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Nurses' perspectives on nurse-coordinated prevention programmes in secondary prevention of cardiovascular disease: a pilot survey

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Background: Secondary prevention of coronary artery disease (CAD) is increasingly provided by nurse-coordinated prevention programs (NCCP). Little is known about nurses' perspectives on these programs. *Aim:* To investigate nurses' perspectives/experiences in NCCPs in acute coronary syndrome patients. *Methods:* Thirteen nurses from NCCPs in 11 medical centers in the RESPONSE trial completed an online survey containing 45 items evaluating 3 outcome categories: (1) conducting NCCP visits; (2) effects of NCCP interventions on risk profiles and (3) process of care. *Results:* Nurses felt confident in counseling/motivating patients to reduce CAD risk. Interventions targeting LDL, blood pressure and medication adherence were reported as successful, corresponding with significant improvements of these risk factors. Improving weight, smoking and physical activity was reported as less effective. Screening for anxiety/depression was suggested as an improvement. *Conclusions:* Nurses acknowledge the importance and effectiveness of NCCPs, and correctly identify which components of the program are the most successful. Our study provides a basis for implementation and quality improvement for NCCPs.

Keywords: coronary artery disease; cardiovascular nursing; prevention and control; risk factors

Introduction

Nurse-coordinated prevention programmes (NCCPs) have been shown to be more effective than usual care in reducing cardiovascular risk (Allen & Dennison, 2010; Jørstad et al., 2013; Murchie, Campbell, Ritchie, Simpson, & Thain, 2003; Wood et al., 2008). Therefore, the European Society of Cardiology (ESC) 2012 European Guidelines on cardiovascular disease prevention in clinical practice recommend NCCPs be integrated into healthcare systems. However, the ESC also states that research is needed to determine the knowledge and skills needed for effective prevention programmes, and the education required to ensure competence (Perk et al., 2012). Little is known about the perspectives and experiences of nurses participating in such programmes, whereas their insights could help further implementation and improvement of new or established NCCPs. Therefore, we conducted an extensive survey to investigate nurses' perspectives and experiences in running an NCCP as part of the RESPONSE (Randomized Evaluation of Secondary Prevention by Outpatient Nurse Specialists) trial. The RESPONSE trial showed that an NCCP on

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top of usual care leads to a significant reduction in cardiovascular risk as compared with usual care alone. In short, nurses working at the NCPPs saw patients in the first 6 months after an ACS, focusing on healthy lifestyles, risk factors and medication adherence during up to four visits. The NCPP has previously been described in detail elsewhere (Jørstad et al., 2013, 2009).

Methods

We performed our study within the RESPONSE trial, a large (754 patients), randomized clinical trial designed to quantify the impact of a practice oriented, hospital-based NCPP integrated into the routine clinical care of patients discharged after an acute coronary syndrome (ACS) (Jørstad et al., 2013). In this trial, patients were either randomized to attending the NCPP in addition to usual care (intervention), or to usual care alone (control). In short, the NCPP consisted of four outpatient clinic visits (approximately 30 minutes per visit) during the first 6 months after the inclusion event (ACS). The NCPP followed a protocol based on national and international guidelines, focusing on (1) healthy lifestyles, (2) biometric risk factors and (3) medication adherence. The NCPP consisted of counselling, motivating, conducting physical measurements, referrals or consultations, and were aimed at the following guideline-based targets: cessation of smoking, sufficient regular exercise, healthy food choices, a body mass index of 25 kg/m² or less, control of diabetes, hypertension and dyslipidaemia, and medication adherence. Medication titration for hypertension and hyperlipidaemia was conducted according to instructions on the case report forms, based on the current national guidelines (Burgers, Simoons, Hoes, Stehouwer, & Stalman, 2007). A brief list of interventions per modifiable risk factor is shown in [Box 1](#).

