could be used when planning the staffing of out-of-hours services to optimise appropriate care and minimise patients' exposure to unnecessary intrusive and expensive hospital care.

Keywords

emergency medical services; family practice; physician's practice patterns; referral and consultation.

INTRODUCTION

Marked variations in GPs' daytime routine hospital referral rates exist and factors that influence referrals have been identified in the literature. Patient factors include diagnoses and medications,¹ age and deprivation,^{2,3} and morbidity rates.⁴ Doctor factors include age, sex, years since qualification, satisfaction with the specialty being referred to, importance in making or confirming a diagnosis,¹ and the general practice where they work.⁴ Referral rates are also affected by processes such as the development of clinical guidelines for management and referral,² feedback of routine referral data, and past experience of, or future threat of litigation or complaint¹. High referrers may be more psychosocially orientated and perhaps more risk averse.¹

Out-of-hours referrals are usually emergencies and may be less influenced by doctor factors than the routine referrals of daytime practice. The study aimed to identify the extent of variation in GPs' out-of-hours referral rates and factors that might explain the variations.

METHOD

North Bristol Doctors Out-of-hours Cooperative provides on call services to 19 local practices and was responsible for the care of their patients 70% of the time. GPs work together in shifts of up to 8 hours to look after 167 000 patients. Patients telephoning their GP out-of-hours are automatically diverted to NHS Direct who answer and triaged these calls (Supplementary Figure 1) and either pass emergency calls to the ambulance service or accident and emergency departments, advise patients to contact their GP in normal working hours, or give advice and forward the remaining calls to the Cooperative. Patients are then offered telephone advice, consultations at the out-of-hours primary care centre or a home visit by a GP. Most GPs who worked in the Cooperative come from one of the member practices, and a few are locums. GPs are allocated shifts with primary roles either to visit patients or be based in the primary care centre. The rates of referral of these GPs were compared. Information about the GPs came

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Submitted: 8 May 2006; Editor's response: 29 November 2006; final acceptance: 4 January 2007.

©British Journal of General Practice 2007; 57: 152–154.

from the Cooperative's records or from the General Medical Council (GMC) website. Three years of data (2001–2004) on patients who accessed the service were examined.

Data were analysed using Stata (version 7) and SPSS (version 13). Factors thought to be predictors of variation in referral rates were investigated using logistic regression analysis. The odds ratios were calculated using STATA (version 7) with the cluster subcommand to use robust standard errors to allow for the fact that the contacts within each GP are not independent of each other. The referral rates for individual GPs were grouped into quartiles.

The intraclass correlation coefficient (ICC) for referral rates of GPs in practices was calculated to investigate whether the difference in referral rates could be due to a practice effect. Locum GPs and registrars were excluded in the intraclass analysis.

RESULTS

Excluding incomplete or incorrect entries and 22 GPs who had less than 20 face-to-face contacts (consultations at the primary care centre and home visits) and averaged less than one shift each year (Supplementary Figure 1), the remaining 149 GPs had 33 808 face-to-face patient contacts. Forty-seven per cent of the GPs are female and 35% of patient contacts are with a female GP. There was a wide variation in GP referral rates (Supplementary Figure 2). The 10 highest referring GPs saw 1656 patients and admitted 372, the 10 lowest referring GPs saw 1755 and admitted 35. Widely differing referral rates were not related to the number of contacts. When GPs were grouped according to their referral rates into quartiles, there was an almost fivefold difference in referral rates between the bottom and top quartiles (Table 1).

Predictors investigated included the sex of the clinician, the employment status of the clinician (locum, GP in a local practice, or GP registrar), the number of out-of-hours contacts carried out by that clinician in the 3-year period, the number of years post GMC registration experience, the time the contact occurred (day 7 am–7 pm, evening 7 pm–11 pm, or night 11 pm–7 am) and place of the contact (patients' homes, or at the primary care centre). Correlation between GPs from the same practice was investigated using the ICC on GPs' individual referral rates. This was found to be 0.056, and not statistically significant with a *P* value of 0.18. When GP practice was fitted in the model with a separate level for locums and registrars the odds ratio for the highest referral group remained 4.59 (95% confidence interval [CI] = 3.88 to 5.43) demonstrating that the difference in referral patterns was not due to referring practice.

The only predictors found to have an independent association with referral rates were the sex of the

How this fits in

Rates of non-urgent referrals of patients by GPs to secondary care vary widely during office hours. This study shows that the rates of emergency out-of-hours referrals by GPs of patients to hospitals varies fivefold. A GP's sex (female), the time of day (11 pm to 7 am), and place of consultation (home visit) are associated with an increased rate of emergency out-of-hours referrals of patients to hospitals. These factors do not explain all of the variation.

clinician, the time of the consultation, and the place of the consultation (Table 2). Although there were statistically significant differences with levels of experience, as measured by employment status, years since registration, and number of out-of-hours patient contacts in the 3-year period in the univariate analysis; once sex, time, and place were controlled for, these were not statistically significant. The sex of the GP does not explain all the difference. The proportion of female GPs in each quartile from lowest to highest, was 24.3, 40.5, 59.5 and 63.2%, respectively. The increased rate of referral for patients seen by female GPs was represented by an odds ratio of only 1.37 (95% CI = 1.09 to 1.72).

DISCUSSION

GPs looking after the same population out-of-hours vary greatly in their management of patients. Rates of referral to hospital were increased if the GP was female, if the patient was seen on a home visit, and if seen between 11 pm and 7 am. The experience of the GP as measured by employment status, years since registration, total number of out-of-hours patient contacts and place of daytime practice did not influence referral rates. This observational study was limited by the information available about the GPs and the relatively small number of GPs and practices being compared. Most of the predictors of variation remain unknown. The appropriateness and consequences of each doctor's referrals or non-referrals was not assessed.

