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General practice out-of-hours service, variations in use and equality in access to a doctor: a cross-sectional study

Dermot O'Reilly, Michael Stevenson, Cara McCay and Jim Jamison

SUMMARY

Background: There is increasing dissatisfaction among general practitioners (GPs) with their 24 hour commitment despite the demand for GP services outside ordinary working hours. The creation of out-of-hours co-operatives has been welcomed by participating GPs and their families and patient satisfaction is generally high. However, there have been concerns about the lack of patient consultation in their development and on the quality of care provided.

Objectives: To examine geographical variation in the rates of out-of-hours calls and to see if there is any systematic variation in how the co-operative that covers the area responds to calls.

Design of study: A secondary data analysis of 110 357 calls received by the co-operative during the second year of its operation.

Setting: A co-operative with four centres providing out-of-hours care for one mostly rural Health Board in Northern Ireland.

Method: Deprivation score and mortality and long-term illness ratios provided indicators of need at an area level. Proximity to the four co-operative centres was measured as the distance in kilometres and estimated travel time (in minutes) along the road network.

Results: Out-of-hours call ratios were proportional to the area deprivation score and proximity to the co-operative centres, though not to area indicators of ill health. Older patients were more likely to be seen by the GP and females over the age of 15 years were more likely to receive telephone advice only (adjusted odds ratio [OR] = 0.785, 95% confidence intervals [CI] 0.756–0.816, $P < 0.001$). Each kilometre from the centres reduced the likelihood of seeing the GP (OR = 0.978, 95% CI = 0.976–0.979, $P < 0.001$). Even after controlling for potential confounders a large difference remained in how centres responded to calls.

Conclusions: It is not certain whether these inequalities in services delivery represent inequity as the apposite level or type of response cannot be determined until more is known about the appropriateness of the demand for out-of-hours medical care.

Keywords: out-of-hours care; out-of-hours co-operatives; health care quality, access, and evaluation.

Introduction

IN recent years, the demand for general practitioner (GP) services outside ordinary working hours has been rising substantially.^{1,2} At the same time, the increasing dissatisfaction among GPs with their 24-hour commitment³ led to pressure for a change in the way services outside working hours were organised.⁴ In 1994, GP terms and conditions were changed and development funds were made available that encouraged the creation of out-of-hours co-operatives as an alternative means of providing patient cover. The number of co-operatives has risen from about 31 in England in 1993 to 251 throughout the United Kingdom in 1997,⁵ each covering an average of approximately 150 000 patients.

Studies have shown that out-of-hours co-operatives have been welcomed by participating GPs⁶ and have had a positive impact on the way that out-of-hours work is viewed by GPs and their families.⁷ Patient satisfaction with co-operatives is generally high⁸ and greater than that of deputising services.⁸ However, there have been concerns about the lack of patient consultation in their development and on the quality of care provided.^{5,9} As equality of access to uniformly high standards of care is an important goal for primary care, a particular concern is that the recent changes in out-of-hours services might accentuate inequalities in access and care.¹⁰

This study examines geographical variation in the out-of-hours contact rates throughout a rural Health Board in Northern Ireland and looks for any systematic variation in the way that the co-operative covering this area responds to those contacts.

Method

The co-operative, comprising 230 GPs, serves a population of approximately 394 000 in the Northern Health and Social Services Board area (Figure 1). There are four localities, each with a staffed Primary Care Centre (PCC). Patients who contact the co-operative may be managed by being asked to attend the nearest PCC, by receiving a home visit (dedicated drivers for GPs are provided) or they may receive telephone advice only.

The data for the analysis is based on the 110 357 calls received throughout 1998, the second year of the co-operative's operation. There was incomplete data on some of the calls; for example, age, sex, and postcode were missing for 390, 1330, and 11 537 calls respectively. There was no systematic difference between PCCs in the proportion of missing postcodes. In addition, 1605 cases were deemed not to be within the Board boundaries and a further 5000 could not be assigned to an enumeration district. Seven thousand one hundred and fifty-nine calls were classified within the com-

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HOW THIS FITS IN*What do we know?*

Demand for general practitioner services outside normal working hours has been great in recent years, and has led to the establishment of co-operatives. Participating GPs have welcomed these new work procedures; however, some have voiced concern over equality of access and other elements involving co-operatives.

What does this paper add?

This study examines geographical variation in out-of-hours contact within a large Northern Ireland rural co-operative. Differing management styles, rather than simply geographic location, produced significantly different data. However, the inequalities revealed cannot be attributed to one factor alone.