Box 1. Summary of nurse interventions in RESPONSE trial – per modifiable risk factor

Risk factor	Intervention	Target	Measurement
Smoking	Counselling/support with use of educational material	Smoking cessation	Self-reported
Physical activity	Counselling/support with use of educational material	≥30 min 5×/week minimal intensity equivalent to brisk walk	Self-reported
Weight/fat distribution	Counselling/support with use of educational material	♂: BMI ≤ 25 kg/m ² or waist circumference <94 cm ♀: BMI ≤ 25 kg/m ² or waist circumference <80 cm	Height/weight Waist circumference
Hypertension	Active screening Counselling/support with use of educational material Referral to treating specialist if outside target range	SBP < 140 mmHg	Blood pressure Right/Left arm
Dyslipidaemia	Active screening Counselling/support with use of educational material Referral to treating specialist if outside target range	LDL ≤ 2.5 mmol/l HDL ≥ 1.0 mmol/l TG ≥ 2.0 mmol/l	Fasting venous blood sample: TC, LDL, HDL, TG

(Continued)

Box 1. Continued.

Risk factor	Intervention	Target	Measurement
Antithrombotic therapy	Interview about compliance	Maximum adherence to treatment	Self-reported
Medication adherence	Active screening Counselling/support with use of educational material Referral to treating specialist	Maximum adherence to treatment	Self-reported

BMI, body mass index; SBP, systolic blood pressure; LDL, low-density lipoprotein; HDL, high-density lipoprotein; TG, triglycerides; TC, total cholesterol.

Nurses were selected by the local investigators and received at least one day of central training in cardiovascular risk management and one day of local individual training in using the study protocol, in addition to up to three investigators meetings. All nurses were given a three-day course in motivational interviewing at the Department of Medical Psychology, Academic Medical Center – University of Amsterdam, Amsterdam, the Netherlands. To assess their ability to deliver the intervention, individual nurses were observed on up to three separate occasions by study personnel. Video recordings were made of the nurses' consultations (with patient permission) that were evaluated by a medical psychologist, who gave feedback to individual nurses.

In the current study, we specifically aimed to evaluate nurses' experiences and perspectives participating in a guideline-based prevention programme (as designed in the RESPONSE trial). The study protocol of RESPONSE was approved by the institutional committees on human research of all recruiting hospitals.

Study design

We conducted an extensive survey by administering an anonymous, online questionnaire to nurses participating in the NCPP that was part of the RESPONSE trial. The RESPONSE trial was approved by all participating hospitals' institutional review committees. The design and main outcomes of the RESPONSE trial have been published (Jørstad et al., 2009, 2013).

Data collection and outcomes

We collected data after completion of the inclusion of patients in the RESPONSE trial. All nurses participating in the NCPP as part of the RESPONSE trial were invited to complete a questionnaire containing 45 items capturing 3 main outcome categories: (1) conducting NCPP visits, (2) the effects of NCPP interventions on patients' risk factor profiles and (3) the process of care offered in NCPP visits. The main categories and subcategories of the survey are listed in Box 2. The 45 items of the survey consisted of closed questions in which a single answer option could be selected and open questions in which nurses' perspectives could be entered in a text box. For closed questions, respondents were provided the opportunity to comment on specific items in a separate text field. Several items of the survey consisted of statements that could be rated on a 5-point Likert scale to assess the degree of agreement. For statements regarding the degree of achieved success and sustained success in risk factor, modification responses were categorized as either achieved and sustained success, achieved but not sustained success or unsuccessful risk factor modification.

These subjective statements were then compared with the true degree of success in achieving risk factor targets as documented in the RESPONSE trial (Jørstad et al., 2013).

Box 2. Survey categories

Questions 1–7

Trial execution and user friendliness of case report forms

Number of patients seen, use and structure of case report forms.

Experiences with standardized procedures to adjust cholesterol and blood pressure.

Questions 8–21

Nurse perceived effects of NCPP interventions on patients' risk factor profile

Estimation of success in achieving target values for blood pressure, cholesterol, weight, diet/eating pattern, physical activity, overall risk profile and confidence in the sustainability of the achieved changes.

Questions 22–45

Process of care

General evaluation of executing RESPONSE clinic visits, strong and weak points, efficiency and effectiveness of the intervention. Willingness to work in NCPPs in the future.

