Health Service Research

Patient cardiovascular risk self-management: results from a randomized trial of motivational interviewing delivered by practice nurses

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Abstract

Background. To enhance cardiovascular risk management and patients' self-management, a tailored programme to improve cardiovascular risk management was tested in a randomized trial. The presented study concerned secondary analysis.

Objectives. To explore the correlations of practice nurses' counselling skills at baseline on chronic illness care (measured with Patient Assessment of Chronic Illness Care questionnaire) and patients' self-management (assessed with Patient Activation Measure) at follow-up and to examine the effect of the tailored implementation programme on chronic illness care and patients' self-management.

Methods. A two-arm cluster randomized trial was conducted in 34 general practices in the Netherlands. Counselling skills of practice nurses at baseline were abstracted from audio-taped consultations, which were assessed by Motivational Interviewing Treatment Integrity. Data of 2184 patients with established cardiovascular disease or at high cardiovascular risk were gathered at inclusion and at 6 months follow-up by a composite questionnaire. Multilevel regression analysis was applied, controlling for patient characteristics.

Results. Counselling skills of practice nurses were not associated with chronic illness care and patients' self-management scores. At follow-up, patients in the intervention group experienced less chronic illness care and were less activated in disease management than patients in the control group. The most important predictors were patients' age, gender and education level.

Conclusions. The logic model underlying the implementation programme needs to be reconsidered, because patient perceptions were neither influenced by nurses' counselling skills nor by other components of the implementation programme.

Key words: Cardiovascular, counselling, health care, nurses, patients, self-management.

Introduction

Prevention of cardiovascular diseases remains high on the agenda in health care systems. In the Netherlands, GPs have delegated preventive activities to practice nurses who work independently and have their own consultations (1–3). They provide patients with a chronic condition with lifestyle advice, perform measurements of patients' biomedical parameters and report to the GP on medication issues, which has also been found in other countries (4,5). Lifestyle counselling and encouraging patients' self-management constitute important elements in prevention (6), yet these are difficult for

practice nurses to perform well (7). More than half of the patients with a chronic condition are not able to take an active role in their own health care (8). Also, care delivered by practice nurses is suboptimal; their counselling skills, for instance, could certainly be enhanced (9). To enhance cardiovascular risk management care, a tailored implementation programme was developed, aimed at practice nurses' counselling skills (10). Practice nurses received feedback training on motivational interviewing skills; motivational interviewing is considered a promising counselling technique (11). However, the primary analyses of this tailored implementation programme in a randomized trial (12) and a process evaluation (13) showed hardly any improvement in patient cardiovascular risk factors and practice nurses' counselling skills.

In this study, we aimed to explore the impact of the implementation programme, which included feedback training on motivational interviewing skills on the quality of chronic illness care perceived by the patients and patients' self-management of health and disease. Quality of chronic care and self-management can be seen as intermediate outcome measures in cardiovascular risk management, which we intended to assess in this study. Furthermore, we wondered whether there was any relationship between practice nurses' counselling skills and patient perceptions of care at all. Although counselling skills had been identified as key determinant in achieving optimal outcomes in cardiovascular risk management in a previous study (14), it may be possible that the impact was less obvious than assumed.

Objectives

The central aims of this study were to explore the correlations of practice nurses' counselling skills at baseline on chronic illness care (measured with Patient Assessment of Chronic Illness Care questionnaire) and patients' self-management (assessed with Patient Activation Measure) at follow-up, and to examine the effect of the tailored implementation programme on chronic illness care and patients' self-management.

Methods

Study design

This study was based on data from the European Tailored Intervention for Chronic Diseases project in 2013–2014 (15). The ethical committee of Arnhem and Nijmegen has granted ethical approval (2013/229).

