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The importance of organizational climate and implementation strategy at the introduction of a new working tool in primary health care

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Abstract

Rationale, aims and objectives The transmission of research findings into routine care is a slow and unpredictable process. Important factors predicting receptivity for innovations within organizations have been identified, but there is a need for further research in this area. The aim of this study was to describe contextual factors and evaluate if organizational climate and implementation strategy influenced outcome, when a computer-based concept for lifestyle intervention was introduced in primary health care (PHC).

Method The study was conducted using a prospective intervention design. The computer-based concept was implemented at 6 PHC units. Contextual factors in terms of size, leadership, organizational climate and political environment at the units included in the study were assessed before implementation. Organizational climate was measured using the Creative Climate Questionnaire (CCQ). Two different implementation strategies were used: one explicit strategy, based on Rogers' theories about the innovation-decision process, and one implicit strategy. After 6 months, implementation outcome in terms of the proportion of patients who had been referred to the test, was measured.

Results CCQ questionnaire response rates among staff ranged from 67% to 91% at the 6 units. Organizational climate differed substantially between the units. Managers scored higher on CCQ than staff at the same unit. A combination of high CCQ scores and explicit implementation strategy was associated with a positive implementation outcome.

Conclusions Organizational climate varies substantially between different PHC units. High CCQ scores in combination with an explicit implementation strategy predict a positive implementation outcome when a new working tool is introduced in PHC.

Introduction

New methods are continuously being developed in medical research, but the transmission of research findings into routine care is a slow and unpredictable process.¹⁻³ Despite a large number of recent studies in this area, there is still a need to identify factors that predict successful implementation of research findings and new working tools into health care practice.^{4,5}

Implementation research emanates from the studies of diffusion of innovation in various settings conducted by E.M. Rogers, who stressed the importance of the innovation attributes and the characteristics of the potential adopters.⁶ In recent decades, implementation research has focused to a larger degree on the organizational context, including both the inner context, structural and cultural, such as size, leadership and organizational climate, and outer context, such as interorganizational influence, environment and politics.⁷⁻⁹ Several important factors predicting receptivity for innovations and knowledge management capabilities within an organization have been identified, including a supportive organizational culture, good managerial and clinical relations and clarity of goals and priorities.^{7,10} Managers opinions to innovations may also be important in achieving a receptive context for change.⁷ Verbeke et al. state that “organization culture reflects the way things are done in an organization”, and define organizational climate as “a reflection of the way people perceive and come to describe the characteristics of their environment”.¹¹ Various instruments for the assessment of creative climate, or work group climate for innovation, have been developed and validated.^{12,13}

The need for theory application in the study of implementation has been discussed among researchers. Eccles et al. argue that a theoretical framework is necessary for promoting the uptake of research findings in health care,¹⁴ whereas Oxman et al. prefer less theory and more common sense, i.e. sound practical judgment independent of specialized knowledge and

training.¹⁵ According to Bhattacharyya et al., it is not clear that explicit theory-based interventions are more effective than those based on implicit theories.¹⁶

When a computerized concept for screening and brief intervention regarding alcohol use and physical activity was introduced in primary health care (PHC) in Östergötland, Sweden,¹⁷ the implementation strategy was based not on any specific theory, but rather on what Oxman refers to as “common sense”.¹⁵ The computer-based concept was developed by a research team at Linköping University to facilitate increased attention to lifestyle issues in PHC. Because lifestyle-related diseases are increasing worldwide,¹⁸ it has become important to address lifestyle issues in PHC, and computer-based tools have been positively evaluated as an aid to staff to overcome the perceived obstacles.¹⁹ After 1 year, the implementation outcome was evaluated, and was found to differ considerably between the units.¹⁷ One explanation seemed to be size of the unit, but several other factors, not studied, might have influenced the implementation outcome. The research team saw a need for evaluation of other factors that could be of importance for the implementation, such as organizational climate, local contextual factors and the implementation strategy used, which led to the present study.