Table 1. GPs' out-of-hours referral rates in quartiles.

Quartiles	Referral rate, %	UOR (95% CI)	AOR (95% CI)
Lowest quartile	4.1 (289/7139)	1.00 (RG)	1.00 (RG)
Second quartile	7.4 (795/10813)	1.88 (1.62 to 2.19)	1.80 (1.56 to 2.08)
Third quartile	10.9 (1028/9412)	2.91 (2.51 to 3.36)	2.75 (2.38 to 3.17)
Highest quartile	17.3 (1113/6444)	4.95 (4.15 to 5.90)	4.56 (3.86 to 5.38)

*Referral rates (referrals/face-to-face consultations) in the four referral rate quartiles together with the odds ratios of being referred during a consultation if seen by a GP in each of these referral quartiles compared with the lowest referring quartile. AORs are those controlling for sex of GP and time and place of the consultation. On unadjusted and adjusted analyses *P*<0.001. AOR = adjusted odds ratio. RG = reference group. UOR = unadjusted odds ratio.*

Table 2. GPs' out-of-hours referral rates 2001–2004.

Variable	Referral rate, %	UOR (95% CI)	P-value	AOR (95% CI)	P-value
Sex			0.008		0.007
Male	8.6 (1884/21821)	RG		RG	
Female	11.2 (1341/11987)	1.33 (1.08 to 1.65)		1.37 (1.09 to 1.72)	
Years since registration as doctor in UK		0.010		0.27	
0–9	12.4 (434/3491)	1.38 (1.05 to 1.81)		1.20 (0.89 to 1.62)	
10–19	9.4 (1159/12363)	1.00 (0.79 to 1.27)		0.95 (0.76 to 1.21)	
20–29	9.4 (1344/14371)	RG		RG	
≥30	8.0 (288/3583)	0.85 (0.63 to 1.13)		0.88 (0.69 to 1.12)	
Number of out-of-hours face-to-face contacts over 3 years			0.34		0.77
20–149	10.7 (448/4203)	1.18 (0.95 to 1.47)		1.07 (0.86 to 1.32)	
150–399	9.2 (1771/19267)	RG		RG	
≥400	9.7 (1006/10338)	1.06 (0.82 to 1.38)		0.95 (0.73 to 1.24)	
Employment status			0.042		0.30
Registrar	14.9 (37/248)	1.73 (1.09 to 2.76)		1.45 (0.90 to 2.34)	
Locum	10.6 (762/7196)	1.17 (0.92 to 1.48)		0.96 (0.72 to 1.29)	
Practice-based	9.2 (2426/26364)	RG		RG	
Time of day of out-of-hours contact			<0.001		<0.001
Day (7 am–7 pm)	8.0 (1377/17247)	RG		RG	
Evening (7–11 pm)	10.5 (1098/10419)	1.36 (1.23 to 1.50)		1.37 (1.25 to 1.50)	
Night (11 pm–7 am)	12.2 (750/6142)	1.60 (1.30 to 1.98)		1.51 (1.13 to 2.02)	
Place of out-of-hours contact			<0.001		<0.001
Surgery	8.1 (2087/25649)	RG		RG	
Home visit	13.9 (1138/8159)	1.83 (1.62 to 2.07)		1.76 (1.54 to 2.00)	

Referral rates have been calculated as a percentage of the total number of contacts in the 3-year period. Odds ratios have been calculated using STATA (version 7) with the cluster subcommand to use robust standard errors. UOR is calculated using just the variable in question and the constant term in the model, the AOR controls for the sex of the GP, the time and the place of the contact. AOR = adjusted odds ratio. RG = reference group. UOR = unadjusted odds ratio.

A strength of the study was that it compared the performance of many GPs from different practices working with similar patients in similar circumstances, and showed they acted significantly differently from each other.

Doctors behave differently, and a doctor working out-of-hours influences the fate of the patient, the number of hospital admissions, and extra costs to the health service. The changes in the GP contract in 2004 have limited GPs' responsibility for their registered patients to between 8 am and 6.30 pm Monday–Friday. New out-of-hours organisations, and health professionals other than GPs will make the decision to admit patients to hospitals in the out-of-hours period. Other changes in the NHS, such as 'payment by results' for hospitals and 'practice-based commissioning' for GPs will increase the pressure to offer patients alternatives to hospital care. The NHS quality requirements⁵ give no guidance or standards for the organisations providing out-of-hours services regarding variations in the rate of referral of patients to hospitals.

If these findings are confirmed and investigated further they could be used when commissioning and providing out-of-hours services to improve care and minimise patients' exposure to unnecessary intrusive and expensive hospital care.

The hypothesis that out-of-hours referrals are

usually emergencies and should be less influenced by doctor factors than daytime routine referrals has not been supported.

Supplementary information

Additional information accompanies this article at: <http://www.rcgp.org.uk/bjgp-supinfo>

Funding body

Dr Rossdale and Dr Kemple are in receipt of NHS research practice funding

Ethics committee

Ethics approval was not required because the paper is based on North Bristol Doctors Ltd audit data, and General Medical Council information in the public domain

Competing interests

Dr Rossdale and Dr Kemple are directors of North Bristol Doctors Ltd

Acknowledgements

We thank Dr Richard Danbury, the North Bristol Doctors Ltd and the GPs who participated.

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