Does primary medical practitioner involvement with a specialist team improve patient outcomes? A systematic review

Geoffrey Mitchell, Chris Del Mar and Daniel Francis

SUMMARY

Patients with chronic or complex medical or psychiatric conditions are treated by many practitioners, including general practitioners (GPs). Formal liaison between primary and specialist is often assumed to offer benefits to patients.

The aim of this study was to assess the efficacy of formal liaison of GPs with specialist service providers on patient health outcomes, by conducting a systematic review of the published literature in MEDLINE, EMBASE, PsychINFO, CINAHL and Cochrane Library databases using the following search terms: 'family physicians': synonyms of 'patient care planning', 'patient discharge' and 'patient care team'; and synonyms of 'randomised controlled trials'.

Seven studies were identified, involving 963 subjects and 899 controls. Most health outcomes were unchanged, although some physical and functional health outcomes were improved by formal liaison between GPs and specialist services, particularly among chronic mental illness patients. Some health outcomes worsened during the intervention. Patient retention rates within treatment programmes improved with GP involvement, as did patient satisfaction. Doctor (GP and specialist) behaviour changed, with reports of more rational use of resources and diagnostic tests, improved clinical skills, more frequent use of appropriate treatment strategies, and more frequent clinical behaviours designed to detect disease complications. Cost effectiveness could not be determined.

In conclusion, formal liaison between GPs and specialist services leaves most physical health outcomes unchanged, but improves functional outcomes in chronically mentally ill patients. It may confer modest long-term health benefits through improvements in patient concordance with treatment programmes and more effective clinical practice.

Keywords: *specialist services; patient care planning; patient care team.*

G Mitchell, FRACGP, senior lecturer in general practice; C Del Mar, MD, FRACGP, professor of general practice; and D Francis BSc, APP, HMS(Ex-Sci), research assistant, University of Queensland, Brisbane, Australia.

Address for correspondence

Dr G Mitchell, Centre for General Practice, University of Queensland Medical School, Herston Road, Herston 4006, Queensland, Australia. E-mail: g.mitchell@spmed.uq.edu.au

Submitted: 5 January 2001; Editor's response: 12 April 2001; final acceptance: 21 January 2002.

Introduction

PATIENTS with chronic or complicated conditions are often managed by clinicians whose roles should be complementary. However, health systems often lead to compartmentalised care, with duplication of services and inefficient care delivery. General practitioners (GPs), family practitioners, and other primary care physicians provide primary medical care for individuals in the context of the family and their society.[1] A key task for GPs is to coordinate and manage the input of specialists and other health professionals.[2,3] In 1999, the Australian Government supported this function of general practice by initiating remuneration for GPs to participate in the multidisciplinary care of patients with chronic or complex conditions.[4] Such encouragements to teamwork have been established in several healthcare systems.

It is assumed that GPs should contribute usefully to the management of patients who need specialist services. However, little is known about the impact of involving GPs in specialist teams on patients' health outcomes, in patients with chronic and/or complex conditions. This systematic review aims to affirm or reject this assumption: to determine what differences, if any, close, formalised cooperation makes to the health outcomes of patients, the behaviour of medical practitioners, and the costs of health delivery.

Method

We defined organised cooperation between primary medical practitioners and specialists, as any formal arrangement that linked the GPs with specialist practitioners in the care of the patient. This definition thus included case conferences between the specialist and GP, shared consultations, organised consultations by GPs of patients in specialist inpatient units, visits by specialist staff to a GP clinic, as well as formal shared care arrangements between the patient's GP and a specialist clinic. 'Specialist' included medical and nursing specialists.