Evaluation of consultations and correspondence with and availability of general practitioners and cardiologists. Did general practitioners, cardiologists listen to the ideas and advice of nurses and did they handle accordingly?

NCPP, nurse-coordinated prevention programme.

Data analysis of open questions and comments capturing nurses' perspectives on the beneficial effects of NCPP included comparison of responses across the sample. In the early stages of the analysis, members of the research team (H.T. and K.C.) read and re-read the responses carefully to generate an initial understanding of the data. The initial identification of components resulted in a coding frame, and was refined on the basis of the common themes in the responses. The coding frame was applied to all answers to open questions and nurses' comments, and relevant text was identified. This led to the identification of three common components: (1) an educational and awareness component, (2) a psychological component and (3) a monitoring and feedback component.

Demographic and educational background data for nurses were derived from nurse's personal resumes.

Statistical analysis

Nurses' age is presented as median (interquartile range), categorical data are presented as frequencies and/or percentages. Comparisons between groups were summarized as between-group difference (intervention group minus control group) in percentage of individuals on target for a specific risk factor; *p*-values were calculated using Fisher's exact tests. In statements graded by a Likert scale, a score of 1 or 2 is defined as "disagree/unsuccessful", 3 as "neutral" and 4 or 5 as "agree/successful" as appropriate.

Results

Thirteen of 15 nurses from 11 hospitals in The Netherlands completed the survey. In total, nurses had seen 366 patients in the intervention group of the RESPONSE trial; the number of patients seen by each individual nurse varied, from 7 to 155 patients (4 nurses conducted the intervention

for up to 11 patients, the remaining nurses 26 or more). Nurses contributing to the prevention programme were registered nurses with a minimum of a 4-year bachelor's degree and experience in the care of cardiac patients ($n = 15$ in 11 centres). Four nurses had previous experience with participation in prevention programmes: three nurses had previously participated in lipid-lowering programmes, while a single nurse had participated in a physician-coordinated prevention programme. Nurse characteristics are presented in [Table 1](#).

Conducting NCPP visits

There were no difficulties reported with conducting NCPP visits according to the instructions in the case report forms/study protocol. Respondents agreed with the selected guideline-based interventions and techniques used in the RESPONSE trial. Eight and 11 respondents indicated that they occasionally needed to deviate from the steps described in the protocol to regulate their patients' cholesterol and blood pressure levels, respectively. A single respondent indicated that it was necessary to deviate from the protocol on multiple occasions to regulate patients' cholesterol and blood pressure levels. Reasons quoted for deviating from the study protocol were patient preferences or patient circumstances not related to the study protocol. All deviations from the study protocol were carried out after consulting with the treating physician.

Nurses' perceived effects on patients' risk factor profiles

[Table 2](#) summarizes the nurses' perception of achieved success and nurses' estimated degree of sustained success in risk factor modification per risk factor. Respondents perceived the interventions for treatment to target of healthy food choices (9 of 13 respondents), LDL-cholesterol (7 of 13 respondents), systolic blood pressure (7 of 13 respondents) and medication adherence (9 of 13 respondents) to be the most successful. Moreover, the interventions for these risk factors were thought to have a sustained effect ([Table 2](#)). In contrast, respondents did not feel confident about counselling patients to reach targets for weight, smoking and physical activity. These perceptions were consistent with the observed improvement in on-target risk factor control in the patients attending the NCPP as compared with those in the control group. A significant improvement in on-target risk factors was seen in systolic blood pressure, LDL-cholesterol, self-reported healthy food choices (alcohol, fruit and vegetable consumption) and physical activity ([Table 2](#)). While medication adherence was excellent in both groups, ACE-inhibitors and diuretics were more frequently prescribed in patients attending the NCPP. The NCPP had no significant influence on smoking cessation or weight, as compared with the control group.

Table 1. Nurse characteristics.

