Team climate for innovation: what difference does it make in general practice?

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Abstract

Objective. Teamwork in primary healthcare is associated with patient care processes and staff outcomes. The ability of teams to be innovative is a hypothesized mechanism. We examined the characteristics of general practices with good team climate for innovation, and assessed the impact of climate on chronically ill patients' assessment of their care and on the job satisfaction of the staff.

Design. Large cross-sectional study.

Setting. Australian general practices.

Participants. A total of 654 general practitioners and staff and 7505 chronically ill patients from 93 general practices in 6 Australian states and territories.

Measures. The Team Climate Inventory and the Overall Job Satisfaction Scale, customized for use with general practices, were administered to general practitioners and practice staff, and the General Practice Assessment Survey was administered to patients. Practice characteristics were collected by survey from the principal doctor or practice manager.

Results. Mean scores of team climate in Australian general practices were similar to those reported in the UK, except that in our study there was no association between the number of doctors in a practice and their team climate. Better team climate was found in practices with fewer non-clinical staff. Team climate predicted the job satisfaction of the general practitioners and staff, irrespective of the number of practice staff. Better team climate was associated with greater satisfaction by patients with their care.

Conclusions. Team climate is important for patient and staff satisfaction. In large general practices, separate sub-cultures may exist between administrative and clinical staff, which has implications for designing effective team interventions.

Key words: chronic disease, general practice, innovation, team climate, team work

Collaborative teamwork provides a link between efficient organizational practice and high-quality patient care [1], with the team's ability to be innovative as one hypothesized mechanism. Innovative teams are characterized by high levels of support and challenge, sharing and implementing new ideas and clarity of tasks and objectives [2]. Four team processes have been shown to be important: having clearly defined and valued group goals, participative decision-making, quality task orientation and support for innovation [3]. When these four factors are present, innovativeness and effectiveness are higher [4]. A study in an Australian hospital, for example, found that an effective team work significantly impacted on the diffusion and effective use of an innovative online evidence retrieval system for clinical care [5]. In the UK, team processes predicted the level and quality of team innovation in 27 hospitals [6]. Team size and team tenure were unrelated to innovation.

Innovative team processes are also associated with better quality care for patients and with team members' well-being and satisfaction. In the UK, four team processes accounted for 23% of the variation in effectiveness between primary heathcare teams over a 6-month period [7]. Specifically, teams that had clear, shared objectives were task-focussed with an emphasis on quality, participated in decision-making and open to innovation were more likely to work well as a team, structure their work more effectively and to be more effective in their health care delivery. Two studies in Spain also found that innovative teamwork was related to job satisfaction of the staff and service quality in primary care [8, 9].

However, there has been a dearth of research measuring team climate in relation to chronic disease care and staff satisfaction in general practices. One notable exception was a UK study which demonstrated that team climate was associated with better diabetes care and patient evaluations of the practice, but it did not measure staff satisfaction [10, 11]. The research gap is particularly salient, as chronic illnesses such as diabetes, asthma and cardiovascular disease impose a significant burden on individuals and the health system. In Australia, the majority of care for patients with chronic conditions takes place within general practice and practices receive government incentives for creating disease registers and recall/reminder systems whereby chronically ill patients are regularly followed-up [12]. Yet, anecdotally, many general practitioners report little satisfaction with caring for such patients, as general practices are predominantly organized for providing acute, episodic care. Until reliable information is collected about team climate within general practices, it is difficult to design effective team interventions.

Within a large sample of general practices across Australia, our study sought to answer three questions:

(i) What characteristics of general practices are associated with better team climate?
(ii) Does team climate predict job satisfaction of general practitioners and practice staff?
(iii) Does team climate predict chronically ill patients' assessments of the care delivered by practices?