SilverPlatter MEDLINE (1966–2001), Ovid EMBASE (1980–2001), Ovid CINAHL (1982–2001), CSI PsychINFO (1984–2001), and the Cochrane Library (database of systematic reviews and controlled trials register) were searched up to August 2001. Box 1 shows the strategy, modified from that of the EPOC group from the Cochrane Collaboration[5] used to identify studies for the first four databases, and a modified strategy using the keywords 'family practice' and ('patient care planning' *or* 'patient discharge' *or* 'patient care team') was used for searching the Cochrane Library. All abstracts were double read. Articles that reported controlled or randomised controlled trials relevant to the definition were retrieved in full, and trials involving close cooperation

HOW THIS FITS IN

What do we know?

Patient care, and thus patient outcomes, should improve when GP and specialist services work closely together.

What does this paper add?

There are limited short-term gains in chronic mental illness. Patients may gain in the long term through improved compliance with care and better clinician performance

between specialists and general practitioners are reported. These studies were assessed for methodological quality using the strategy described by the Australian National Health and Medical Research Council.[6] Recruitment strategy, randomisation procedure, the presence and method of blinding, the procedure for dealing with cases lost to follow-up, and the method of analysis (intention to treat or not) were assessed. The reference lists from the studies identified were hand searched.

Results

The above search strategy identified 169 papers. The Cochrane Library search revealed no relevant systematic reviews. Most papers were descriptive reports and covered a wide range of subject material from undergraduate education to referral practices. There were 32 randomised controlled studies, mostly reporting therapeutic trials or educational interventions. We found seven studies that tested interventions that conformed with our definition — testing organised, close cooperation between GPs and an individual specialist or specialist service. These studies involved 963 subjects and 899 controls (Table 1). The methods of selection of patients and controls and blinding techniques reported were judged to be adequate in all reported studies. All studies reported pre-intervention characteristics of the intervention and control groups and these were nearly all similar between groups. Three studies described the analysis as intention to treat and a further two used intention-to-treat methodology in that they analysed all patients who did not drop out, whether they completed the intervention or not (Table 1).

The studies addressed very different illness groups and although the interventions and methodologies are broadly similar, these differences precluded any attempt to perform a meta-analysis by statistical pooling. However, the results could be aggregated into five themes:

1. Health outcomes

There were mixed effects for physical outcomes. Heard reported that intervention subjects had less nocturnal asthma. However, more intervention patients smoked at the end of the study than the beginning.[7] There was no difference in the proportion of patients with the same or improved levels of hypertension[8] or in creatinine and $HbA1_c$ levels in diabetics.[9] However, diabetics in the intervention group also showed greater weight gain than controls.[9]

1. Exp family practice or exp physicians/family
2. Exp interprofessional relations
3. Exp patient care planning
4. Exp patient care team
5. Exp multidisciplinary teams?.tw
6. Multidisciplinary team?.tw
7. Multi disciplinary team?.tw
8. Interdisciplinary team?.tw
9. ((doctor? Or physician?)adj5 nurse? Adj5 collaborat?).tw
10. 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9
11. 1 and 10
12. randomised controlled trial.pt
13. controlled clinical trial.pt
14. intervention studies/
15. experiment?.tw
16. (time adjusted series).tw
17. (pre-test or pre test or (posttest or post test).tw
18. random allocation/
19. impact.tw
20. intervention.tw
21. chang$.tw
22. effect.tw
23. comparative studies/
24. 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23
25. 11 and 24

Box 1. Search strategy for MEDLINE, EMBASE, CINAHL.

Frail aged patients were more likely to have changes made to their discharge plans when a GP was involved, but there was no improvement in readmission rates or time to readmission.[10] When GPs were closely involved in community programmes for chronic psychiatric illness, more treatable needs were met than with outpatient-based care.[11] One study reported significant reductions in inpatient hospital stays and increased length of time between admissions in chronic mentally ill patients.[12] With the above exceptions, no intervention group had worse health outcomes.

2. Contact with services

The three studies[8,9,11] (391 intervention and 334 control patients) that reported retention rates of subjects demonstrated improved retention rates within programmes involving GPs, compared with patients of standard outpatient specialist care of people with hypertension, diabetes, and chronic schizophrenia.