Intervention

The intervention programme consisted of mandatory feedback training. Practice nurses received during one session two times feedback on their motivational interviewing skills by an experienced trainer after two consecutive consultations with patients at their practice. We offered an educational web programme to enhance practice nurses' knowledge about cardiovascular risk management, and we asked the practice nurses to categorize patients in three groups based on the presence of depressive symptoms. We asked practice nurses to offer patients without depressive symptoms an information card with an option to write down target values for blood pressure and low-density lipoprotein cholesterol. We suggested use of E-health options: 'thuisarts.nl' and 'hartenvaatgroep.nl', as well as Twitter consultation options. Patients with mild depressive symptoms should be referred to a physical exercise group. For patients with severe depressive symptoms, we advised the practice nurse to refer these patients to their GP, practice nurse mental health or psychologist.

Participants

In total, 1600 invitations were sent to general practices. Eligibility criteria for practice nurses were treating patients and being trained in motivational interviewing. Per general practice up to 75 patients with established cardiovascular diseases and up to 100 patients at high cardiovascular risk were invited to participate. A possible 30% drop-out was included in these numbers. Patients were selected by using International Classification of Primary Care codes K74-76, K85-K92, K99.1 and T93; sometimes two codes or more were needed to determine high cardiovascular risk, depending on age, gender and smoking status. Patients at high cardiovascular risk have an estimated 10-year risk score of 20% or higher for morbidity and mortality due to cardiovascular diseases. Eligible patients were aged 18 or older and were able to fill out an informed consent form. Patients were excluded if they had a terminal illness, pregnancy or lactation, cognitive impairment and/or poor language skills. To measure cardiovascular risk management only, health care patients with diabetes mellitus were excluded, because otherwise the quality of diabetes care would be measured instead.

Data collection

Data were collected at baseline and at follow-up, which was planned for 6 months but due to practical constraints became 4 up to 9 months. Counselling skills of practice nurses were documented by a verbatim transcribed audio tape of a conversation between practice nurses and patients at baseline. These audio tapes were collected via secure USB sticks. One of two professional trainers who were connected to MINTned (Dutch association of trainers in motivational interviewing) scored the transcriptions using the validated Motivational Interviewing Treatment Integrity (16). The trainers developed a protocol to assess the transcriptions in the same way. The Motivational Interviewing Treatment Integrity is a behavioural coding system that assesses motivational interviewing skills.

Participating patients completed a composite paper-based questionnaire at baseline and at follow-up, which they received by post. This questionnaire included the Patient Assessment of Chronic Illness Care to assess patients' experiences of chronic health care (17–19), the Patient Activation Measure which measures patients' self-management (20,21), and patient characteristics questions.

Data measures

The Motivational Interviewing Treatment Integrity score consists of a global score to characterize the interaction, which comprises five categories: elicit, collaboration, autonomy, direction given and empathy. First the transcription was completely read while listening to the audio tape. Then, the audio tape was listened again, but now in fragments to score each item of the global score between one and five (low to high). The Motivational Interviewing Treatment Integrity global score is the sum of the five categories and divided by five; following the Motivational Interviewing Treatment Integrity, it is considered desirable that the global score is above 3.5 (16).

The Patient Assessment of Chronic Illness Care contains 20 items and each item could be scored on a five-point Likert scale, which ranges from 1 = 'almost never' up to 5 = 'almost always'. Higher scores indicated that patients perceived more quality of chronic health care. The patients' responses to Patient Assessment of Chronic Illness Care items were aggregated and divided by the total of the

questions answered. Patients with missing scores on one third or more in total were not included for analysis. The Patient Activation Measure questionnaire consists of 13 items with four answer categories per item, ranging from 'strongly disagree' to 'strongly agree', while a fifth response option 'non applicable' was also given. The items were focused on confidence, beliefs, knowledge and skills. Higher scores indicated better self-management skills of patients. For the Patient Activation Measure questionnaire, the raw scores ranged from 13 to 52, which were converted to 'activation scores' ranging from 1 to 100. Patients had to answer at least up to 9 out of 13 questions to be included. The following descriptive characteristics were also used from the composite questionnaire: gender, age, having established cardiovascular diseases or high cardiovascular risk, and educational level.

