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Organizing Cardiovascular Preventive Care in General Practice: Determinants of a Successful Intervention[1]

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Background. **Although outreach visitor interventions have proven to be effective, more detailed studies are needed to understand what elements of interventions work and why. In this study we investigate the determinants of success of an intervention for optimizing cardiovascular preventive care in general practice.**

Methods. **After baseline measurements and randomization, 62 general practices received a comprehensive intervention program, by means of outreach visitors, lasting 21 months. Data on practice management and preventive activities were gathered at baseline and at postintervention measurements. Key characteristics of the intervention considered possible determinants of success were gathered by questionnaire. The difference between ideal and actual practice in each aspect of organizing cardiovascular preventive care was calculated as a deficiency score. The difference between deficiency scores before and after the intervention were the main outcome measures.**

Results. **The key characteristic, *duration of exposure to an aspect* (in months), was positively related to the change in availability of separate clinics and in the amount of teamwork. The improvement in instruments and materials was positively related to the general practitioner's opinion about the given feedback. No relations were found between the key characteristics and changes in record-keeping or follow-up routines.**

Conclusion. **Although implementation of a comprehensive prevention program is effective, we could not fully disentangle the "black box" of the intervention. The duration of exposure to an aspect of organizing cardiovascular care was the key determinant to success.**

Key Words: **prevention; organization; intervention determinants; cardiovascular care; general practice.**

INTRODUCTION

Cardiovascular diseases are among the most prevalent health problems in general practice; a major part of all chronic problems are of cardiovascular origin [*1*]. It is generally accepted that the general practitioner (GP) plays a crucial part in prevention, early detection, treatment, and surveillance of cardiovascular problems in patients with a high-risk of cardiovascular disease. In general practice these tasks are not yet performed satisfactorily [*2–6*]. One of the factors influencing physician behavior is the way prevention in practice is organized. Systematic prevention and disease management require adequate practice management and adequate organization of medical practice [*7–10*]. Furthermore, practice support mechanisms are required for sustained improvements [*11,12*].

Medical practice can be improved effectively by well-planned strategies, composed of a variety of interventions and methods [*13–16*]. Such combined strategies preferably include a personal audit of practice routines, feedback to the practice, and instruction, education, guidance, and support over a prolonged period of time. The "outreach visitor model" is based on these principles of educational outreach [*13,17*]. Educational outreach visits can be effective in improving some areas of professional practice [*18–21*], but even these interventions do not always enhance performance [*22*].

In a systematic review of outreach visits, Thomson O'Brien *et al.* also showed effect of outreach visits, but reported that the interventions used varied enormously [*23*]. We previously reported on the implementation of a comprehensive intervention program by out-

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reach visitors aimed to optimize cardiovascular preventive care in general practice. The primary analysis of this randomized controlled trial showed significant changes for each aspect of organizing preventive care [*24*]. Although our intervention was successful in optimizing practice organization, it is unclear which specific parts of the intervention contributed to the effects we found.

Numerous studies have addressed different kind of interventions in general practice [*23*]; however, to our knowledge there are no studies in which an attempt was made to discover which determinants contribute to the found effects of the intervention. To establish which elements of an intervention work and the reasons why, we have to look inside the "black box" of the intervention [*25*]. In the present study we assessed which key characteristics of the intervention were important for attaining success of the program.

METHODS

Design and Practices

A randomized controlled trial was performed in the southern half of The Netherlands from November 1996 until February 1999. Practices were invited by letter and via regional GP bulletins to participate in the study. After baseline measurements, 124 general practices were randomly allocated to either the intervention or the control group. The 62 intervention practices received 21 months of intervention; after this period postintervention measurements were performed. Control practices did not receive any stimuli between randomization and postintervention measurements.

Intervention

The intervention, which has been described more extensively in a another article [*24*], comprised both practice organization and clinical decision-making. We focus here on aspects of the organization of preventive care, which we divided into six separate domains. Some of these can be seen as conditions needed to perform adequate disease management, while others actual performance. Items were derived from guidelines developed by the Dutch College of General Practitioners and by consensus procedures [*20*,*26*,*27*].