Figure 1. Geography of the co-operative (unshaded) and the four Primary Care Centres. (Divisions represent local government districts in Northern Ireland.)

puter system as 'repeat calls within a 24-hour period' and excluded from analysis. The rationale for the exclusion was that previous calls might have influenced subsequent GP decisions about patient management. The total number of calls for which there was complete data was 78 907.

Two measures of ill health were calculated at the level of electoral ward: the limiting long-term illness question from the 1991 census and standardised mortality ratios. The latter were based on five years' deaths from 1993 to 1997 inclusive. These were indirectly standardised using the Northern Ireland average rates and the 1991 population estimates. The level of deprivation of each enumeration district was estimated using the Townsend score.¹¹

Proximity of the patient's home to the PCC was measured as both the distance in kilometres and in estimated travel time by car (minutes). Distance along the road network from the population-weighted centroid of the enumeration district to each PCC had been calculated by geographers from Lancaster University for a different exercise.¹² The equivalent travel times were estimated taking into consideration the different road types, number of interconnections, and using

average road speeds as determined by the Department of Transport.

The study was conducted in two parts. In the first part we assessed the variation in demand for out-of-hours care. Age- and sex-standardised call ratios were the dependent variable in the multiple linear regression, with the needs indicators and measures of proximity to the PCCs included as possible explanatory factors. The second part of the study explored the responses of the PCCs to the calls made. Here, the dependent variables in the logistic regression were the individual calls with age, sex, Townsend score, and distance from the PCC as explanatory variables. The second part was a two-stage process to mirror the likely decision-making process of the GP (i.e. based on what the GP knows of the patient: 'Do I need to see them or will advice-only suffice?', and 'Should I go to them or can they come to me?'). For the first part, the options of a PCC visit and a home visit were combined, making a dichotomous call outcome ('face-to-face consultation with doctor', 'telephone advice only'). In the second the likelihood of receiving a home visit rather than coming to a PCC was estimated.

Results

The out-of-hours contact rate for this year was 280 calls per 1000 patients per year. Call rates were highest for those at the extremes of the age distribution; the rates for the under-15-year-olds and for the over-85-year-olds were 725 and 754 per 1000 patients per year respectively. Between the ages of 10 and 70 years the rates averaged 151 per 1000 patients. Between 15 and 60 years, females had higher call rates while for those over the age of 80 years the rates for males exceeded those of females. Seventy-four per cent of calls came from patients who lived less than 20 minutes drive time from the PCC; only 10% were from patients who lived more than an estimated 30 minutes away. Fifty-four per cent of patients received telephone advice only, 27% were seen at the PCC, and 19% were seen at home.

PCC contact rates

The levels of PCC contact for the enumeration districts (standardised for age and sex) were positively correlated with the area deprivation scores (Pearson correlation coefficient = 0.26, $P < 0.001$) and negatively correlated with proximity to the PCC centre (correlation coefficient = -0.20, $P < 0.01$). There was no significant relationship between proximity to the PCC and the area deprivation score or the standardised mortality or limiting long-term illness ratios.

The results of the linear regression modelling of the age and sex standardised call ratios are shown in Table 1. (These results exclude the data for one local government district that did not fit the general pattern. This area subsumes a large town whose recent expansion is poorly captured in the census, possibly producing artefactually high levels of demand.) The final model includes two variables that explain a modest 12% of the variation. Other things being equal, more deprived areas tended to exhibit higher call ratios, while areas further away from the PCC tended to call less. Neither of the other areal indicators of need (mortality or long-term illness) was significantly associated with the out-of-hours call ratios.

Table 1. Final linear regression model: The unit of analysis was the 924 enumeration districts. The dependent variable was the standardised call ratios with a range of area characteristics as predictors.

	Unstandardised coefficient (se)	T	P-value
Distance from primary care centre	-0.68 (0.08)	-8.43	<0.001
Townsend score	0.17 (0.03)	5.38	<0.001

Adjusted R^2 = 11.8%, se = standard error.

PCC response

There was a clear association between type of PCC response and the age and sex of the patient. Overall, most patients who contacted the co-operative did not get a face-to-face consultation from the GP but received only telephone advice. Both the likelihood of a consultation at the PCC and a home visit were strongly related to age and inversely related to each other. PCC consultations were common for younger patients but infrequent at older ages. Conversely, fewer than 10% of young children received home visits while about 50% of those aged over 85 years did. The probability of a face-to-face consultation increased for both sexes over the age of 40 years.