Data analysis

Data were analysed using SPSS (version 20, IBM Corp.). To explore the impact of practice nurses' counselling skills, the Motivational Interviewing Treatment Integrity scores were used as a predictor in a multilevel regression analysis with the patient's assessment of chronic illness care and patient activation at follow-up as outcomes. Analyses were corrected for age, gender, established cardiovascular diseases or high cardiovascular risk, and Patient Assessment of Chronic Illness Care and Patient Activation Measure scores at baseline. By this multilevel design of the analysis, the patients are clustered with practice nurses. A significant difference was set at $P < 0.05$ and all P-values were two sided.

Then, we calculated the differences between the dependent variables, the mean Patient Assessment of Chronic Illness Care and Patient Activation Measure scores for baseline and follow-up. To explore the effect of the implementation programme on the Patient Assessment of Chronic Illness Care and Patient Activation Measure scores at follow-up, we performed a multilevel regression analysis with measurements (pre–post) nested in patients and patients within general practices. Group allocation (intervention–control) and time of measurement (pre–post) were taken into account as an interaction term. Again we controlled for the following patients' characteristics: age, education level, gender and established cardiovascular diseases versus at high cardiovascular risk. An additional analysis was done to test whether the effect of the implementation programme was different for the two patient groups: patients with established cardiovascular diseases and patients at high cardiovascular risk; again we controlled for age, education level and gender, because it concerns other patients. We reported effect estimates by means of Restricted Maximum Likelihood, as well as the SD, and we reported if there was a significant difference.

Results

A total of 48 practice nurses showed their interest. Ten practice nurses withdrew before the initial visit, and four practice nurses withdrew after the initial visit. In total, 34 actually started (see Figure 1). All practice nurses handed in the requested audio tape.

At baseline, we gathered results of 2184 patients (41% of those invited), of whom 1221 patients in the intervention group and 963 patients in the control group. Two thirds of the patients consisted of men, both in the established cardiovascular diseases and in the high-risk group, in the intervention practices and in the control practices. The mean age of patients in the intervention group was 72.7 years and for patients in the control group 71.5 years. Table 1 presents general practice characteristics and patient characteristics at baseline.
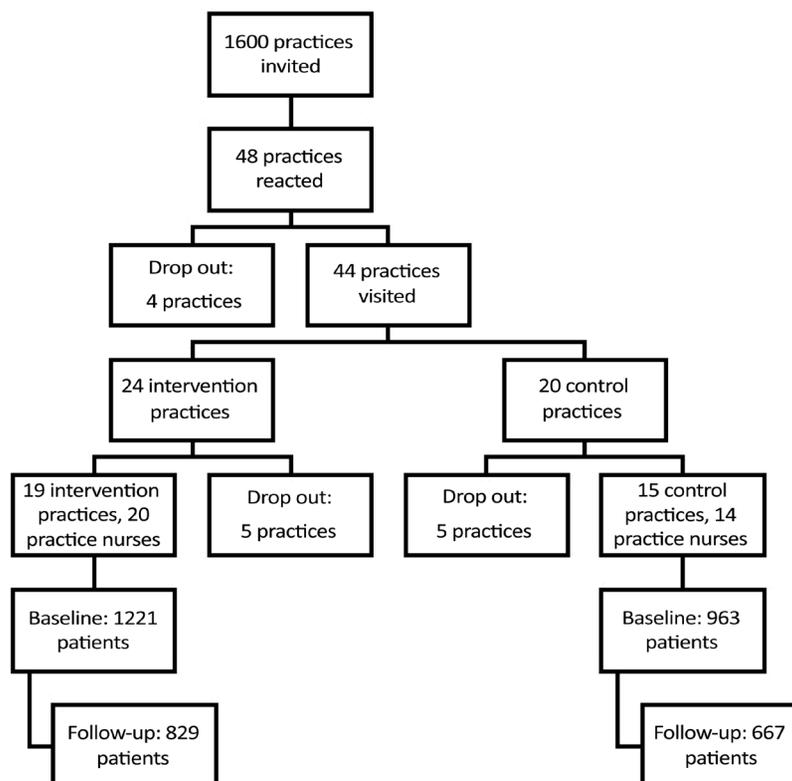