Methods

Participants

Across six Australian states and territories, 2062 general practices (of 7741 nationally) were informed about the research through their Division of General Practice. One hundred and thirty-five practices (6.5%) expressed interest, of which 97 practices (4.7%) took part. In each practice, all general practitioners and practice staff were invited to participate, and a random sample of up to 180 patients aged 18 + years diagnosed with type II diabetes, ischaemic heart disease/hypertension or moderate to severe asthma was selected using practice software. In total, 378 general practitioners (out of 21 605 in Australia), 582 practice staff and 12 544 patients were invited to participate. Doctors and staff were given their questionnaires in the general practices; patients were sent their questionnaires by mail. One follow-up letter was sent to those who returned incomplete or no questionnaires. The study was undertaken as part of a larger study investigating the impact of the organizational capacity of general practices on the quality of chronic disease care.

Ethics

All general practitioners, practice staff and patients provided full written informed consent. The study received ethics approval from the Human Research Ethics Committees of the University of New South Wales and University of Adelaide.

Measures

(1) The Team Climate Inventory is a 44-item questionnaire measuring facet-specific climate for work group innovation [3]. Respondents are asked in each question to 'consider how your team tends to be or how you feel in general about the climate in your team'. Items are measured on a 5-point scale and presented in three sections: Communication and Innovation (1 = Strongly Disagree to 5 = Strongly Agree); Objectives (1 = Not at all to 5 = Completely); and Task Style (1 = To a very little extent to 5 = To a very great extent). Four sub-scale scores are derived:

(i) Team vision (11 items)—assesses team members' views on the clarity, sharedness, attainability and value of team objectives. Example: 'To what extent do you think these objectives are realistic and can be attained?'
(ii) Participative safety (12 items)—measures team participation (e.g. influence over decision-making, information sharing and interaction frequency) and psychological safety and support (e.g. to try out new ideas). Example: 'Everyone's view is listened to, even if it is a minority'.
(iii) Task orientation (Seven items)—measures team emphasis on critical reflection and on monitoring quality. The sub-scale includes items such as monitoring each others' work, provision of practical ideas and help, appraisal of weaknesses. Example: 'Do you and your colleagues monitor each other so as to maintain a higher standard of work?'
(iv) Support for innovation (Eight items)—includes both articulated support and enacted support. Example: 'Members of the team provide and share resources to help in the application of new ideas'.

There is a fifth social desirability sub-scale of six items. Sub-scale scores (1–5) are derived by averaging items within the sub-scale. Although the questionnaire is administered at the individual level, team climate requires that perceptions are shared. Before individual scores were aggregated into an overall team climate score for each practice, therefore, we applied a measure of consensus, the within-group inter-rater agreement co-efficient [13], as recommended in the scale's manual [14], to test that the data represent shared climate perceptions rather than aggregations of diverse individual perceptions. Scores above 0.7 demonstrate acceptable level of agreement among respondents. For similar reasons and in line with other studies, we excluded from the analyses any practices where <30% of the staff completed questionnaires. Individual responses to items were then summed-up to create a group-level mean for each sub-scale and an overall total for each practice. The questionnaire has good internal reliability and demonstrated construct, predictive and discriminant validity [3, 14].

(2) The General Practice Assessment Survey is a 53-item patient-report questionnaire assessing 10 dimensions of general practice care: Access, Receptionists, Continuity of Care, Communication, Interpersonal Care, General Practitioners' Knowledge of the Patient, Specialists Referral, Enablement,

Practice Nursing and Overall Satisfaction [15] (Appendix 1). The scale consists of report items e.g. 'How long do you usually have to wait at the practice until your consultations begin?' and assessment items e.g. 'How do you rate this?' Only assessment items are used in the calculation of scale scores. They are measured on 6-point scales, which are summed-up and rescaled to range from 0 to 100. A higher score reflects a better patient assessment of care.

(3) Overall Job Satisfaction Scale [16] is a 15-item questionnaire measuring facets of job satisfaction (physical work conditions, income, amount of responsibility given, freedom in the job, variety, work colleagues, opportunity to use abilities, recognition, hours of work) with a sixteenth item measuring overall job satisfaction. Items are rated on a 7-point scale, ranging from extremely dissatisfied to extremely satisfied. Higher scores represent higher job satisfaction. The scale has good psychometric properties and has been used in healthcare and industrial contexts worldwide. In Australia, a 10-item version of the scale was customized for use with general practitioners [17], but it has not been used to date with the whole general practice staff. We used the customized 10-item version: nine job facets summed-up to produce a total faceted job satisfaction score (7–63), plus overall satisfaction (1–7).

