Multidisciplinary Team Care Arrangements in the management of patients with chronic disease in Australian general practice

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Patients with chronic diseases often require care from providers from multiple disciplines, working as a team.[1] Multidisciplinary planned team-based care has been demonstrated to improve outcomes in patients with diabetes in primary care.[2-4]

Multidisciplinary care planning was introduced in Australia through Medicare in 1999, and subsequently modified in 2005 to provide funding for a limited number of allied health provider visits as part of a multidisciplinary care plan for patients with chronic and complex conditions.[5] These formal agreements between general practitioners and other health practitioners are known under Medicare as Team Care Arrangements (TCAs). Although multidisciplinary care planning is associated with improved intermediate outcomes, there are significant organisational barriers to the use of TCAs for goal setting, communication and coordination.[6-8]

We investigated the influence of patient and practice characteristics on the frequency of TCAs, and the impact of TCAs on patient-assessed quality of care.

ABSTRACT

Objective: To explore factors associated with the frequency of multidisciplinary Team Care Arrangements (TCAs) and the impact of TCAs on patient-assessed quality of care in Australian general practice.

Design and setting: Data were collected as part of a cluster randomised controlled trial conducted in 60 general practices in New South Wales, the Australian Capital Territory and Victoria between July 2006 and June 2008. Multilevel logistic regression analysis evaluated factors associated with the frequency of TCAs recorded in the 12 months after baseline, and multilevel multivariable analysis examined the association between TCAs and patient-assessed quality of chronic illness care, adjusted for patient and practice characteristics.

Main outcome measures: Frequency of TCAs; Patient Assessment of Chronic Illness Care (PACIC) scores.

Results: Of 1752 patients with clinical audit data available at 12-month follow-up, 398 (22.7%) had a TCA put in place since baseline. Women, patients with two or more chronic conditions, and patients from metropolitan areas had an increased probability of having a TCA. There was an association between TCAs and practices with solo general practitioners and those with greater levels of teamwork involving non-GP staff for the control group but not the intervention group. Patients who had a TCA self-assessed their quality of care (measured by PACIC scores) to be higher than those who did not.

Conclusions: Findings were consistent with the purpose of TCAs — to provide multidisciplinary care for patients with longer-term complex conditions. Significant barriers to TCA use remain, especially in rural areas and for men, and these may be more challenging to overcome in larger practices.

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METHODS

A randomised controlled trial evaluating a general practice-based intervention (involving staff training and facilitator visits to the practice) to enhance the role of non-GP staff in chronic disease management was conducted between July 2006 and June 2008.[9] This article does not report on the results of the intervention, but is a descriptive substudy of practice and patient characteristics associated with TCAs.

Participants

Sixty eligible practices (with computerised records and a practice nurse or manager) were recruited between January and June 2006 from 155 that expressed interest (39%) from 16 Divisions of General Practice in New South Wales, Victoria and the Australian Capital Territory.[10] Thirty practices were randomly assigned to each of the intervention and control groups. In each practice, up to 160 patients aged 18–79 years with diabetes, ischaemic heart disease and/or hypertension (inclusion criteria) who had attended the practice in the previous 12 months were selected from practice records and invited by the practice to participate. Where numbers exceeded 160, patients were selected using a randomisation program. This generated 8925 patient records (mean, 149 per practice). GPs reviewed and excluded 1688 patients (mean, 28 per practice) who were severely ill, unlikely to read or understand the information sheet, had significant cognitive impairment, or had left the practice.

Instruments and data collection

At baseline and again 12 months later, patients were invited to complete a mailed questionnaire, which included demographic and illness information and the Patient Assessment of Chronic Illness Care (PACIC),[11] based on the chronic care model described by Wagner and colleagues.[1] The PACIC has been validated in the United States[11] and Germany,[12] and we have confirmed its psychometric properties in two Australian general practice studies.[13] A reminder was mailed if there was no response after 4 weeks.

The postcode of each patient's residence was classified as low or high disadvantage according to the 2006 Index of Relative Socio-economic Advantage and Disadvantage of the Socio-Economic Indexes for Areas (SEIFA).[14]

Practice information collected included the number and type of practice staff and hours worked. Team roles within the practice were assessed using the Chronic Care Team Profile (CCTP).[15] Higher CCTP scores indicate greater levels of teamwork involving non-GP staff in the management of patients with chronic disease.