Figure 1. Flowchart of the study (2013/2014)

Practice nurses' counselling skills related to Patient Assessment of Chronic Illness Care and Patient Activation Measure scores

The counselling scores of all but one practice nurses were lower than the advised 3.5 (16) (one practice nurse in the control group had a score of 4.0 at the start). The mean global score of the Motivational Interviewing Treatment Integrity (counselling skills) for practice nurses in the intervention group was 2.1 [scores between 1.0 and 3.2 (SD = 0.51)] and for the control group 2.3 [scores between 1.0 and 4.0 (SD = 0,80)]. Motivational Interviewing Treatment Integrity scores were not associated with Patient Assessment of Chronic Illness Care and Patient Activation Measure, even after controlling for Patient Assessment of Chronic Illness Care and Patient Activation Measure scores at baseline (see Table 2).

Effect of the implementation programme on Patient Assessment of Chronic Illness Care and Patient Activation Measure scores

Patients in the intervention group had a mean Patient Assessment of Chronic Illness Care score of 1.86 at baseline and 1.94 at follow-up compared with a mean score of 2.07 for patients in the control group at baseline and 2.09 at follow-up, whereby the patients in the intervention group did not show more improvement compared with patients in the control group. Patients in the intervention group had a significant lower score at follow-up than patients in the control group ($P = 0.02$) controlled for age, gender, education level and having established cardiovascular diseases or high cardiovascular risk and baseline scores (see Table 3). There was a non-significant deterioration over time of the Patient Assessment of Chronic Illness Care

Table 1. General practice, practice nurse and patient characteristics at baseline (2013/2014)

	Intervention group	Control group
Practice characteristics	*n* = 19	*n* = 15
Solo practice	*n* =10 (52.6%)	*n* = 9 (60%)
Duo/group practice	*n* =9 (47.3%)	*n* = 6 (40%)
Rural area	*n* =10(52.6%)	*n* = 6 (40%)
Urban area	*n* =9 (47.3%)	*n* = 9 (60%)
Mean number of patients visiting the general practice per week (SD)	185.31 (91.56)	141.00 (48.34)
Mean FTE practice nurses (SD)	0.71 (0.35)	0.65 (0.32)
Practice nurse characteristics	*n* = 20	*n* = 14
Sex % female	90	100
Mean age in years	42	43
Mean number of years' experience as a practice nurse	12	11
Mean number of hours previous training of motivational interviewing skills	14.7	14.8
Patient characteristics	*n* = 1221	*n* = 963
Sex % female	35.1	34.6
Mean age in years (SD)	72.6 (9.2)	71.6 (9.7)
Patient with established cardiovascular diseases	*n* = 519	*n* = 413
Patients at high risk	*n* = 702	*n* = 550

FTE, full-timer equivalent.

Table 2. The association of Motivational Interviewing Treatment Integrity with Patient Assessment of Chronic Illness Care and Patient Activation Measure scores (with and without controlling for quality of chronic care) (2013/2014)

	Patient Assessment of Chronic Illness Care results at follow-up (*n* = 634) (SD)	Patient Activation Measure results at follow-up (*n* = 1339) (SD)	Patient Activation Measure results at follow-up (controlling for quality of chronic care) (*n* = 600) (SD)
Intercept	0.86 (0.3)*	46.55 (5.1)**	44.89 (7.7)**
Motivational Interviewing Treatment Integrity at baseline	−0.04 (0.1)	−0.02 (0.7)	0.30 (0.9)
Established cardiovascular diseases (high cardiovascular risk ref)	−0.11 (0.1)	1.33 (1.0)	1.64 (1.4)
Intervention group (control group ref)	−0.08 (0.1)	−1.55 (1.0)	−1.49 (1.3)
Mean age in years	0.0 (0.0)	−0.11 (0.1)*	−0.15 (0.1)
Gender (male ref)	−0.10 (0.1)	−1.14 (1.0)	−0.14 (1.4)
Education level (high education ref) Education low	0.18 (0.1)*	−3.77 (1.2)**	−0.81 (1.7)
Education medium	0.23 (0.1)**	−2.71 (1.2)*	−0.70 (1.8)
Patient Assessment of Chronic Illness Care baseline	0.65 (0.0)**		1.07 (0.8)
Patient Activation Measure baseline		0.48 (0.0)**	0.48 (0.0)**

Ref, reference.