The aim of this study was to describe contextual factors and evaluate whether organizational climate and implementation strategy influenced outcome at the introduction of a computer-based tool for lifestyle intervention in PHC.

Materials and methods

Design

The study was conducted using a prospective intervention design. A computer-based concept for lifestyle intervention, described in detail by Carlford et al.,¹⁷ was implemented at 6 PHC units, using 2 different implementation strategies. Contextual factors in terms of size, age distribution among listed patients, organizational climate, leadership (managerial opinions) and political environment at the units were assessed before implementation. Managerial and clinical staff opinions were compared. After 6 months in operation, the implementation outcome in terms of the number of patients referred to the test related to the number of patients visiting the unit was measured.

Setting

Swedish health care is publicly funded and delivered by the county councils. Hospital care and PHC are provided. Each county council has the responsibility to provide health care as well as preventive services to the population. Six PHC units, i.e. health care centers with GPs and other staff members, 2 in each of 3 county councils in the south east of Sweden were recruited to the study. The county councils were Östergötland with 421,000 inhabitants, Jönköping with 333,000 inhabitants and Kalmar with 234,000 inhabitants. All the units volunteered to participate. The units were chosen to be as similar as possible regarding size (in terms of listed patients) and location (urban/rural area) within each county council. Through randomization one unit within each county council was selected to the implicit implementation strategy, and the other to explicit implementation strategy. Each county council has their own political public health program, thus both units within each county council have the same political goals.

Implementation strategies

Two different implementation strategies were used to introduce the computerized concept at the 6 PHC units: implicit and explicit implementation:

- The implicit implementation strategy included an information session at the unit by a change agent from the research team. The change agent explained the computer-based lifestyle test, and gave staff members instructions about the opportunity to refer their patients to the test after the consultation. No further dialogue was encouraged. The computer with the lifestyle test was installed and patient testing could start immediately.
- The explicit implementation strategy was based on Rogers' theories about the innovation-decision process, including knowledge, persuasion, decision and implementation.⁶ Attributes of the innovation, such as trialability and observability were also taken into account.⁶ This resulted in a strategy that began with an information session (knowledge) followed by a testing period for 1 month, during which all staff members were encouraged to perform the test and give their opinions about it (persuasion, trialability, observability). After the 1-month testing period the change agent visited the unit again; there was a discussion about how the test could be used in the daily work, and a mutual agreement to incorporate it or not, as a working method, was made (decision). After that second meeting the lifestyle test was made available to patients (implementation).

After patient testing began, all units received weekly feedback from the test assembled by the change agent. The feedback included the number of completed tests, distribution of those tested into different risk groups concerning alcohol and physical activity, and the number of referred by each staff category.

The Creative Climate Questionnaire instrument

The Creative Climate Questionnaire (CCQ) was developed by Ekvall et al. to measure the creative climate within working organizations.¹² It has been applied and validated in various organizational settings, and has been used to assess work climate in health care organizations in several studies.^{12,20–22} The CCQ instrument was considered appropriate for the study as it is developed in Sweden and available in a Swedish version.

The instrument consists of 50 statements answered using a 4-point scale: 0, do not agree at all; 1, agree to some extent; 2, agree to a great extent; and 3, fully agree. Mean scores are calculated for each dimension. The statements are formulated in the following way: “There is openness to new solutions here”. Statements are grouped into 10 different organizational climate dimensions with 5 statements covering each dimension.²³ The 10 dimensions are:

1. Challenge: the employee’s involvement in and commitment to the organization.
2. Freedom: the extent to which employees are allowed to act independently in the organization.
3. Idea support: the overall attitude towards new ideas.
4. Trust/openness: the emotional security and trust in the relations within the organizations.
5. Dynamism/liveliness: the dynamics within the organization.
6. Playfulness/humor: the spontaneity and ease that is displayed in the organization.
7. Debate: to what extent different views, ideas and experiences exist in the organization.
8. Conflicts: the presence of personal and emotional tensions.

9. Risk taking: the willingness to tolerate insecurity in the organization, such as new ideas, news and initiatives rather than the conventional definitions of risk taking.
10. Idea time: the time devoted to development of new ideas.