GPs completed the General Practice Clinical Care Interview (GPCCI), which assesses GP-reported technical quality of care for patients with diabetes and cardiovascular disease.[16] Higher GPCCI scores indicate

1 Patient and practice characteristics at baseline

Characteristic	No. (%)
Patients	*n* = 2552*
Sex	
Male	1187 (46.5%)
Female	1364 (53.5%)
Age, years	
18–39	80 (3.1%)
40–59	698 (27.5%)
> 59	1762 (69.4%)
No. of conditions	
1	1555 (62.5%)
> 1	934 (37.5%)
Duration of disease, years	
0–3	407 (18.0%)
4–10	894 (39.6%)
> 10	958 (42.4%)
SEIFA	
Low disadvantage	1328 (52.6%)
High disadvantage	1198 (47.4%)
Practices	*n* = 60†
Location	
Metropolitan	32 (53.3%)
Rural‡	28 (46.7%)
No. of general practitioners	
1	12 (20.0%)
2–3	14 (23.3%)
⩾ 4	34 (56.7%)
No. of practice nurses	
0	5 (8.3%)
1	23 (38.3%)
⩾ 2	32 (54.4%)
No. of practice managers	
0	2 (3.3%)
⩾ 1	58 (96.7%)
GPCCI score (SD)	
Intervention group	10.82 (5.39)
Control group	10.91 (5.39)
Chronic Care Team Profile score (SD)	
Intervention group	63.11% (13.04%)
Control group	66.55% (13.80%)

SEIFA = Socio-Economic Indexes for Areas (Index of Relative Socio-economic Advantage and Disadvantage). GPCCI = General Practice Clinical Care Interview. * Figures may not sum to total because of missing responses. † Thirty practices assigned to each of intervention and control groups. ‡ Includes two remote practices.

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2 Multilevel logistic regression models for Team Care Arrangements during 12 months after baseline, by randomisation group

	Odds ratio (95% CI)	
Independent variables	Control group	Intervention group
Patient characteristics		
Sex (referent, male)		
Female	2.08 (1.29–3.36)*	1.55 (1.01–2.39)*
Age, years (referent, 18–39)		
40–59	1.47 (0.12–18.03)	3.18 (0.32–32.10)
> 59	2.38 (0.20–28.12)	5.11 (0.52–50.41)
No. of conditions (referent, 1)		
> 1	4.04 (2.46–6.65)*	3.58 (2.27–5.64)*
Duration of disease, years (referent, 0–3)		
4–10	1.20 (0.58–2.49)	1.11 (0.58–2.10)
> 10	0.88 (0.43–1.82)	1.46 (0.78–2.74)
SEIFA (referent, low disadvantage)		
High disadvantage	1.01 (0.50–2.00)	0.50 (0.22–1.16)
Practice characteristics		
Practice location (referent, rural or remote)		
Metropolitan	2.89 (1.40–5.98)*	4.01 (1.20–13.36)*
No. of general practitioners (referent, ⩾ 4)		
1	4.68 (1.49–14.68)*	0.38 (0.07–1.97)
2–3	1.48 (0.62–3.54)	0.25 (0.05–1.38)
No. of FTE practice nurses (referent, 0–1)		
⩾ 2	0.73 (0.34–1.57)	1.18 (0.35–4.05)
No. of practice managers (referent, 0)		
⩾ 1	0.56 (0.22–1.47)	0.20 (0.05–0.73)*
Baseline GPCCI score (referent, ⩽ mean)		
High (> mean)	1.00 (0.97–1.02)	1.02 (0.99–1.04)
Follow-up Chronic Care Team Profile score (referent, ⩽ mean)		
High (> mean)	4.19 (1.86–9.45)*	0.89 (0.24–3.36)
Variance between practices (SE)	0.14 (0.13)	1.20 (0.45)*
Explained between-practice variance†	84.7%	4.4%

SEIFA = Socio-Economic Indexes for Areas (Index of Relative Socio-economic Advantage and Disadvantage). FTE = full-time equivalent. GPCCI = General Practice Clinical Care Interview. * Statistically significant values. † Explained variance using the variance in the baseline model as reference. The variance for the baseline model was 1.26 and 0.90 for intervention and control groups, respectively.

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better quality of care. GPs' scores were averaged at practice level.

A clinical audit was conducted to identify patients' chronic disease type or types (diabetes only; ischaemic heart disease and/or hypertension only; diabetes and ischaemic heart disease and/or hypertension) and whether a TCA was recorded within the 12 months before baseline and within 12 months after baseline.

Statistical analysis

Descriptive analyses were conducted using SPSS, version 15 (SPSS Inc, Chicago, Ill, USA). Multilevel regression models were used with TCA as a dichotomous dependent variable and PACIC as a continuous dependent variable to adjust for clustering of patients (level 1) within practices (level 2). Initially, we fitted the baseline model (no independent variables) for the response variable, followed by the main model with patient and practice variables. The models were fitted in MLwiN software, version 2.0 (Centre for Multilevel Modelling, University of Bristol, Bristol, UK).[17] Multilevel logistic regression analysis evaluated factors associated with the

3 Estimates of regression coefficient of multilevel regression analysis for patient and practice characteristics for total Patient Assessment of Chronic Illness Care follow-up score

