Do single handed practices offer poorer care? Cross sectional survey of processes and outcomes

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BMJ 2001;323:320–3

Abstract

Objectives To determine whether there are important differences in performance between group practices and singlehanded general practitioners and the extent to which any differences are explained by practice characteristics such as deprivation.
Design Cross sectional survey.
Setting 206 singlehanded practices and 606 partnerships in Trent region, United Kingdom.
Method Comparison of process and outcome measures derived from routinely collected data on hospital admissions and target payments for singlehanded practices and partnerships. Multivariate analysis was used to adjust for the confounding effects of general practice characteristics—deprivation (Townsend score), percentage of Asian residents, percentage of black residents, proportion of men over 75 years, proportion of women over 75 years, rurality, presence of a female general practitioner, and vocational training status.
Results Differences in achievement of immunisation and cytology targets apparent on univariate analysis were not seen after adjustment for other general practice characteristics. Similarly, significant differences ($>15\%$; $P<0.01$) for three types of hospital admission seen on univariate analysis were not present after adjustment for other practice characteristics.
Conclusions This study provides no evidence that singlehanded general practitioners are underperforming clinically. Our results offer insight into the structural difference between the two types of practice and underline the importance of the effect of other practice characteristics on process and outcome measures.

Introduction

Ten per cent of all general practitioners are single handed. Patients like singlehanded practices because of good communication, personal rapport, and availability and for the continuity of care they provide.[1–3] Small practices are seen by their patients to be more accessible,[4] are preferred by patients,[5] and achieve higher levels of patient satisfaction.[6] Singlehanded doctors are very satisfied with their solo status and do not wish to join partnerships.[3 7] However, the NHS Plan will have a particular impact on singlehanded general practice through either a negotiated change to the "red book" or a new national personal medical services contract into which all singlehanded general practitioners will be transferred by 2004.[8] The NHS Plan recognises that the vast majority of singlehanded doctors work hard and are committed to their patients but comments that they can work in relative clinical isolation without the ready support from colleagues enjoyed by general practitioners in larger practices. The changes are intended to reduce professional isolation and protect quality standards.[8]

Like the contractual threat to singlehanded practice,[9] these concerns about quality standards are not new. However, there is limited evidence on which to base them. Singlehanded general practitioners tend to work in areas of high deprivation and need,[9] and deprivation is known to affect rates of referral,[10] emergency admissions,[11 12] night visits,[13] and patient consultations.[14]

Our aim was to determine whether there are important differences in performance between group practices and singlehanded general practitioners and to assess the extent to which these are explained by practice characteristics such as deprivation.

Method

We obtained approval for the study from the multicentre research ethics committee and the local research ethics committee. We identified all 206 singlehanded practices and 606 partnerships existing in Trent region (excluding South Humber) on 1 April 1998. We obtained data on practice characteristics and population distributions (Körner age bands) from the NHS Executive, Quarry House, Leeds. We defined singlehanded general practitioners as general practitioner principals who were not in partnership with other general practitioner principals.

General practitioner, practice, and population characteristics

We compared the sex distribution and mean age of singlehanded general practitioners with those of general practitioners in partnership. We compared the proportion of each type of practice that were involved in general practitioner training, fundholding, dispensing, child health surveillance, and providing personal medical services and the proportion that were members of the Trent Focus collaborative research network. We

compared the Carstairs rurality score linked to the electoral ward of the general practitioner surgery postcode for the two types of practice.[15] We examined the age-sex structure of the practice populations and compared the list size per whole time equivalent general practitioner and per whole time equivalent nurse. Given the potential confounding effect of deprivation on admission rates and other performance indicators and outcome measures, we collected data for the Townsend score associated with the electoral ward where the main general practitioner surgery was located. We chose to use Townsend score associated with electoral ward for our main analysis as it most closely adheres to the concept of material deprivation.[16] We collected data for the percentage of black people and percentage of Asian people in the electoral ward associated with the general practitioner's main surgery.

Assessment of performance and health outcome measures

We selected performance and outcome measures that were relevant to general practice and measurable with routinely available data.[17 18] We identified all relevant hospital admissions between 1 April 1993 and 31 March 1997 by searching the NHS hospital admissions database for Trent region. We were unable to access data for deaths linked to general practice other than those occurring during inpatient admissions. We were also unable to access data for measures of cost effective prescribing. We grouped the indicators and outcome measures under five published headings.[17 18]

Disease prevention and health promotion—Proportion of practices that achieved target payments for immunisations, preschool boosters, and cervical cytology for three successive quarters in 1998-9.

Chronic care management—Admission rates for asthma (international classification of diseases code 493; Office of Population Censuses and Surveys code J45-6), diabetes (250; E10-14), and epilepsy (345; G40-1).