3. Patient satisfaction with service

Four studies, involving 663 intervention and 618 control patients, tested the satisfaction of participants on the intervention, compared with control. They showed that GP involvement in care led to greater patient satisfaction among patients with diabetes, hypertension, chronic schizophrenia, and geriatric problems.[8-11] Improved professional accessibility, reduced waiting times, and reduced personal costs per consultation were reported. One study reported that patients felt better prepared for discharge from hospital when the GP was involved in pre-discharge planning.[10]

4. Clinical behaviour of GPs

Four studies demonstrated improved clinical behaviour for GPs. This was: more rational use of resources and diagnostic tests (by both GPs and specialists[13]), improved clinical

Table 1. Details of studies

Author	Subjects	Participants (subjects/ controls)	Test and control groups similar at baseline?	Patients lost to follow-up (subjects/controls)	Intervention Patients without complete data	Intervention	Study designs (randomisation procedure)
McInnes *et al*[10]	Frail aged	205/159	Yes — age, sex, MMSE[d], live at home, NESB[e] No — Barthels Score, test <control (P = 0.03)	47 died, 15 lost to follow-up; 32 declined (total numbers — no difference between groups)	99 (no visit from GP)[a]	GP visited hospital and discussed discharge with staff and patient versus usual care	RCT[c] (computer generated sequence)
Vierhout *et al*[13]	Routine orthopaedic referrals	144/128	Yes — age, sex, married, insurance status, duration of disorder, type of disorder, degree of suffering (non-participants not reported)	25/36	Only complete data analysed	Joint consultation of patient GP and consultant versus usual care	RCT (numbered envelopes)
Heard *et al*[7]	Asthma patients in GP setting	97/94	Yes — age, sex (participants similar to non-participants)	1/3	31 (did not complete intervention)[a]	Consultation by asthma nurse then GP consultation versus usual care	RCT (randomisaton chart within practices)
Gater *et al*[11]	Chronic schizophrenia	42/47	Yes — age, time since recorded contact with service, single, living alone, in work No — sex, more females in control and more refused to participate (P<0.05)	10/8 declined to participate	14 (did not have regular contact with service)[b]	Offered outpatient-based mental health team, regular consultation with GP	Clustered randomisation (not stated)
McGhee *et al*[8]	Hypertension	277/277	Yes — age, sex, married, employed full-time, lives in area (non-participants not reported. Participating GPs similar to non-invited GPs)	10/7 died, 9/39 lost to follow-up	57 (did not complete the full review schedule[b])	GP shared management/set criteria and responsibilities, and specialist liaison where things were going wrong, versus traditional outpatient department care	Randomly selected for intervention, matched controls (not stated)
Diabetes Integrated Care Evaluation Team (DIET)[9]	Adult diabetics (type I and type 2)	139/135	Yes — age, characteristics of diabetes and management, blood pressure (non-participants not reported)	11/10 died, 4/14 lost to follow-up	4/14 lost to follow-up	GP shared management, agreed protocol and responsibilities, no routine GP/specialist contact	RCT (not stated)
Wood and Anderson[12]	Chronic mentally ill	59/59	Yes — matched for illness, age, sex, marital status, number of prior inpatient admissions	1 died, 1 became deluded about carer, 1 alcoholic, 4 moved to other services	Only complete data analysed	Outpatient-based team, monthly case conference with patient's GP	Pragmatic controlled trial. Matched intervention and control subjects. Subjects blinded. (not relevant)

[a]Stated intention to treat analysis; [b]analysis included non-completers/non-participants; [c]randomised controlled trial; [d]Mini-Mental State Examination; [e]non-English speaking background.

Table 2. Outcomes of studies of formal GP/specialist service interventions.