The first eight visits were dedicated to improving practice organization. Although the emphasis changed toward clinical decision-making from the ninth visit onward, practice organizational aspects continued to be addressed until the end of the intervention period. For each aspect the outreach visitors followed the subsequent steps of a theoretical model of change (orientation, insight, acceptance, and change) [*13*,*17*]. The intervention design allowed practice members to draw up and prioritize their own list of gaps and planned changes (goal-setting, as recommended for continuous quality improvement) [*28*]. This list was used as guidance throughout the intervention period.

Measurements and Variables

Data on aspects of practice organization (Table 1) were gathered by questionnaire and observation, at baseline and after 21 months of intervention. The eight key characteristics of the intervention were derived by discussion among the project team while creating the intervention. They included the number of visits spent on each aspect, total number of visits, duration of exposure to an aspect, time invested, priority given, change of facilitator, opinions of the GP and practices assistant about the intervention, and opinion of the GP about guidelines.

The outreach visitors reported each visit in detail on a contact form: e.g., traveling time, aspects discussed, number of visits used to change a particular aspect of practice organization. We used this form to obtain the number of visits during which each aspect was discussed, the total number of visits per practice, and the duration of exposure to an aspect (in number of months). During each visit the outreach visitors asked the practice employees the amount of time spent (excluding the visits) on meetings, reading, and education; with this information the mean time invested per GP and per practice assistant was calculated. During the intervention period the outreach visitors and the authors (B.F. and C.L.) had regular meetings to discuss the progress made by the practice employees. The variable "priority given" was considered positive when the practices chose an aspect of practice organization as a priority and started the intervention period with that aspect. We also noted which practices changed outreach visitor during the course of the intervention. At the end of the intervention all practice employees completed a questionnaire concerning their experiences on the feedback they had received, the educational materials, and their opinion about the knowledge and capabilities of the outreach visitor. In addition we asked the GPs about their agreement with practice organizational guidelines. Their answers could be given on a five-point scale (strongly disagree, disagree, neutral, agree, and strongly agree); when the latter two were scored, the answer was considered positive. These questions were asked at the individual level and later aggregated to practice level. When at least 50% of the GPs or practice assistants per practice had a positive opinion, that variable was considered positive.

Analysis

The practice was the unit of analysis. Frequencies and descriptive analyses were used to describe the actual exposure of the practices to the key characteristics of the intervention. All analyses were made on an intention-to-treat basis.

TABLE 1

Aspects of Organizing Cardiovascular Preventive Care[a]

Domain	Item
A. Availability of instruments and materials	1. Instruments: blood pressure meter, Doppler device, weighing scale, measuring staff, glucose meter, cholesterol meter, body mass index table, nomogram, and urine sticks
	2. Leaflets on hypertension, cholesterol, angina pectoris, peripheral arterial disease, transient ischemic attack, diabetes mellitus, heart failure, smoking, diet, and exercise
	3. Adequate ancillary staff present
	4. Separate room for the practice assistant
B. Presence of separate preventive clinics	1. Separate clinics for hypertensive and diabetic patients
	2. Use of smoking cessation package (MIS)
C. Preventive tasks performed by the practice assistant	1. Measurements taken: blood pressure, glucose, cholesterol, height, weight, and body mass index
	2. History questions asked: cardiovascular history, cardiovascular family history, smoking habits, and alcohol intake
	3. Advice given on diet, smoking, losing weight, exercise, and alcohol
D. Teamwork in the practice	1. Written protocols on diabetes mellitus, hypertension, and detecting patients at risk
	2. Hold regular, scheduled meetings
E. Record-keeping	1. Computerized patient records
	2. Systematic entries concerning four risk factors
	3. Record risk factors separately from the consultation notes
	4. Record diagnoses separately from the consultation notes
	5. Risk profile for cardiovascular patients
	6. Register preventive activities separately
F. Follow-up	1. Make an appointment immediately after the visit
	2. Make an identifiable note
	3. Provide an appointment card for patients with diabetes mellitus, hypertension, cholesterol, angina pectoris, peripheral arterial disease, and heart failure
	4. Contact patients who fail to attend an appointment

[a] For details see Ref. [*24*].

We computed for each of the six aspects of preventive care a "deficiency score," i.e., logarithm of the difference between the maximum possible score minus the actual score, both at baseline and after the intervention period. The main outcome measure was the difference between the deficiency scores in each aspect of organizing preventive care before and after the intervention.