*$P < 0.05$; **$P < 0.01$.

Table 3. Results of the Patient Assessment of Chronic Illness Care and Patient Activation Measure scores at follow-up (2013/2014)

	Patient Assessment of Chronic Illness Care, intervention + control (SD)	Patient Assessment of Chronic Illness Care, patients with cardiovascular diseases (SD)	Patient Assessment of Chronic Illness Care, patients at high risk (SD)	Patient Activation Measure, intervention + control (SD)	Patient Activation Measure, patients with cardiovascular diseases (SD)	Patient Activation Measure, patients at high risk (SD)
Intercept	2.74 (0.18)**	2.55 (0.21)**	3.29 (0.30)**	81.69 (2.75)**	80.40 (3.17)**	84.76 (4.79)**
Intervention × Time measurement	−0.01 (0.06)	−0.03 (0.08)	0.00 (0.08)	−0.24 (0.93)	1.08 (1.28)	−1.32 (1.32)
Established cardiovascular diseases (high cardiovascular risk ref)	0.04 (0.04)			−0.06 (0.70)		
Intervention group (control group ref)	−0.11 (0.05)*	−0.08 (0.07)	−0.11 (0.06)	−1.59 (0.75)*	−1.97 (1.08)	−1.24 (1.03)
Time measurement	−0.01 (0.04)	−0.07 (0.06)	0.03 (0.06)	0.14 (0.70)	−0.46 (0.96)	−0.1 (0.98)
Mean age in years	−0.01 (0.00)**	−0.01 (0.00)	−0.02 (0.00)**	−0.10 (0.04)**	−0.08 (0.04)	−0.15 (0.06)*
Gender (male ref)	−0.03 (0.04)	−0.12 (0.07)**	0.07 (0.06)	−2.38 (0.70)**	−2.67 (1.02)	−2.06 (0.98)*
Education level Education low (high level ref)	0.17 (0.05)**	0.24 (0.86)**	0.12 (0.07)	−5.14 (0.83)**	−6.02 (1.27)**	−4.56 (1.10)**
Education medium	0.10 (0.06)	0.16 (0.09)	0.07 (0.07)	−2.80 (0.88)**	−2.87 (1.35)*	−2.98 (1.16)*

Ref, reference.

*$P < 0.05$, **$P < 0.01$.

score for patients with established cardiovascular diseases, while no difference was found for patients at high risk at follow-up. Patients in the intervention group had a mean Patient Activation Measure score of 69.02 at baseline and 67.88 at follow-up compared with a mean score of 70.51 for patients in the control group at baseline and 70.29 at follow-up. Patients in the intervention group also had a significant lower Patient Activation Measure score at follow-up than patients in the control group ($P = 0.03$), controlled for age, gender, education level, having established cardiovascular diseases or high cardiovascular risk and baseline scores (see Table 2). The Patient Activation Measure scores did not differ between patient groups (established cardiovascular diseases or at high cardiovascular risk).

The most important predictors for the Patient Assessment of Chronic Illness Care and Patient Activation Measure scores were age, gender and educational level (see Table 3). Both Patient Assessment of Chronic Illness Care and Patient Activation Measure scores decreased with the advancing age of patients. For both Patient Assessment of Chronic Illness Care and Patient Activation Measure, female patients had lower scores. Patients with low education had a higher Patient Assessment of Chronic Illness Care score and a lower Patient Activation Measure score compared with patients with higher education level.