Avoidable admissions—Admission rates for ear, nose, and throat infections (381-2; H66), urinary tract infections (590, 599.0; N39.0, N15.1, N15.9), and congestive cardiac failure (428; I50).

Inappropriate surgery—Operation rates for dilatation and curettage (Q10.3, Q10.8, Q10.9) in women under 40 years; operation rates for grommet surgery (D15.1).

Health outcomes—Teenage pregnancy rates (ages 13-19 years).[19]

Statistical analysis

We used Poisson regression to estimate rate ratios with 95% confidence intervals for the admission rates for singlehanded general practitioners compared with partnerships (Stata Statistical Software version 5, Stata Corporation, College Station, TX). A rate ratio greater than one indicates a higher admission rate in singlehanded practices, and a rate ratio less than one indicates a lower rate. We included the following variables in the multivariate Poisson regression analysis: Townsend score, percentage of black residents, percentage of Asian residents, proportions of men and women over 75 years, rurality, presence of a female general practitioner, and vocational training status. For binary outcome variables (such as whether or not a practice attained higher targets for immunisation), logistic regression was used to calculate odds ratios with 95% confidence intervals (SPSS version 10). We used multiple logistic regression to adjust for Townsend score, percentages of black and Asian residents, proportions of men and women over 75 years, rurality, presence of a female general practitioner, and training status. We decided that a greater than 15% difference in admission rates would be clinically important. We selected the 0.01 two tailed significance level.

We conducted retrospective power calculations for two main variables of interest—achievement of targets and admissions for diabetes.[20 21] These were chosen because they represent variables over which general practitioners are most likely to have control.

Target achievement—For a comparison of proportions between the partnerships and singlehanded practices with available data, the study has 97% power to detect a relative difference in proportions of 15% or more at the 0.01 level for immunisation under the age of 1 year and a 99% power for cytology. For preschool boosters, the study has 43% power to detect a relative difference in proportions of 15% at the 0.01 level or 80% power to detect a relative difference in proportions of 22% at the 0.01 level.

Diabetes admissions—Using a mean rate of 38.1 admissions per 10 000 patients over the four years, with 606 partnerships and 206 singlehanded practices, the study has an 80% power to detect a difference in rates of ≥15% at the 0.01 two sided significance level.

Results

On 1 April 1998, 206 (25.4%) of the 812 practices in Trent region were single handed. Of the 4.9 million

Table 1 Characteristics of singlehanded practices and partnerships. Values are numbers (percentages) unless stated otherwise

	Singlehanded practices (n=206)	Partnerships (n=606)	P value
General practitioners' characteristics			
Whole time equivalent general practitioners	206	2188	
Total No of general practitioners	206	2383	
Mean (SD) age of general practitioner in years	52 (8)	44 (6)	<0.0001
Mean (SD) list size per whole time equivalent general practitioner	2299 (708)	2058 (535)	<0.0001
Characteristics of practice			
Practice with a female general practitioner	25 (12)	462 (76)	<0.0001
Trent Focus research practice	6 (3)	60 (10)	0.02
Current general practitioner trainer in practice	4 (2)	117 (19)	<0.0001
Approved general practitioner trainer in practice	8 (4)	165 (27)	<0.0001
Vocational training scheme course organiser in practice	0 (0)	25 (4)	0.001
Fundholder by April 1996	87 (42)	314 (52)	0.02
Personal medical services pilot by 1999	4 (2)	10 (2)	0.78
Child health surveillance provided	187 (91)	597 (99)	<0.0001
Dispensing practice	28 (14)	124 (20)	0.03
Rural practice location	51 (25)	137 (23)	0.52
Mean Townsend score for electoral ward of surgery postcode (SD)	2.5 (3.9)	1.5 (3.6)	<0.0001
Mean (SD) % Asian patients	5.7 (12.3)	3.6 (9.9)	0.07
Mean (SD) % black patients	1.7 (3.01)	1.09 (2.21)	0.06
Registered female patients			
Girls 0-4 years	14 102 (3)	123 157 (3)	
Women ≥75 years	20 892 (4)	206 510 (5)	
Total No of female patients	232 417 (49)	2 221 802 (50)	
Registered male patients			
Boys 0-4 years	14 845 (3)	129 455 (3)	
Men ≥75 years	12 953 (3)	119 839 (3)	
Total No of male patients	241 208 (51)	2 180 052 (50)	
Total population size	473 625 (100)	4 401 854 (100)	

Table 2 Proportion of practices reaching higher targets for immunisations under the age of 1 year, preschool boosters, and cytology