To assess the influence of the key characteristics of our intervention, multiple linear regression analyses were performed with each of the main outcome measures as dependent variable. The outcome measures addressed the preventive tasks performed by the practice assistant, the presence of separate preventive clinics, the availability of instruments and materials, the amount of teamwork in the practice, follow-up routines, and record-keeping. The key characteristics with $P < 0.25$ in univariate analyses entered the model.

RESULTS

All 124 practices received baseline and postintervention measurements. Four intervention practices did not complete the intervention period: one because of illness of the GP, one found the intervention too burdensome, and two due to personnel changes. There were no dropouts in the control group.

Outcome

For all six domains, the difference in change between intervention and control practices was statistically significant ($P < 0.001$), and in favor of the intervention practices (Table 3 in [*24*]).

Key Characteristics of the Intervention

There was considerable variation in the number of visits spent on the different aspects of practice organization (Table 2). The subject of separate clinics was discussed most, while the mean number of visits spent on an issue was lowest for teamwork. Table 2 shows that no single aspect was addressed in all practices. Over 21 months the total number of visits per practice was 15 (SD 2.6). On average, the practices worked on each practice organization aspect for a period of 4 months. Apart from visits, the time spent by GPs on meetings, reading, and education averaged 18 h, ranging from 1 to 85 h; for practice assistants the mean time spent was close to 10 h. Although most visits were spent on the organization of separate clinics, the sub-

TABLE 2

Key Characteristics of the Intervention[a]

Key characteristic	Mean (range)	Standard deviation
Number of visits spent on		
Preventive tasks	3.3 (0–10)	2.5
Separate clinics	3.6 (0–9)	2.4
Instruments and materials	2.9 (0–10)	2.2
Teamwork	0.9 (0–7)	1.9
Follow-up	1.8 (0–7)	1.8
Registration	3.2 (0–8)	1.9
Total number of visits	15.1 (4–17)	2.6
Duration of exposure (in number of months) to the aspect		
Preventive tasks	3.1 (0–17)	3.5
Separate clinics	4.5 (0–16)	3.9
Instruments and materials	5.2 (0–15)	3.4
Teamwork	4.5 (0–12)	3.2
Follow-up	3.8 (0–16)	3.2
Registration	5.6 (0–15)	3.6
Time invested (hours) per		
GP	18.2 (1–85)	12.9
Practice assistant	9.9 (0–84)	11.7

Key characteristic	Number of practices	Percentage
Priority given to		
Preventive tasks	9	14.5
Separate clinics	7	11.3
Instruments and materials	10	16.1
Teamwork	3	4.8
Follow-up	6	9.7
Registration	27	43.5
Change of facilitator	12	19.4
≥50% of the practice employees positive opinion about		
Feedback		
GP	43	69.4
Practice assistant	36	58.1
Used materials		
GP	42	67.7
Practice assistant	46	74.2
The facilitator		
GP	49	79.0
Practice assistant	52	83.9
Positive opinion of the GP about guidelines concerning		
Preventive tasks	42	67.7
Separate clinics	18	29.0
Instruments and materials	36	58.1
Teamwork	51	82.3
Follow-up	31	50.0
Registration	57	91.9

[a] $N = 62$ practices.

ject of record-keeping was worked on for the largest period of time. Additionally, we found that 16% of the practices worked on teamwork during the intervention and 95% of the practices addressed record-keeping.

Most practices gave priority to and started the intervention period with improving record-keeping (44%). The questionnaire about experiences revealed that in more than 69% of the participating practices the GPs and in 58% the practice assistants were positive about the feedback they received. In 67% of the practices the GPs and in 74% the practice assistants were positive about the used materials. In 79% of the practices the GPs and in 84% the practice assistants had a positive opinion about the outreach visitor. In 92% of the practices the GPs were positive about the guidelines we provided concerning record-keeping.

Determinants of Success

Multivariate linear regression analysis revealed no relationship between the key characteristics of the in-

tervention and the increase of preventive tasks performed by the practice assistant. The duration of exposure to an aspect (in months) was positively related to the change in availability of separate clinics and of teamwork. The GPs' opinion about the given feedback was a positively related to improvements in available instruments and materials. No relationship was found between the key characteristics and the changes in record keeping or follow-up routines.

DISCUSSION

The comprehensive intervention program was carried out successfully. To gain insight into which of the program elements contributed to the observed effects, we a priori identified key characteristics of the intervention program. Duration of exposure to program aspects turned out to be the most important determinant of success.