The CCQ instrument provides reference values to describe an organization as innovative or stagnated.²³

Data collection

An assessment form was sent by e-mail to all clinical staff members who meet patients in their daily practice, and thus could be expected to refer patients to the lifestyle test. The web-based tool Piblech® Survey 5.6 was used to distribute the 173 questionnaires, which were answered anonymously. The assessment form included the CCQ instrument,¹³ and also contained statements about perceived priorities concerning lifestyle factors at the unit, about perceptions of the patients' responsibility regarding lifestyle and about the health care system's responsibility to ask about lifestyle factors. A 4-point scale identical to the CCQ scale was used for those statements (considered ordinal data in the analysis). The managers at each unit received an assessment form similar to that sent to staff members, including the CCQ instrument. Managers were also asked about their knowledge of their county council's public health plan, and about perceived priorities regarding lifestyle factors among their head directors, and among staff at the unit. The questionnaire for the managers was not answered anonymously, because there was a question about the unit. All the managers were aware that they could be identified. One reminder was sent to those who had not answered the questionnaire after 3 weeks, and another reminder to those who had not answered 2 weeks later. Data on structural factors, unit size in terms of the number of listed patients, the number of employees, and age distribution of the patients were collected from county council registers. The computers were connected to the local health care computer network in each

county council, which made it possible to collect data from the test centrally. The implementation outcome was measured after 6 months of patient testing. Staff members were encouraged to refer all patients 18 years or older to the test, and implementation outcome was measured in terms of patients reporting they had been referred to the test, in relation to the number of unique individuals aged ≥ 18 years who visited the unit during the period.

Data analysis

Analysis of CCQ differences between the 2 units in each county council and between managers and staff was performed using t-test, and analysis of differences according to ordinal data was performed using the Chi-square test or Mann-Whitney test. Correlations were analyzed using Pearson's correlation coefficient. Statistical significance was set at $p \leq 0.05$. Implementation outcome differences were calculated as outcome at the unit with explicit implementation strategy related to outcome at the unit with implicit implementation strategy within each county council, and were described in terms of risk ratio (RR). Statistical analyses were performed using the computer-based analysis program Statistical Package for the Social Sciences (SPSS) version 16.0, and the open access statistical program OpenEpi version 2.3.

Results

Response rates

Staff questionnaires were returned by 144 individuals. Response rates among staff ranged from 67% to 91% at the 6 units, with 81% in county council A, 83% in county council B and 84% in county council C. The average response rate was 83%. All the 6 managers answered the questionnaire.

Structural factors

Structural factors at the 6 participating units, according to county council, are listed in Table 1. The 2 units in each of the county councils were similar according to all items assessed. Unit II in county council C had a high number of employees in relation to the number of listed patients. This is due to an obligation to provide acute care at night, and to provide physiotherapy, occupational therapy and other services to a larger population than the patients listed.

Opinions on preventive services

Concerning priority of lifestyle issues at the unit, the managers scored higher for their own priorities than on perception of staff priorities, though the differences were not significant. The staff groups perceived the manager's priority of lifestyle issues to be higher than the staff priority ($p=0.000$). There was a strong correlation between staff perception of priority at the unit and staff perception of the manager's priority ($r=0.63$, $p=0.01$). No differences in perceived priorities were found between the 2 units in county councils A or B, whereas in county council C, unit I had significantly higher scores than unit II (staff priority $p=0.001$, manager priority $p=0.009$).

Organizational climate

The organizational climate, measured by the CCQ questionnaire, was compared between the 2 units in each county council but also between managers and staff. The CCQ questionnaire was completed by 121 individuals. The comparison between the units in each county council revealed several differences between the units (Table 2). The difference was significant for 7 of the 10 dimensions in county council A, 8 in county council B and 5 in county council C. All significant differences were in favor of the same unit in each county council.

A comparison between managers and staff at all participating units at group level revealed that managers in general scored higher than staff members on the organizational climate dimensions. In the dimension *conflicts*, for which managers scored lower, a low score indicates a better climate. Two differences between managers and staff were significant: the dimension *challenge* and the dimension *idea support* (Table 3).