	Singlehanded practices (%)	Partnerships (%)	Unadjusted odds ratio (95% CI)	P value	Adjusted odds ratio* (95% CI)	P value
Immunisation under age 1 (n=690)	155/187 (83)	459/503 (91)	0.45 (0.28 to 0.74)	<0.0001	0.73 (0.39 to 1.38)	0.33
Cytology (n=537)	117/140 (84)	383/397 (96)	0.19 (0.09 to 0.38)	<0.0001	0.31 (0.11 to 0.84)	0.02
Preschool booster (n=567)	109/163 (67)	283/404 (70)	0.86 (0.58 to 1.26)	0.43	1.20 (0.73 to 2.00)	0.47

*Adjusted for Townsend score, percentage of Asian and black residents, proportion of men and women over 75, rurality, presence of a female general practitioner, and training status.

patients registered with practices in Trent, 9.7% were registered with a singlehanded general practitioner.

General practitioner, practice, and population characteristics

Table 1 shows the characteristics of the general practitioners, practices, and populations. Singlehanded general practitioners were on average eight years older than general practitioners in partnerships. Partnerships were more likely to train general practitioners and to offer child health surveillance. Singlehanded general practitioners had larger list sizes per whole time equivalent general practitioner than did partnerships. Data for practice nurses were available for only 68% (413/606) of partnerships and 59% (121/206) of singlehanded practices as two health authorities were unable to provide these data. Where data were available, 14% of singlehanded practices did not have a practice nurse compared with 3% of partnerships ($\chi^2 = 24.3$, df = 1, $P < 0.0001$). The age-sex structure of the population registered with singlehanded practices was similar to that for partnerships (table 1). Singlehanded practices served more deprived populations.

Table 3 Mean (SD) hospital admission rates per 10 000 patients for the four year period 1993-7

	Singlehanded practices	Partnerships
Chronic care management		
Asthma	70.9 (72.2)	59.3 (41.3)
Epilepsy	33.8 (40.9)	28.7 (26.3)
Diabetes	41.2 (38.2)	38.1 (24.2)
Avoidable admissions		
Ear, nose, and throat infections	31.7 (30.1)	30.9 (16.9)
Urinary tract infection, renal abscess, and pyelonephritis	43.2 (32.8)	43.7 (26.6)
Congestive cardiac failure	73.7 (52.3)	69.0 (39.5)
Inappropriate surgery		
Grommet	29.1 (31.3)	29.6 (14.7)
Dilatation and curettage in women under 40 years*	16.0 (19.4)	14.9 (10.9)
Health outcomes		
Teenage pregnancies (age 13-19)†	46.7 (53.0)	38.0 (27.3)

*Denominator is number of women under 40 years.
†Denominator is number of female patients aged 13 to 19 years.

Table 4 Rate ratios for admissions in 1993-7, determined by Poisson regression. A ratio >1 indicates a higher rate in singlehanded practices

	Unadjusted rate ratio (95% CI)	P value	Adjusted rate ratio* (95% CI)	P value
Chronic care management				
Asthma	1.23 (1.18 to 1.27)	<0.0001	1.08 (1.03 to 1.12)	0.001
Epilepsy	1.23 (1.17 to 1.30)	<0.0001	1.09 (1.03 to 1.16)	0.004
Diabetes	1.08 (1.03 to 1.14)	<0.001	0.95 (0.90 to 1.00)	0.06
Avoidable admissions				
Ear, nose, and throat infections	1.02 (0.97 to 1.08)	0.43	0.98 (0.92 to 1.04)	0.43
Urinary tract infection, renal abscess, and pyelonephritis	1.02 (0.98 to 1.07)	0.34	1.05 (1.00 to 1.11)	0.07
Congestive cardiac failure	1.10 (1.06 to 1.34)	<0.0001	1.03 (0.99 to 1.08)	0.11
Inappropriate surgery				
Grommet	0.96 (0.91 to 1.01)	0.13	0.98 (0.92 to 1.05)	0.64
Dilatation and curettage in women under 40 years†	1.13 (1.05 to 1.21)	0.002	1.01 (0.92 to 1.10)	0.82
Health outcomes				
Teenage pregnancies (age 13-19)‡	1.19 (1.13 to 1.25)	<0.0001	1.03 (0.97 to 1.09)	0.38

*Adjusted for Townsend score, percentage of Asian and black residents, proportion of men and women over 75, rurality, presence of a female general practitioner, and training status.
†Denominator is number of women under 40 years.
‡Denominator is number of female patients aged 13 to 19 years.