In the first instance the variation in the PCC response was explored by examining the differences between areas. Table 2 shows the correlations between the types of PCC response patients in enumeration districts received, the area deprivation scores and proximity to the PCC. The probability of receiving only telephone advice was positively correlated with both the distance and the estimated travel time to the PCC. There was a negative but weak association between the distance from the PCC and the level of home visits. Those patients living closer to the PCC were more likely to be asked to visit the PCC.

The final logistic regression models for PCC response are shown in Table 3. Increasing age was associated with an increased likelihood of a face-to-face consultation. Up to the age of 15 years, males and females had equal likelihood of being seen by a GP; at older ages females were about 20% more likely to receive telephone advice only. Patients from deprived areas were more likely to be seen by the doctor. All other things being equal, the likelihood of a face-to-face consultation with the doctor decreased the further the patient lived from the PCC. (The odds ratio of 0.98 per km seems quite modest; however, this equates to an odds ratio of 0.50 at 34 km [21 miles]. Thus a patient living 34 km from the PCC has about half the chance of a face-to-face consultation with the GP compared with a patient living on the PCC's doorstep.) A large PCC effect was also evident, with Ballymena and Whiteabbey PCCs more likely than Coleraine or Moneymore to offer callers 'telephone advice only'. Neither mortality nor long-term limiting illness levels was significantly associated with the likelihood of seeing the doctor. Estimated travel times was shown to be an inferior predictor of the effects of PCC proximity compared with road distance. Different models were tested with travel distance entered as power, logistic, and quadratic functions, and all were inferior to the linear model.

The likelihood of receiving a home visit rather than having to come to the PCC varied with the patients' age, where the patient lived, and which PCC they had contacted. PCC con-

sultations were principally for younger patients. Patients aged over 65 years were 40 times as likely to receive a home visit than one aged under 15 years. Home visits were also more likely for patients from deprived backgrounds or if they lived further away from the PCC.

Discussion

With 230 GPs and a population of almost 400 000 patients this is one of the larger co-operatives in the UK.⁶ The Northern Health and Social Services Board is, by comparison with other parts of the UK, a mostly rural place and it is therefore not certain how generalisable these findings are to other areas. However, the number of calls received was commensurate with the population size. The overall call rate was higher than that reported in a recently published sample of general practice co-operatives throughout England but was in keeping with those for Scotland.¹³ The proportion of calls managed with telephone advice only (55%) was higher than in some reported studies⁷ but lower than in others,¹⁴ though it is acknowledged that there is a considerable variation in how co-operatives respond to patient calls.⁵

Throughout the world there is continuing pressure to concentrate aspects of the health services. A major impetus for these changes is the presumption that larger or more specialised centres with greater throughputs are associated with better outcomes for patients. However, the centralisation of out-of-hours services into co-operatives has been primarily to improve the quality of life of GPs, and it is important to ensure that these changes do not affect the quality of care for patients. This study has shown that although patients furthest away from the co-operative tend to call less they are also less likely to get to a face-to-face consultation when they do call. In addition, women are more likely than men to receive only telephone advice. Do either of these inequalities represent inequities?

It could be argued that some of the variation in the chances of a patient having a face-to-face consultation is owing to reluctance on the part of the patient to travel the greater distances to the PCC and therefore cannot be counted as inequity. However, all inequity is relative and if the decision not to attend the PCC was influenced by the additional distance that some patients would have had to travel — owing, for example, to the higher taxi fares — then this we suggest may represent *relative* inequity.

Salisbury *et al*, in a recent study of 20 co-operatives,¹³ found that the variation in call rates was not explained by differences in demography or deprivation. We have shown that they are also not related to the more usual indicators of need, such as mortality or limiting long-term illness ratios. The relationship with deprivation found in this study may be related to the choice of Townsend rather than Jarman scores as the indicator of deprivation. It is probable that the prevail-

Table 2. Association between PCC response and measures of proximity and deprivation for 924 enumeration districts (data represent Pearson correlation coefficients).

	PCC response			Area characteristics		
	Telephone advice	PCC visit	Home visit	Townsend score	Distance from PCC	Travel time from PCC
PCC response						
Telephone advice (%)	1.00					
PCC visit (%)	-0.63	1.00				
Home visit (%)	-0.43	-0.43	1.00			
Area characteristics						
Townsend score	-0.16	-0.11	0.31	1.00		
Distance from PCC	0.42	-0.34	-0.10	-0.02 ^a	1.00	
Travel time from PCC	0.42	-0.32	-0.12	-0.02 ^a	0.99	1.00

^aNot significant. All other correlations are significant at the 0.01 level.