Study	Patient group	Outcome measure	Estimate of treatment effect (intervention versus control)	Result (figures quoted if significant results: *P*-values if 0.05, or reported 95% CI[a])
Health outcomes				
McInnes *et al*[10]	Frail aged	% readmissions within 6 months	30% versus 25%	NS[b]
		Mean number of days to readmission	60 versus 43 days	NS
Vierhout *et al*[13]	Routine orthopaedic	% free of disorder after 1 year	35.4% versus 23.4%	<0.05
		Degree of improvement from disorder (all patients)	No difference	NS
		Degree of improvement in general health (all patients)	No difference	NS
Heard *et al*[7]	Asthma	Nocturnal wakening	7% versus 20% (OR = 0.38)[c]	(95% CI = 0.16–0.91)[d]
		Morning wheeze	22% versus 33% (OR 0.65)	(95% CI = 0.32–1.34)
		Hospitalisation	2% versus 5% (OR 2.97)	(95% CI = 0.05–1.75)
		Numbers reporting time lost from work or school	13% both groups	NS
McGhee *et al*[8]	Hypertension	% patients with same or better control of hypertension	67.8% versus 63.8%	NS
DIET[9]	Diabetics (type 1 and type 2)	$HbA1_c$[e]	5.3% versus 5.3%	NS for difference
		BMI[e]	28.7 versus 27.9 (95% CI = -2.4 to 0.8)[f]	NS for difference
		Creatinine (micromol/L)[e]	102.2 versus 100.6 (95% CI = -9.3 to 6.1)[f]	NS for difference
		Systolic BP[e]	161.5 versus 156.4 (95% CI = -11.7 to 1.5)[f]	NS for difference
Gater *et al*[11]	Chronic schizophrenia	At 1 year: mean number of unmet needs	0.57 versus 1.62	<0.001
		Mean number of met needs	2.62 versus 1.60	<0.001
		At 2 years, % correctible needs met:		
		Activities of daily living	70% versus 29%	<0.01
		Use of public facilities	83% versus 14%	<0.03
		Managing finances	56% versus 17%	<0.05
Wood *et al*[12]	Chronic mentally ill patients	% readmitted	27% versus 64%	0.002
		Matched pairs: difference in median number of inpatient admission days	64.5 days	95% CI = 16–134.5 days
Contact with services				
Gater *et al*[11]	Chronic schizophrenia	During intervention, % contact with:		
		Community psychiatric nurses	71% versus 30%	<0.01
		Social worker	48% versus 26%	<0.01
		Occupational therapists	48% versus 2%	<0.01
		% patients with no contact with service	9.5% versus 12.7%	NS
McGhee *et al*[8]	Hypertension	% in contact with GP/clinic after 2 years	96.6% versus 85.9%	<0.001
DIET[9]	Diabetics (type 1 and type 2)	Defaulters from programme	3% versus 10%	For difference, 95% CI = 2–13%
Patient satisfaction				
McInnes *et al*[10]	Frail aged	Discharge discussed with patient (%)	89% versus 69%	<0.0001
		Felt prepared for discharge (%)	93% versus 82%	0.03

Table 2 continued on next page

Table 2. Outcomes of studies of formal GP/specialist service interventions (continued).