Assessment of performance and health outcome measures

Disease prevention and health promotion—Table 2 shows the data for meeting contractual targets for immunisations under the age of 1 year, cytology, and preschool boosters. Data for immunisations under age 1 were available from all 10 health authorities, whereas data for preschool boosters and cytology were available from only eight health authorities. Although there were significant differences in the proportions of singlehanded practices achieving higher targets for immunisations under age 1 and cytology compared with partnerships on univariate analysis, neither of these differences persisted at the 0.01 significance level after adjustment for other practice characteristics. Table 3 shows the mean hospital admission rates per 10 000 population for singlehanded general practitioners compared with partnerships for the four year period 1993-7. Table 4 shows the admission rate ratios before and after adjustment for other practice characteristics.

Chronic care management—Singlehanded general practitioners had 23% higher admission rates for both asthma and epilepsy on univariate analysis, but these were only 8% and 9% higher once adjustment had been made for other practice characteristics (table 4). There were no important differences in admission rates for diabetes on univariate or multivariate analysis.

Avoidable admissions—The admission rates for ear, nose, and throat infections, urinary tract infections, and congestive cardiac failure were not significantly different on multivariate analysis (table 4).

Inappropriate surgery—There was no important difference in the surgery rates for grommets on univariate or multivariate analysis (table 3). Singlehanded practices had 13% higher admissions for dilatation and curettage for women aged under 40, although this was reduced to 1% and was no longer significant after adjustment for other practice characteristics in the multivariate analysis (table 4).

Health outcomes—Singlehanded practices had 19% higher teenage pregnancy rates compared with partnerships on univariate analysis but only 3% higher rates after adjustment for other practice characteristics.

Discussion

This study has important limitations. It is based on routinely collected data on hospital admissions and

general practitioners' target payments. Although we have adjusted for deprivation as a census derived variable, we were not able to adjust for more subtle population characteristics (such as smoking habits) or to link these findings to clinical activity within the practices. We have no data on the arrangements for covering patient care out of hours. We were not able to include private referrals as these data are not collected systematically and are therefore not routinely available. We had no data from two health authorities for nurse time, preschool boosters, and cytology. The link between performance indicators, including those for outcomes, and the clinical activity of individual doctors or groups of doctors is unclear, so interpretation must be cautious.[22] However, given the current debate about singlehanded practices arising from the publication of the NHS Plan,[8] these findings are worth exploring, albeit with caution.

The demographic characteristics of singlehanded practices shown here match expectations. Singlehanded doctors are on average older than those in partnerships and more likely to be male. Singlehanded practices are less likely to be involved in vocational training or child health surveillance, have higher list sizes per general practitioner, and are less likely to have a practice nurse. Singlehanded general practitioners work in more deprived areas of Trent.

At first sight, screening uptake seems to be lower in singlehanded practices. We recognise that it is harder for small singlehanded practices to reach immunisation and cytology targets, as it only takes a few patients to drop out for the overall percentage to drop considerably when the denominator is small. However, target achievement does not differ between singlehanded general practitioners and partnerships once other practice characteristics have been taken into account. This is despite the change in the remuneration for health promotion activity in primary care in 1993, which led to fewer payments for singlehanded general practitioners and those whose surgeries were located in electoral wards with high deprivation indices.[23]

We have found no evidence in this study that singlehanded general practitioners are underperforming clinically. Rather, our results offer insight into the structural differences between these two types of practice and underline the importance of the effect of practice characteristics on process and outcome measures. For instance, three types of admission met our criteria for an important difference (a 15% difference in admission rates significant at the 0.01 level) on univariate analysis. However, after adjustment for deprivation, the percentage of black and Asian residents, the proportion of patients over 75 years, rurality, the presence of a female general practitioner, and vocational training status there were no remaining substantial differences.

Andy Nicholson and Howard Chapman from NHS Executive Trent helped with the extraction of the admissions data, and Maura Bell helped to process the ethical approval.

Contributors: JH-C initiated and designed the study, obtained ethical approval, undertook the literature search, designed and carried out the data collection and manipulation, the data analysis, and interpretation of results, and contributed to drafting the paper. MP contributed to the study design and interpretation and contributed to drafting the paper. CC contributed to the data analysis and interpretation. VH contributed to the study design and data collection. AW contributed to the study design and interpretation. JH-C is the guarantor for the paper.

Funding: None.

Competing interests: None declared.

What is already known on this topic

Singlehanded general practitioners tend to work in areas of high deprivation and need

Patients like singlehanded practices because of good communication, personal rapport, availability, and continuity of care

Concerns have been expressed about professional isolation and quality standards for singlehanded practice, on the basis of little evidence

What this study adds

This study provides no evidence that singlehanded general practitioners are underperforming clinically

The results offer insight into the structural differences between the two types of practice and underline the importance of other practice characteristics such as deprivation

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(Accepted 24 May 2001)