Parameter	Estimate for baseline model	Main model (SE)
Patient main effect		
Intercept	2.92	2.53
Female (referent, male)		0.00 (0.05)
Age, years (referent, 18–39)		
40–59		0.20 (0.19)
> 59		0.28 (0.20)
College/university education (referent, elementary/high school)		–0.13 (0.06)*
Employment status (referent, unemployed)		
Employed		–0.07 (0.08)
Retired		–0.14 (0.08)
Two or more conditions (referent, one condition)		0.36 (0.06)*
SEIFA		0.00 (0.00)
Duration of disease, years (referent, 1–3)		
4–10		–0.12 (0.08)
> 10		–0.08 (0.08)
Team Care Arrangement (referent, no)		
Yes		0.32 (0.07)*
Unknown		0.17 (0.17)
Practice main effect		
No. of general practitioners (referent, ⩾ 4)		
1		0.18 (0.09)*
2–3		0.06 (0.09)
Metropolitan (referent, rural or remote)		0.11 (0.08)
Intervention group (referent, control group)		0.15 (0.07)*
Variances		
Variance between practices (SE)	0.03 (0.01)*	0.02 (0.01)*
Explained between-practice variance†		39.4%
Variance between patients (SE)	1.12 (0.04)*	1.05 (0.04)*
Explained between-patient variance†		6.4%

SEIFA = Socio-Economic Indexes for Areas (Index of Relative Socio-economic Advantage and Disadvantage). * Statistically significant values. † Explained variance using the variance in the baseline model as reference.

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frequency of TCAs in the 12 months after baseline. Separate analyses were conducted for the intervention and control groups to account for the possible effect of the intervention on TCA use. Multilevel multivariable analysis examined the association between TCAs and PACIC scores, adjusted for patient and practice characteristics. Significance was assessed using the Wald joint χ^2 test statistic.[17]

Ethics approval

The study was approved by the University of New South Wales Human Research Ethics Committee. Participants gave their informed consent.

RESULTS

Of the 7237 patients invited to participate, 2642 (36.5%) consented. Of these, 2552 (96.6%) returned the baseline questionnaire (Box 1), and 1749 (66.2%) returned the 12-month follow-up questionnaire. In total, 2024 had clinical audit data for the 12 months before baseline and 1752 for the 12 months between baseline and follow-up — these data showed that 377 patients (18.6%) had a TCA within the 12 months before baseline and 398 (22.7%) within the 12 months after baseline. At baseline, there were no significant differences between intervention and control groups in GPCCI or CCTP scores (Box 1). However, there was a significantly greater improvement in CCTP scores between baseline and 12-month follow-up in intervention than in control practices (mean change, 5.56 v –3.02; $F = 4.93$; $P < 0.05$).

In both intervention and control groups, female patients, patients having two or more conditions, and those attending practices located in metropolitan areas had an increased probability of having a TCA during the 12 months after baseline (Box 2). In the control group only, patients attending practices with higher CCTP scores and practices with a solo GP were more likely to have a TCA. Number of full-time equivalent practice nurses, patient age and patient socioeconomic status were not associated with the likelihood of patients having a TCA.

Of the patients who had a TCA within 12 months after baseline, those who had two or more conditions, lower educational attainment or who attended a solo GP practice rated their quality of chronic illness care higher than those who did not (Box 3). Higher PACIC scores were also associated with practices in the intervention group.

DISCUSSION

An important predictor of patients receiving a TCA was having multiple health conditions. Patients with a TCA were, in turn, more likely to assess the quality of their care more favourably than those who did not have one. These findings are consistent with the purpose of TCAs — to improve the quality of multidisciplinary care for patients with longer-term complex conditions.

Our finding that female patients were more likely to have TCAs is consistent with our previous study.[6] Patients attending practices in metropolitan areas were more likely to have TCAs than those in rural areas. Rural practices are under greater work pressure, which will affect the capacity of GPs to organise and carry out multidisciplinary care plans. Rural areas also have access to fewer allied health professionals.[18]

Control-group patients attending solo GP practices and those with higher CCTP scores were more likely to have TCAs. It may be that smaller practices are more flexible and therefore find it easier to organise TCAs. However, in the intervention group, there was no association between TCA use and either practice size or team roles. The improvement in team roles in the intervention practices suggests that negative effects of larger practice size may be compensated by facilitation of teamwork.

This study had a number of limitations. It was conducted in 32 metropolitan, 26 rural and two remote practices in NSW, the ACT and Victoria, and thus may not be generalisable to other areas. Participating practices were volunteers and thus might not be representative of all practices.

TCAs appear to be associated with positive outcomes.[6] However, the lower likelihood of TCAs being in place for male and rural patients suggests systematic barriers to their use. Their association with smaller practice size challenges the assumption that larger practices can more readily arrange multidisciplinary care.

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COMPETING INTERESTS

None identified.

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