Table 3. Final logistic regression model: the likelihood of face-to-face consultation rather than telephone advice, compared with only the likelihood of the GP seeing them at home rather than at the PCC.

	Likelihood of face-to-face consultation rather than telephone advice only		Likelihood of GP seeing patient at home compared with at the PCC	
	Odds ratio	95% CI	Odds ratio	95% CI
Age (years) ^a				
0-14	1.00		1.00	
15-34	0.82	0.79-0.86	2.75	2.56-2.94
35-64	1.11	1.06-1.16	6.61	6.21-7.04
65+	1.86	1.77-2.95	40.11	36.93-43.56
Female (> 15 years of age)	0.79	0.76-0.82	NS	
Townsend score	1.01	1.01-1.02	1.11	1.10-1.12
Distance (km)	0.98	0.97-0.99	1.02	1.01-1.02
Primary care centre				
Ballymena	1.00		1.00	
Coleraine	1.67	1.61-1.74	1.07	1.01-1.13
Moneymore	1.68	1.61-1.75	0.50	0.47-0.54
Whiteabbey	1.17	1.17-1.26	NS	

NS = not significant at 0.05 level. ^aAge: baseline is both sexes at ages 0 to 14 years, at older ages the odds ratios are for males only; the odds for females aged over 14 years are obtained by multiplying these by the age factors by the female > 15 years factor.

ing geographical variation in the levels of out-of-hours call rates is a reflection of more established historical patterns with an urban/rural component that has been largely unaffected by the co-operative within the first two years of its existence. It has been suggested¹⁵ that the patient's decision on whether or not to use a service will depend on the opportunity costs of utilisation, the perceived seriousness of the condition (relative to normal health), and the expected efficiency of the treatment. There is evidence to show that, other things being equal, the willingness of patients to seek care declines with distance.¹⁶ Patients in rural districts tend to consult less than those in urban areas¹⁶ and this holds for serious as well as for minor conditions.¹⁵

In this study indicators of health and, by inference, the need for health services, were not associated with distance, therefore a greater proportion of less frequent calls from those further away should have been appropriate. Yet these patients were least likely to have a face-to-face consultation with the GP. Between 23% and 29% of out-of-hours calls have been deemed unnecessary from a medical viewpoint in the past decade^{18,19} and this may represent a rising trend when set against earlier studies.²⁰ People living in deprived

areas are perhaps more likely to make an inappropriate out-of-hours call;¹⁸ however, it is not known whether appropriateness varies with distance. If populations living closer are receiving optimum levels of care then those further away are disadvantaged. The system might be therefore be modified as in Denmark²¹ to include a financial incentive for GPs to do more home visits to patients who are further away. Alternatively, if the latter are receiving adequate care then local residents are receiving a disproportionate amount of care. If the health of more distally sited patients was being significantly compromised then perhaps higher levels of usage of emergency services, such as ambulance calls or admissions to accident and emergency units, would be expected in these areas. McKee,²² who looked at A&E attenders to a district general hospital within this Health Board in 1989, showed that there was a strong inverse relationship between proximity to the A&E services and their use. It is likely that the use of alternate services accentuates rather than attenuates the distance effects on the utilisation of out-of-hours services.

Other things being equal, women were only 80% as likely as men to receive a face-to-face consultation. Again, the

appropriateness of this response cannot be answered by these data. The Fourth Morbidity Study of General Practitioners²³ showed that more women than men consulted with diseases that were classified as minor or intermediary. However, the health differences between the sexes is still being actively debated.²⁴

Even allowing for patient and area characteristics, large and significant differences remained in how centres responded to out-of-hours calls. Approximately 25% of patients calling Ballymena and Whiteabbey PCCs attended the PCC and just less than 20% got a home visit with 55–60% of callers getting telephone advice only. For Coleraine and Moneymore, less than 50% of callers got advice only; in the case of Moneymore this was because a greater proportion (37%) attended the PCC while at Coleraine the proportions of both PCC and home visits were higher than at Ballymena or Whiteabbey. These different management styles are probably a combination of GP preferences, knowledge of anticipated patient preferences, and custom and practice for the area.

While it is probable that the distance and sex inequalities represent inequity, the data in this paper cannot provide a definitive answer. The demands for out-of-hours medical services are rising and the pressure is taking its toll on the medical services. Nurse telephone consultation services²⁵ might form part of the answer. However, until more is known about the appropriateness of this demand, the apposite level or type of response cannot be determined.

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