(4) Practice characteristics were collected by survey from the principal general practitioner or practice manager.

Sample size and power

A priori sample size calculations for our larger study were carried out on our pilot General Practice Assessment Survey data [15], specifically on 'Access to care' which had the highest intra-class correlation of 0.17. They showed that 100 practices with an average of five patients per practice had 80% power with 5% significance to detect an effect size of 0.24 between male and female patient groups after adjustment for a cluster effect of 0.17. *Post hoc* power calculations on the Team Climate Inventory confirmed that a sample size of 93 practices with 653 staff members (227 from practices with less than four general practitioners and 426 from practices with four or more general practitioners) can detect an effect size of 0.35 on total scores for comparison of smaller practices and larger practices at a significance level of 0.05 with a power of 0.80 after adjusting for a cluster effect of 0.21.

Analyses

Data were analysed using multiple linear regression (SPSS version 13) and multi-level regression analysis (MLwiN version 2). Two multiple linear regressions were performed to evaluate how well practice characteristics predicted team climate within practices. In the first linear regression, the independent variables were the practice size (number of staff) and practice location. In the second regression, the dependent variables were staff job satisfaction scores. The multi-level regression analysis examined the influence of team climate on patients' assessments of care, controlling for patients' age and gender, and practice size and location. The General Practice Assessment Survey scores had skewed distributions, so we transformed them to normal scores (mean = 0, SD = 1) by replacing each value by its standard normal score using MLwiN. The normal scores were used in the multi-level regression analyses, producing standardized regression coefficients (beta coefficients). The transformations were carried out to make the results more accurate (see [18] for full details of the multi-level analysis). Consistent with other studies [11], to permit international comparison and to minimize multiple hypothesis testing, we used Total Team Climate Inventory scores in our main analyses, which we computed by summing-up the four sub-scale scores, resulting in scores ranging from 4 to 20. We also averaged the 10 General Practice Assessment Survey scales to produce scores ranging from 0 to 100.

Results

Of the 97 practices participating in the study, 63 (64.9%) were located in metropolitan areas. Twenty-five (25.8%) of the practices had solo practitioners (c.f. 22% for Australia), 32 (33%) had two to three general practitioners and 40 (41.2%) had four or more. Eighty-four practices (86.6%) were accredited (a triennial quality assurance process in which practices are assessed against standards set by the Royal Australian College of General Practitioners) a marginally higher figure than the 80% national average [19].

Response rate

Six hundred and fifty four general practitioners and staff from 94 practices returned Team Climate questionnaires. Data from one practice were subsequently excluded from the analyses because only one (20%) of its staff completed the instrument. The remaining 653 doctors and staff (Table 1) from 93 practices represented a response rate of 68%. There were no significant differences between respondents and

Table 1 Practice staff details

Position	Number (%)	Gender	
		Male	Female
General practitioners	259 (39.7)	159	100
Practice nurses	82 (12.6)	1	81
Practice managers	53 (8.1)	4	49
Receptionists	250 (38.3)	6	244
Allied health professionals	1 (0.2)	0	1
Other	2 (0.3)	0	2
Total	647[a]	170	477

[a]Details were missing for six practice staff members.

non-respondents in gender ($P = 0.36$) or professional group ($P = 0.37$). The results of the within-group inter-rater agreement analyses of the team climate data at practice-level showed that 88, 91, 75 and 88 practices were above the suggested 0.7 cut-off for shared perceptions of Vision, Participative Safety, Task Orientation and Support for Innovation, respectively, indicating that it was acceptable to aggregate and analyse the data at practice-level.