Study	Patient group	Outcome measure	Estimate of treatment effect (intervention versus control)	Result (figures quoted if significant results: *P*-values if 0.05, or reported 95% CI[a])
Gater *et al*[11]	Schizophrenia	Client Satisfaction Questionnaire (scale 1–4, low is better)	1.86 versus 2.23	not stated
		Would recommend service to a friend	More likely	not stated
		Accessibility and appointment times	Better	<0.01
		Disruption from staff changes	Less disruption	<0.01
McGhee *et al*[8]	Hypertension	Prefer shared care to outpatient care	More preferred shared care	not stated
DIET[9]	Diabetics (type 1 and type 2)	Perceived advantages	Favour GP based (multiple measures)	not stated
		Perceived disadvantages	Fewer for GP care (multiple measures)	not stated
Physician behaviour				
McInnes *et al*[10]	Frail aged	Referral to community support services	OR 1.63 (95% CI = 1.0–2.54)	0.03
		Referral to community nursing	OR 2.10 (95% CI = 1.29–3.41)	0.002
		Referral to supported accommodation	OR 0.81 (95% CI = 0.52–1.26)	NS
Vierhout *et al*[13]	Orthopaedic	GPs and specialists		
		Radiology ordered	34% less (79 versus 120)	<0.01
		Pathology ordered	47% less (23 versus 43)	<0.01
		GPs		
		Medication prescribed	67% less (2 versus 6)[g]	NS
		Injection therapy	290% more (44 versus 15)[g]	<0.01
		Refer to physiotherapy	15%more (62 versus 54)[g]	NS
		Referrals to orthopaedist	41% less (51 versus 87)[g]	<0.01
		GP orthopaedic knowledge	9% decrease in exam scores	NS
		GP clinical skills knowledge	58% improved exam scores	<0.05
Heard *et al*[7]	Asthma	Patient has peak flow meter	73% versus 56% (OR 8.30)	(95% CI = 2.96–23.27)
		Action plan provided by GP	75% versus 65% (OR 1.62)[h]	(95% CI = 0.82–3.22)
		Discuss trigger factors for asthma	85% versus 71% (OR 1.71)[h]	(95% CI = 0.87–3.36)
DIET[9]	Diabetics (type 1 and type 2)	Over 2 years, mean frequency of performing:		For difference, 95% CI
		$HbA1_c$	4.5 versus 1.3	-3.5 to -2.9
		Creatinine	0.5 versus 0.7	0.03 to 0.37
		Fundoscopy	1.1 versus 0.9	-0.4 to -0.04
		Visual acuity	2.6 versus 0.7	-2.1 to -1.7
		Foot examinations	1.4 versus 0.5	-1.1 to -0.7
		Peripheral pulses	1.9 versus 0.5	-1.6 to -1.2
		Neurological examination	1.9 versus 0.5	-1.6 to -1.2
		Blood pressure measurements	4.2 versus 1.2	-3.3 to -2.7
Cost				
Gater *et al*[11]	Chronic schizophrenia	Net cost per capita (£ sterling)	4403 versus 3849 (large individual variation)	Not stated
McGhee *et al*[8]	Hypertension	Two-year cost per capita (£ sterling)	8988 versus 10412	Not stated
DIET[9]	Diabetics (type 1 and type 2)	Net cost per visit borne by system (£ sterling)	79–101 versus 55	Not stated
		Net patient cost per visit	1.70 versus 8	Not stated

[a]95% CI = 95% confidence interval; [b]NS = not significant; [c]OR = odds ratio; [d]for odds ratios; [e]mean values at end of intervention; [f]confidence intervals for between-group differences; [g]numbers of patients; [h]significant increase in both groups during intervention.

skills[13]), more frequent use of appropriate treatment strategies (for example, better rates of referral to community services[10]), and more frequent clinical behaviours designed to detect disease complications (for example, more patients owning peak flow meters in asthma[7] and performing fundoscopy in diabetics.[9])

5. Cost

These results were mixed. For community care of chronic psychiatric patients, one study demonstrated significant reductions in hospital bed days and longer time to readmission.[12] However, another could draw no conclusions because of wide patient variation.[11]

The comparisons between general practice-based interventions against standard outpatient care employed such different methods of measuring direct costs that meaningful conclusions were impossible.

Discussion

The involvement of GPs in the care of chronic or complicated cases has mixed success for physical and functional health outcomes in physical conditions. In most cases, physical function is not changed. Some outcomes improve, but some deteriorate. GP and specialist collaboration does appear to improve functional outcomes in chronic psychiatrically ill patients. Indirect or long-term benefits to health may accrue as a result of improved attendance at medical care, and also from changes in physician behaviours that facilitate early detection and treatment of the complications of chronic disease.