Nurses ($n = 15$)	
Median age (interquartile range)	43 years (37–49)
Male gender	25%
Nurses' background/employment	
Nurse practitioner, n (%)	3 (20)
Coronary care unit nurse, n (%)	4 (27)
Nurse + additional experience/specialisation, n (%)	2 (13)
Registered nurse, n (%)	5 (33)
Research nurse, n (%)	1 (7)
Previous experience in prevention programmes, n (%)	4 (27)

Table 2. Perceived success in achieving patients' risk factor targets and perceived success in sustaining effects on patients' risk factors.

Risk factors	Perceived success in achieving patients' risk factor targets			Perceived success in sustaining effects on patients' risk factors			Observed success in on-target risk factors at 12-month follow-up ^a	
	(Very) successful, n (%)	Neutral, n (%)	(Very) unsuccessful (%)	(Very) successful, n (%)	Neutral, n (%)	(Very) unsuccessful, n (%)	Difference intervention – control	p-value
Systolic blood pressure	7 (54)	4 (31)	2 (15)	5(38)	7 (54)	1 (8)	+14%	<0.001
LDL-cholesterol	7 (54)	4 (31)	2 (15)	9(69)	4 (31)	0 (0)	+10%	0.007
Body mass index	6 (46)	3(23)	4 (31)	1(8)	12 (92)	0 (0)	-6%	0.09
Smoking	8 (62)	2 (15)	3 (23)	3(23)	10 (77)	0 (0)	-2%	0.72
Medication adherence	9 (69)	4 (31)	0 (0)	9(69)	4 (31)	0 (0)	AT +0%	0.99
							LLA -1%	0.64
							B-blocker -2%	0.53
							CCB -3%	0.35
							Diuretic +6%	0.04
							ACEI +11%	0.005
							AT2 +0%	0.92
Healthy food choices	9 (69)	3 (23)	1 (8)	8(62)	5 (38)	0 (0)		
Alcohol consumption							+2%	0.35
Fruit consumption							+9%	<0.001
Vegetable consumption							+10%	<0.001
Physical activity	7 (54)	5 (38)	1 (8)	3(23)	9 (69)	1 (8)	+14%	<0.001
Overall risk profile	10 (77)	2 (15)	1 (8)	5(38)	8 (62)	0 (0)	Not applicable	

^aReported differences between intervention and control groups as measured in the RESPONSE trial. The differences are reported as the absolute differences of the percentage of patients in the intervention group on-target minus the percentage of patients in the control group on-target at 12-month follow-up.

LDL-cholesterol, low-density lipoprotein-cholesterol; AT, antithrombotic agent; LLA, lipid-lowering agent; CCB, calcium channel blocker; ACEI, angiotensin-converting-enzyme inhibitor; AT2, angiotensin II receptor antagonist.

Nurses' perspectives on the process of care

Nurses' perspectives on the process of care are shown in **Box 3**. Respondents agreed with the statement that patients benefited from NCPP visits. In addition, given the opportunity, respondents were willing to continue working in a similar prevention programme on a daily basis. One respondent indicated that patients did not experience additional benefit from NCPP visits because of existing local prevention and rehabilitation programmes. This was the only respondent who was not willing to continue working in a similar prevention programme. Ten of 13 respondents agreed with the statement that the achieved results in cardiovascular risk factor modification were worth the time invested in NCPP visits.

Box 3. Evaluation of process of care

Beneficial effects of interventions (categorized in educational and awareness, psychological, and monitoring and feedback components) and suggestions for additional interventions and techniques

Educational component

Increasing knowledge of cardiovascular disease and risk factors

Increasing knowledge of lifestyle changes and what can be achieved with these changes