Six hundred and fifty four doctors and staff from 95 practices completed the Job Satisfaction Scale (response rate 65%). One practice was subsequently excluded from the analyses because only one staff member (20%) completed the questionnaire. The overall reliability of job satisfaction scores for the 94 practices was 0.86.

Of the 12 544 patients randomly selected and invited to participate, 7505 patients (60%) from 96 practices returned questionnaires. One practice was unable to generate the random list of chronically ill patients. Mean age of respondents was 60 years (range 18–96), 53% female.

Team climate scores

Table 2 shows descriptive statistics for the four team climate scales across the 93 practices. The scales had satisfactory consensual validity, as measured by James, Demaree and Wolf's [13] formula and discriminant validity [3, 20]. They also had good internal reliability ($\alpha = 0.86$–0.94). Replicating previous research [3], the scales were intercorrelated ($r = 0.70$–0.71) and all had strong correlations with the overall team climate score (0.85–0.94).

There was no significant difference in team climate between practices in metropolitan versus regional/rural locations ($P = 0.065$). Further, the number of doctors in a practice (which did not vary with the location of practice) was not associated with its overall team climate ($P = 0.13$). However, overall team climate was related to the total number of staff in the practice. An increase of 1 SD in the total number of staff resulted in a decrease of 0.052 (95% CI $= -0.09$ to -0.13, $P = 0.01$) standard deviations in overall team climate. Moving to a finer level of analysis, number of staff was also a significant negative predictor of three of the four team climate scales: Team Vision ($P = 0.009$), Participant Safety ($P = 0.006$) and Support for

Table 2 Team climate scores and indices of consensus and discriminability for 93 General Practices

	Mean	SD	F ratio	Inter-rater reliability (groups)
Team Vision	3.97	0.52	1.9	0.84
Participative safety	3.97	0.46	3.45	0.87
Task orientation	3.79	0.59	1.76	0.80
Support for innovation	3.87	0.49	2.90	0.86

Innovation ($P = 0.03$), but not Task Orientation ($P = 0.086$). Mean number of clinical staff (doctors, nurses and allied health professionals) per practice was 5.16 (standard deviation 4.42); mean number of non-clinical staff (receptionists, administrative staff and practice managers) was 4.58 (standard deviation 2.99). Stepwise regression analyses with the numbers of clinical staff and non-clinical staff as the independent variables showed that the number of non-clinical staff was significantly correlated (negatively) with total team climate ($P = 0.006$) and with Team Vision ($P = 0.007$), Participative Safety ($P = 0.004$) and Support for Innovation ($P = 0.012$), but not Task Orientation. With the number of non-clinical staff in the regression equations, total number of staff was no longer a significant predictor of team climate.

Outcomes

Overall job satisfaction in a practice increased by 0.30 (95% CI $= 0.24$–0.36, $P < 0.001$) standard deviations with an increase of 1 SD in total team climate and faceted job satisfaction increased by 0.26 (95% CI $= 0.21$–0.31, $P < 0.001$) standard deviations with 1 SD increase in total team climate. These associations were the same for all scales of the Team Climate Inventory and were unaffected by the location of practice, the total number of its staff and the number of non-clinical staff.

Patients' assessment of the receptionist services and overall evaluations of the practice increased by 0.088 (95% CI $= 0.047$–0.129, $P < 0.001$) and 0.042 (95% CI $= 0.005$–0.079, $P = 0.014$) standard deviations, respectively for an increase of 1 SD of overall team climate.

Discussion

Australian general practices vary in their team climate for innovation, with mean team climate scores similar to those in British primary health-care teams [14]. However, in contrast to a recent British general practice study in which single-handed status of the practice strongly predicted team climate [11], our data did not show an association between number of doctors in the practice and team climate. We did find, however, that practices with better team climate tended to have fewer staff, and in particular, fewer non-clinical staff. One possible reason is that communication between clinical and non-clinical staff is more difficult with a larger staff. Many larger practices also hold separate meetings for clinical and administrative staff, because there is limited appreciation of the role non-clinical staff can play in supporting clinical care, such as in developing and maintaining disease registers, recall systems, referral pathways, patient education materials [21]. It may also be that separate subcultures for administrative and clinical staff develop in practices with a large staff, and greater effort may be required to facilitate a shared culture.