Involving GPs in multidisciplinary care adds costs related to communications between the team and the GPs, and the cost of extra GP consultations in some cases. These costs may be offset by long-term savings. However, there were insufficient data, which, together with the diversity of settings and methods of analysis, did not allow us to estimate any relative cost efficiencies to be made.

Patients express greater satisfaction when GPs deliver part of the care in the community setting, than for the traditional outpatient setting. This may be important in encouraging compliance with treatment or surveillance for disease complications.

This analysis contains some weaknesses. There are a relatively small number of studies on this issue. However, the numbers of patients involved in the studies — particularly those not involving psychiatric care — probably give sufficient power to draw valid conclusions. It was not possible for double-blinding to be incorporated into the design of most studies of this type, so there may have been some reporting bias present. Selection bias may also occur. The characteristics of practices and practitioners willing to participate in shared management, and those who do not participate, may differ. On the other hand, the intention-to-treat analysis design used by all but two studies will have diluted any effect size, because of the important numbers of patients who withdrew from the trials or did not participate fully in the intervention.

We conclude that formal collaboration between GPs and specialist services confers no consistent benefit in most cases with chronic or complex conditions, but modest benefit in some chronic mental health conditons. When GPs and specialists are engaged in a formal relationship with each other, the clinical practice of each changes — probably for the better. The cost of obtaining this benefit was not able to be established from the studies identified.

References

1. Anonymous. *The scope of general practice*. Melbourne: Royal Australian College of General Practitioners, 1973.
2. McWhinney I. The principles of family medicine. In: *A textbook of family medicine*. New York: Oxford University Press, 1989: 12-25.
3. Olesen F, Dickinson J, Hjortdahl P. General practice — time for a new definition. *BMJ* 2000; **320:** 354-357.
4. Commonwealth Department of Health and Ageing. *Primary care Initiatives: Enhanced Primary Care Package*. 1999. URL: http://www.health.gov.au:80/hsdd/primcare/enhancpr/enhancpr.htm.
5. Zwarenstein M, Bryant W. Interventions to promote collaboration between nurses and doctors (Cochrane Review). *The Cochrane Library, Issue 3, 2002*. Oxford: Update Software Ltd.
6. National Health and Medical Research Council. *How to review the evidence: systematic identification and review of the scientific literature.* Canberra: NHMRC, 1999.
7. Heard AR, Richards IJ, Alpers JH, *et al*. Randomised controlled trial of general practice-based asthma clinics. *Med J Aust* 1999; **171:** 68-71.
8. McGhee SM, McInnes GT, Hedley AJ, *et al*. Coordinating and standardising long-term care: evaluation of the west of Scotland shared-care scheme for hypertension. *Br J Gen Pract* 1994; **44:** 441-445.
9. Diabetes Integrated Care Evaluation Team. Integrated care for diabetes: clinical, psychosocial, and economic evaluation. *BMJ* 1994; **308:** 1208-1212.
10. McInnes E, Mira M, Atkin N, *et al*. Can GP input into discharge planning result in better outcomes for the frail aged? Results from a randomized controlled trial. *Fam Pract* 1999; **16:** 289-293.
11. Gater R, Goldberg D, Jackson G, *et al*. The care of patients with chronic schizophrenia: a comparison between two services. *Psychol Med* 1997; **27:** 1325-1336.
12. Wood K, Anderson J. The effect on hospital admissions of psychiatric case management involving general practitioners: preliminary results. *Aust N Z J Psychiatry* 1995; **29:** 223-229.
13. Vierhout WP, Knottnerus JA, van Ooij A, *et al*. Effectiveness of joint consultation sessions of general practitioners and orthopaedic surgeons for locomotor-system disorders. *Lancet* 1995; **346:** 990-994.