Implementation outcome related to organizational climate and implementation strategy

The mean value of referred/1000 individuals aged ≥ 18 years who visited the unit in 6 months, was 13. Four units reported lower levels, and 2 reported higher levels than the mean. The 2 units in each county council were compared concerning CCQ result, implementation strategy and implementation outcome. Table 4 shows the results for the different variables and the probability of being referred to the test at 1 of the 2 units within each county council. In county council A, the probability that a patient would be referred to the test was 6.5 times higher at the unit where the CCQ score was high and the explicit implementation strategy was used, than at the unit where the CCQ score was low and the implicit implementation strategy was used. The same tendency was seen in county council C, with a smaller, although significant difference. In county council B, the unit with low CCQ score used the explicit implementation strategy, and the unit with high CCQ score used the implicit implementation strategy; there was no difference between the units in the probability that a patient would be referred to the test.

The highest and lowest implementation outcome values were found in county council A. The CCQ scores from these 2 units are illustrated in Figure 1. The reference values for CCQ scores regarding stagnated or innovative organizations are also included.²³

Discussion

The aim of this study was to describe contextual factors and evaluate whether organizational climate and implementation strategy influenced outcome at the introduction of a computer-based concept for lifestyle intervention in PHC.

The main findings were that organizational climate varied substantially between the units in each county council, that PHC units that have creative climate as measured by CCQ appear to be able to more easily implement new interventions, and that implicit implementation strategies amplify implementation problems created by poor climate and vice versa.

Differences between managers and staff regarding perception of creative climate was identified in all 6 units; the managers perceived the climate to be more positive than the staff, and were not aware of conflicts to the same degree as staff members. Previous research on organizational climate has shown a positive relationship between a receptive context and innovativeness in various settings.^{24,25} Considering the variety in CCQ scores reported in this study, it is not surprising that implementation outcome differs between the units when the same implementation activities are offered, as was the case in the previous study.¹⁷

The CCQ scores for the unit with the lowest implementation outcome value were quite close to the reference values characterizing a stagnated organization, whereas the unit with the highest implementation outcome value had a CCQ score very close to the CCQ values characterizing an innovative organization. The reference CCQ values are based on innovativeness in terms of production or services provided by a company.²³ Innovativeness in terms of acceptance of a new working tool follows the same pattern. Based on this, the CCQ could be used as a predictor for successful implementation of new working methods in PHC. One way to overcome differences in implementation outcome could be to assess the organizational climate with a validated instrument, for example the CCQ, before initiating the

implementation activities. If CCQ scores are found to be low, more extensive and tailored implementation efforts would probably result in a better implementation outcome.

The results indicate that implementation outcome was also affected by the implementation strategy used. An implicit implementation strategy together with a low score on the CCQ was associated with a lower likelihood that a patient visiting the unit was referred to the test. A high CCQ combined with the implicit strategy gave the same result as a low CCQ combined with the explicit strategy. The explicit implementation strategy was characterized by a higher level of staff involvement in the decision process, and a more extensive effort from the change agent. Staff involvement previously has been shown to be a fundamental factor in organization development, which could be one explanation for the relative advantage linked to the explicit strategy.²⁶ The authors chose to base the explicit, theory-based implementation strategy on Rogers' model for the innovation-decision process.⁶ Similar step-by-step models are described in the literature, and most individuals, groups or institutions probably go through a process of change when an innovation is to be integrated into practice routines.²⁷

The managers' scores on CCQ showed that they were positive to innovation and preventive services. Regarding leadership, associations between managerial attitude towards change and organizational innovation have been identified, and according to Van de Ven, the managers' support for implementation is crucial in establishing strategies, structures and systems that facilitate innovation.^{28,29} Only 6 units were included in this study, therefore no correlation between the managers' opinions and implementation outcome could be evaluated.

No differences were found regarding age distribution among patients at the different PHC units within each county council. This factor was regarded important to assess, as, for example, a high proportion of elderly could have decreased the referral rates to the computers.