Awareness component

Raising awareness of health status

Raising awareness of what patients can do to improve their health status

Feedback on risk factor modification

Psychological component

Providing support

Reassuring patients by discussing their insecurities

Reassuring patients by providing answers to their questions

Providing extra attention

One-on-one setting

Building trust

Monitoring and feedback component

Frequent visits

Enabling immediate action to treat deviating health outcomes

Suggestions for additional interventions and techniques

Pre-screening of mental status, for example, anxiety and depression

Beneficial effects of the process of care in NCPPs

Free text responses on the beneficial components of the process of care were analysed and coded, resulting in the formulation of the following three components: (1) education and awareness component, (2) psychological component and (3) monitoring and feedback component. Two respondents named a single educational component, 11 respondents indicated that a combination of the listed components contributed to the beneficial effects. Most frequently reported beneficial effects had an educational and awareness component. Ten respondents indicated that educating patients on cardiovascular disease, risk factors and the importance of lifestyle modification would lead to a better understanding of their medical condition. In addition, this was perceived to lead to an increased awareness and to motivate patients to initiate and maintain lifestyle changes. Eight respondents identified beneficial effects from psychological components, such as the approachability of nurses, providing extra attention and support and trust-building. Five respondents suggested beneficial effects from monitoring and feedback. Monitoring of biometrics by multiple NCPP visits enabled nurses to provide patients with feedback on their health behaviours and to act swiftly in case of unfavourable changes.

Table 3. Collaboration with cardiologists and general practitioners.

	Cardiologist			General practitioner		
	(Fully) agree, <i>n</i> (%)	Neutral, <i>n</i> (%)	(Fully) disagree, <i>n</i> (%)	(Fully) agree, <i>n</i> (%)	Neutral, <i>n</i> (%)	(Fully) disagree, <i>n</i> (%)
Sufficiently available for consultation	11 (85)	2 (15)	0 (0)	4 (31)	5 (38)	4 (31)
Listened to my advice/ ideas	11 (85)	2 (15)	0 (0)	4 (31)	5 (38)	4 (31)
Acted on my advice/ideas	12 (92)	1 (8)	0 (0)	3 (23)	6 (46)	4 (31)
Positive experience collaborating with physician	12 (92)	1 (8)	0 (0)	3 (23)	6 (46)	4 (31)

As a major opportunity for improvement, nurses suggested that patients' mental states should be assessed. It was suggested to screen for anxiety and depression to enable more focused NCPP visits. In addition, respondents indicated that positive and sustained effects on health outcomes could potentially be attained by extending the clinic visits beyond the initial 6 months programme.

Collaboration with cardiologists and general practitioners in the process of care

Table 3 shows the evaluation of collaboration with cardiologists and general practitioners. Collaboration with cardiologists was rated positively by the majority of respondents on all four statements regarding availability (11 of 13 respondents), being open to suggestions (11 of 13 respondents), acting on suggestions (12 of 13 respondents) and overall collaboration (12 of 13 respondents). Less consensus was observed in the evaluation of collaboration with general practitioners. There was an almost equal distribution between the three response options: agree/fully agree, disagree/fully disagree and neutral for each of the four statements. Of note, four respondents elaborated on their response by stating that they never or rarely communicated with general practitioners.

Discussion

This is the first study to investigate nurses' perspectives on running NCPPs. We found that nurses participating in an NCPP acknowledge the importance and effectiveness of the programme, and are confident about their abilities to achieve drug-related treatment targets. Nurses viewed treatment-to-target of LDL-cholesterol, systolic blood pressure and medication adherence as the most successful. This was consistent with the observed impact on these risk factors as measured in the RESPONSE trial. Room for improvement was reported for weight reduction, smoking cessation and achieving adequate regular physical activity. Furthermore, room for improvement was reported for facilitating collaboration with general practitioners and for screening for anxiety and depression. The findings of our study provide a basis for the further development and evaluation of NCPPs.

The limited research available on nurses' perspectives on NCPPs is consistent with our finding that nurses support NCPP interventions, believe in the beneficial effects of NCPP interventions, and are willing to participate (Murchie, Campbell, Ritchie, & Thain, 2005). A previous study (Kirkevold, 1997) found that the therapeutic role of stroke care nurses could be classified as: interpretative (helping patients understand stroke), consoling (providing emotional support),

conserving (preventing complications, maintaining normal functions and meeting essential patient needs) and integrative (helping patients meet rehabilitation goals). Kirkevold's categories were confirmed and expanded by a second study (Rowat, Lawrence, Horsburgh, Legg, & Smith, 2009) emphasizing the importance of prevention and the role of systems and structures. Kirkevold's interpretive, consoling and conserving and integrative categories, respectively, correspond with educational and awareness component, the psychological component and the monitoring and feedback component found in our study.