Discussion

The global score of the Motivational Interviewing Treatment Integrity at baseline was not associated with the Patient Assessment of Chronic Illness Care or the Patient Activation Measure score at follow-up. This implies that patient experiences in chronic illness care and active disease management were not associated with practice nurses' counselling skills. Patient experiences of chronic illness care did not change, while their active disease management deteriorated over time. Patients in the control group experienced both their chronic illness care and their disease management as better compared with patients in the intervention group at follow-up. The logic model underlying the tailored implementation programme needs to be reconsidered, because patient perceptions (Patient Activation Measure and Patient Assessment of Chronic Illness Care) were influenced by neither nurses' counselling skills nor other components of the implementation programme.

Patients' experiences in chronic care at baseline and follow-up were lower than those found in previous studies among patients with established cardiovascular diseases or at high cardiovascular risk (22,23) and patients with other chronic conditions (24,25). Overall, patients experienced chronic health care as insufficient; in previous research, patients also assessed chronic health care as poor (26). According to their higher Patient Assessment of Chronic Illness Care scores, lower educated patients were more positive about chronic health care compared with higher educated patients. Previous studies showed that female patients experienced chronic care as less sufficient compared with male patients (26,27), which was also seen in our study, while another study showed that female patients scored better on chronic care (27). Patients' experiences of chronic care deteriorated along with their advancing age (27,28), which corresponds with our study. Possible explanations for our findings may be that patients in the intervention group could be overwhelmed by our recommendations or did not know how to receive the change in care and leaving them more confused than feeling empowered to manage their care.

In the past few years, Dutch health care policies and health care professionals emphasized the importance of patients'

self-management towards their health and lifestyle (29). A previous study reported that health care professionals who were more in favour of supporting patient's self-management were more likely to achieve a cooperative bond with the patient than less supportive health care professionals (30). Patients were approached in several ways to increase their self-management, for instance through websites and public media campaigns, and this approach seemed to be paying off (31). Patients with better active disease management visit the GP less often and are less often hospitalized. This could be a good way to keep health care affordable in the future (1). More attention is needed for patients who have to integrate their vascular disease or high cardiovascular risk into their daily life physically, emotionally and socially, and who have to learn to deal with their health care professionals (32).

The counselling scores showed an overall suboptimal counselling performance by practice nurses. However, other research showed that practice nurses did show better counselling skills when treatment was initiated by patients themselves (33) and not by a health care professional, while self-management of patients increased when practice nurses applied recommended counselling approaches (34). Practice nurses and patients depend on each other to ultimately deliver and receive better care. Previous research showed that an increase in patients' perceptions of their self-management led to a more positive experience of chronic health care (35), which could ultimately lead to enhancing their lifestyle and so decrease cardiovascular risk factors (36). Our study did not confirm this hypothesized causal chain, though.

Better performance of health care professionals in supporting patients' behaviour change could influence the latter's active disease management in a positive way (37,38). A good relationship between patients and health care professionals seems to pay off regarding patients' experienced health care, especially when health care professionals support patients in lifestyle advice. But practice nurses need a reminder on regular basis to continue applying motivational interviewing (39).

In general, more research is needed; Future qualitative research targeted at both practice nurses and patients is needed to determine how health care counselling and self-management are related to each other and how this could influence cardiovascular risk factors.

Strengths and limitations

The Patient Assessment of Chronic Illness Care and Patient Activation Measure questionnaires are both validated questionnaires ensuring the validity of our measures. Patients did not only receive care from practice nurses, we asked the patients to think about all health care professionals who provided cardiovascular risk management care in the general practices; for that reason, it was not clear which health care professional patients had in mind when they filled out the composite questionnaire.

Our research was focused on patients at high cardiovascular risk, meaning that our findings cannot be generalized to patients at moderate or low cardiovascular risk.

Conclusion

This study showed that for patients with established cardiovascular diseases or at high cardiovascular risk their experiences of chronic illness care did not change after the implementation of our tailored programme aiming at nurses' counselling skills. Practice nurses' counselling skills were not associated with patient experiences of chronic illness care and active disease management. In this study, we

did not find a relationship between practice nurses' counselling skills and experiences of patients with established cardiovascular diseases or at high cardiovascular risk with chronic illness care and active disease management. Further research is needed to confirm the lack of relationship between the level of motivational interviewing and outcomes before attributing consequences.

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