By comparing the units within each county council, a similar outer context was achieved, which was important because political and policymaking streams can have a large impact on the success of implementation within health care organizations.^{24,30} In one of the county councils, the perceived priorities among staff varied significantly between the 2 units included, which may have influenced the implementation outcome.

Time must also be considered. In this study, the outcome was measured after 6 months, which is a short time to change habits and establish new routines, and to evaluate the impact of innovative activities.^{31,32} However, our aim was to evaluate the impact of the different implementation strategies that could have affected outcome in the short-term. Another evaluation will be performed when patient testing has been operating for 18 months, and a qualitative study including staff interviews at the participating units is planned.

To our knowledge this is the first study performed in PHC clinical practice, evaluating both CCQ and implementation strategy.

Study limitations

One limitation of this study is the small number of participating units. However, when the units were compared, significance regarding implementation outcome was obtained. All the units volunteered to participate. Thus, there was no random sampling among all PHC units in the county councils, which could affect the generalizability of the results. However, the authors believe that the units are representative regarding the variables measured.

Implementation is a complex process, and several factors not measured in this study could have affected outcome. However, the factors evaluated in this study have earlier been found to influence the diffusion of innovations in health service organizations, which could be regarded a strength.⁷

Another limitation was that the outcome value, the number referred, was based on patients self-reporting within the test. Patients who were actually referred, but chose not to perform the test were not registered. However, because this was the case at all participating units it probably did not affect the overall results.

Conclusion

There is a substantial variation in organizational climate between different PHC units. High CCQ scores together with an explicit implementation strategy predict a positive implementation outcome when a new working tool is introduced in PHC.

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Figure 1 Creative Climate Questionnaire (CCQ) score in unit AI and AII, and reference values for innovative and stagnated organizations

Table 1 Number of employees at each unit, and number and age distribution among listed patients

	County council A		County council B		County council C	
	Unit AI	Unit AII	Unit BI	Unit BII	Unit CI	Unit CII
Employed (<i>n</i>)	45	39	28	31	14	36
GPs (<i>n</i>)	8	7	5	6	4	5
Listed patients (<i>n</i>)	13667	12963	10182	9775	6031	7329
Age (%)						
≤19	24	28	20	20	23	20
20–64	57	56	55	58	57	57
65–74	9	9	11	11	10	8
>74	9	7	13	11	10	14

Table 2 CCQ score, differences between the 2 units in each county council, staff only

CCQ-dimension	County council A unit		County council B unit			County council C unit			
	AI (n=35)	<i>p</i>	AII (n=24)	BI (n=15)	<i>p</i>	BII (n=17)	CI (n=7)	<i>p</i>	CII (n=23)
Challenge	2.09	0.245 ns	2.23	2.16	0.019*	2.45	2.77	0.007**	2.28
Freedom	1.74	0.921 ns	1.73	1.49	0.147 ns	1.76	2.06	0.578 ns	1.92
Idea support	1.89	0.006**	1.44	1.73	0.006*	2.22	2.66	0.012*	1.94
Trust/openness	1.87	0.011*	1.52	1.84	0.001**	2.41	2.69	0.006**	1.94
Dynamism/liveliness	2.01	0.000***	1.42	1.75	0.000***	2.25	2.66	0.011*	1.95
Playfulness/humour	2.10	0.000***	1.63	2.03	0.230 ns	2.20	2.74	0.017*	2.15
Debates	1.70	0.001**	1.24	1.52	0.002**	2.00	2.11	0.110 ns	1.73
Conflicts	0.56	0.046*	0.84	0.55	0.035*	0.24	0.06	0.095 ns	0.38
Risk taking	1.57	0.043*	1.31	1.35	0.013*	1.74	2.09	0.060 ns	1.59
Idea time	1.31	0.253 ns	1.17	0.85	0.000***	1.49	1.43	0.601 ns	1.30

ns, not significant.

* statistical significance on the 0.05 level.