Several factors may have biased our results. The practices volunteered to participate and may have been especially interested in adopting the intervention. Withdrawal from the intervention (four practices) was a minor problem, as these practices agreed to perform postintervention measurements. To assess sustainability of the effects a longitudinal evaluation is needed. Finally, in this article we did not explore the cost-effectiveness nor the effect of improvement of cardiovascular preventive care on patient outcome.

Promoting teamwork in primary care has become an important issue over the past decade, both in the United Kingdom and in the United States [*9,12,29–31*]. Good teamworking is a key part of providing high-quality care [*32*]. However, we found that only 16% of the practices addressed teamwork during the intervention and the mean number of visits spent on this element was less than one. In some practices the teamwork elements were already present in the practice and the outreach visitor needed only one visit to review the written protocols with the practice employees, but a substantial number of practices did not address teamwork.

There was little variation in the mean number of months each practice worked on a particular aspect; ranging from an average of 3.1 months for preventive tasks performed by the practice assistant to 5.6 months for record-keeping. However, there was a difference in time invested on the project per GP (mean 18.2 h) and per practice assistant (mean 9.9 h). Although general practices are working as multidisciplinary groups more and more, in The Netherlands the GP is still the first person in charge of quality improvement in the practice and is the first person to obtain information and initiate meetings before the other employees can follow.

The number of visits used to change an aspect was agreed between the outreach visitor and the practice employees. When the outreach visitor thought that more visits were needed, the employees were encouraged to devote more visits to this aspect. On the other hand, extra time was allowed when the employees needed more time to get the aspect incorporated into their practice. The largest number of visits was spent on starting separate preventive clinics, probably because this required the most effort from the practice employees. To enable the practice assistant to have a major role in these clinics, considerable education and training is required.

The absence of a relationship between any of the key elements of the intervention and the changes in three domains of preventive care (tasks of the assistant, record-keeping, and follow-up routines) was surprising. One explanation could be that other unmeasured characteristics were related to the change in these domains, but more probable is the explanation that no specific aspect of the program, but the program as a whole, was effective.

It has been reported previously that goal-setting is essential for behavior change [*27*]. Our results do not confirm that giving priority to a certain aspect has an influence on the change for any aspect of organizing preventive care. Although it would seem obvious a priori that more visits by an outreach visitor imply more change, this study did not confirm this. An explanation may be that it is more beneficial to direct attention toward topics that are ranked lower in terms of interest than topics that are ranked higher, as shown in a study on continuous medical education [*33*].

The GP's opinion on the guidelines concerning the aspects that were addressed during the intervention was mostly positive, but showed no relationship to the performance of the practices. It has been reported previously that a positive opinion alone is not enough to change behavior [*34*]. In practices where at least half of the GPs were positive about the given feedback, the greatest change was found for the availability of instruments and materials. Although we supplied feedback on all elements of practice management, the feedback report started with a large section addressing this topic. Perhaps this part was most strongly remembered by GPs. We expected to find that opinions on the knowledge and capabilities of the outreach visitor would be an important determinant for a successful intervention; however, this was not the case for any aspect of organizing preventive care.

The duration of exposure to an aspect showed the strongest relationship with changes in the presence of separate clinics and of teamwork. An important implication for practice is that if practices aim to incorporate separate clinics and teamwork in their daily routine, they should take their time to prepare for these changes.

Introducing organizational change in a multidisci-

plinary context is a complex task and is still largely unexplored [*30*,*35*,*36*]. Multifaceted interventions targeting different barriers tend to be more effective than single interventions [*14*]. Particularly educational outreach visits combined with social marketing have been shown to be a promising approach to modifying professional behavior [*23*]. In the effective multifaceted intervention we used, we combined audit of practice routines, feedback to the practice, and instruction, education, guidance, and support over a prolonged period of time.

In conclusion, although implementation of a comprehensive prevention program is effective, we could not fully disentangle the black box of the intervention. Duration of exposure to program aspects was the most important determinant of success. Perhaps key characteristics of the intervention other than those we selected are also of importance, or perhaps the structure is just too complicated to unravel and we should accept that well-defined multifaceted interventions by outreach visitors can bring about major changes in the organization of preventive care, but it is not possible to identify precisely why.

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