Our data showed that team climate predicted job satisfaction. Similar findings have been found in overseas research on team effectiveness [8, 22] but not, to our knowledge, on

team climate. Job satisfaction is positively related to job per-formance [23] and negatively predicts intention to leave [24], but measuring the team climate of employees is easier than measuring team effectiveness. Furthermore, we found that the relationship between team climate and job satisfaction exists irrespective of the number of staff in a practice.

Team climate was also associated with patients' assessment of the practice. Where staff reported better team climate, patients rated the receptionist services more highly and were more satisfied overall with the practice's care. Similar overall satisfaction was found in a study of chronically ill patients in the UK, however, better team climate was also related to higher patient assessments of access to the practice and the continuity of care offered [10]. In Australia, receptionists are generally the public face of, and gate-keepers to, general prac-tices. It is conceivable that chronically ill patients consider the role of the receptionist to be particularly important for their access to and their interactions with the practice.

These findings offer suggestions for building teamwork in general practice, such as:

(i) Establishing suitable leadership (and even possibly joint clinical/non-clinical leadership as in hospital divisions);
(ii) Clarifying clinical and non-clinical goals, and checking the extent to which they are shared and deemed attainable by members of the practice team [14];
(iii) Setting up good communication structures (joint meeting and communication systems between clinical and non-clinical staff) in which participative decision-making is encouraged, as well as sharing of work-related information and ideas;
(iv) Creating clinically relevant roles for non-clinical staff, such as supporting recall and reminder processes;
(v) Allocating time, resources (financial, training, admin-istrative) and practical support within work nodes or tasks to develop new ideas and ways of working.

The current trend towards amalgamation of practices and the creation of new roles (e.g. medical assistants, specialist nurses, allied health providers) will require more effort to facilitate teamwork. Some Australian general practitioners seem to find it difficult to delegate tasks to other members of the practice team: the provision of incentives and business cases, such as rebates for chronic care follow-ups by practice nurses, may help. More joint training and professional devel-opment programs for practice staff (clinical and non-clinical together) would facilitate better understanding of the roles of other professional groups and positive attitudes to teamwork. This is an area where research is needed, particularly when the drive to primary care teams is gathering momentum.

Two limitations must be borne in mind when interpreting our findings. First, our research was cross-sectional and therefore does not imply causation. Second, we did not look at characteristics of general practice teams other than size. Some research suggests that team longevity is associated with reduced innovation and effectiveness over time [25], but this has not been tested in general practice. Another area for future research is the relationship between team climate and quality of chronic disease care in Australian general practice.

We are presently analysing data from our larger study, investi-gating the impact on quality of chronic disease care of four broad areas of organizational capacity in general prac-tice: multi-disciplinary teamwork, information management maturity, business and financial management and practice linkages with other providers.

Declaration

Acknowledgements

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Appendix 1 The General Practice Assessment Survey

Scores/Scale	No. of items	Item content
Access	8	Location, opening hours, phoning through to reception or the doctor, availability of specific or any doctor, waiting times in surgery Same day urgent availability of doctor
Receptionists	1	Service provided by receptionists
Continuity of care	1	Continuity of care provided by patient's usual doctor
Communication	4	Doctor's thoroughness asking questions, attention, explanations. Frequency of leaving surgery with unanswered questions
Interpersonal care	3	Doctor's spending time with patient, showing patience, showing caring and concern
Knowledge of patient	3	Doctor's knowledge of patient's medical history, worries, responsibilities at home/work
Referral	2	Referral to a specialist when patient thought one was needed
Enablement	3	Patient's ability to understand and to cope with problem or illness and to keep healthy
Nursing care	3	Nurse's attention to patient, quality of care, explanations
Overall satisfaction	1	Patient's overall satisfaction with the practice

Source: General Practice Assessment Survey manual—Roland *et al*. (2002).