** statistical significance on the 0.01 level .

*** statistical significance on the 0.001 level .

Table 3 Creative Climate Questionnaire (CCQ) score, differences between managers and staff

	Managers (<i>n</i> =6)	Staff (<i>n</i> =121)	Difference	<i>p</i>
Challenge	2.63	2.25	+0.38	0.008**
Freedom	1.90	1.76	+0.14	0.193ns
Idea support	2.20	1.88	+0.32	0.026*
Trust/openness	2.23	1.93	+0.30	0.180ns
Dynamism/liveliness	2.37	1.92	+0.45	0.092ns
Playfulness/humour	2.40	2.06	+0.34	0.106ns
Debates	1.67	1.66	+0.01	0.975ns
Conflicts	0.23	0.51	-0.28	0.151ns
Risk taking	1.63	1.55	+0.08	0.535ns
Idea time	1.00	1.25	-0.25	0.147ns

ns, not significant.

* statistical significance on the 0.05 level .

** statistical significance on the 0.01 level .

Table 4 Creative Climate Questionnaire (CCQ) score, implementation strategy and implementation outcome, compared between the 2 units in each county council

County council	Unit	CCQ*	Implementation strategy	No. of patients aged ≥ 18 years visiting unit	Number referred	Referred/1000 visits	Risk ratio	Confidence interval
A	AI	H	Explicit	6867	210	31	6.53	4.32–9.89
	AII	L	Implicit	5346	25	5	1	
B	BI	L	Explicit	4860	29	6	1	
	BII	H	Implicit	4201	30	7	1.19	0.71–2.00
C	CI	H	Explicit	2598	48	18	1.87	1.22–2.87
	CII	L	Implicit	3746	37	10	1	

*H, high; L, low. The unit marked H reached a significantly higher score than the unit within the same county council marked L in at least 5 of the 10 CCQ dimensions.

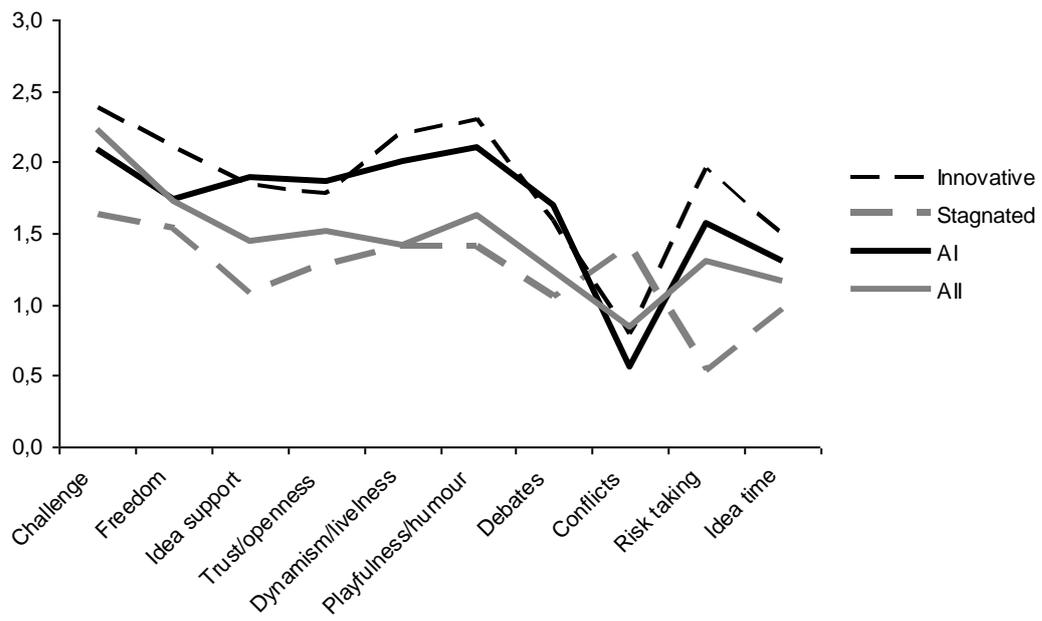


Figure 1