The nurses' perceived effects on patients' risk factor profiles as described in the current paper reflect the results of the main RESPONSE study. Nurses' confidence in interventions for treatment to target of diet, LDL-cholesterol, systolic blood pressure and medication adherence corresponded with significantly improved results in these risk factors at 12-month follow-up. Conversely, interventions to reach targets for smoking and weight, which were perceived as the least successful, showed no significant improvements as compared to the control group at 12-month follow-up in the main study.

Based on these findings, we recommend implementing a quality improvement cycle for NCPPs. Further research should focus not only on obtaining information on nurses' perspectives on NCPP's, but also on the implementation of nurses' suggestions to improve NCPP interventions, and subsequently investigate the effectiveness, efficiency and feasibility of these suggestions.

Limitations

Some aspects of our study warrant consideration. First, our analysis was based on an online survey, with the inherent limitations of this type of study (Chizawsky, Estabrooks, & Sales, 2011). While the number of respondents was high (13 of 15 nurses), a non-response error cannot be excluded in this small study population. In general, all surveys are at risk for measurement errors, that is, all distortions in the assessments of interest, including systematic biases and random variance, both from the interviewers or survey designers, the questionnaires themselves (e.g. biased questions or ambiguous wording of questions), and respondents behaviours (misreporting, misunderstanding questions, etc.). Furthermore, our choice for a mixed survey with open and closed questions, with the possibility to add comments after each question is of influence on the reliability and validity of our data (Krosnick, 1999). Second, the number of survey respondents ($n = 13$) was limited, there was a wide variation in number of patients seen by each nurse, and there was diversity in the educational background and work experience of respondents. However, all respondents were certified cardiac nurses with a bachelors' degree, and were offered uniform training in motivational interviewing. In addition, all nurses were tested for adherence to protocols in delivering the intervention. In clinical practice, implementing new NCPPs in various healthcare settings will likely also lead to the recruitment of nurses with different educational backgrounds and work experience. Third, our study was performed as part of a multicentre randomized trial. Potentially, NCPPs performed outside of clinical trials could have a different impact on risk factor control. However, the RESPONSE trial specifically integrated the NCPP as part of regular care in the participating medical centres, and the intervention was based on practice guidelines.

Fourth, a qualitative study with structured interviews performed by an independent interviewer may have provided more in-depth information about nurses' perspectives on the beneficial aspects of the NCPP. However, after rigorous analysis of all nurses' responses, we were able to identify the components viewed as most beneficial. Qualitative studies are needed to verify and further explore these components. Finally, all nurses participating in both our study and the RESPONSE trial were all individuals willing to work at an NCPP as part of a randomized clinical trial; therefore, the responses may have been biased in favour of the NCPP. However, it should be

noted that the opinions expressed were not unanimously positive, and one nurse did not favour a continuation of the NCPP.

Conclusion

Nurses in the RESPONSE NCPP strongly acknowledge of the importance of NCPPs in secondary prevention. Nurses were motivated to work in an NCPP setting on a daily basis, and felt confident in counselling and motivating patients. Specifically, nurses felt able to successfully influence patients' cardiovascular risk profiles, in particular through modification of LDL-cholesterol levels, reaching blood pressure targets and improving medication adherence. This corresponded with an objective, significant improvement of these risk factors. In contrast, nurses were less confident regarding smoking cessation interventions, improving weight and exercise levels, screening for anxiety and depression, and collaboration with general practitioners. Nurses' perspectives described in this study provide a basis for implementation and for quality improvement of NCPPs.

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Author's contributions

H.T.J. and Y.K.C. made substantial contributions to conception and design, acquisition of data, and analysis and interpretation of data. They drafted and revised the manuscript critically.

W.J.M.S.o.R. made substantial contributions to conception and design, and analysis and interpretation of data. W.J.M. also revised the manuscript critically for important intellectual content.

J.D. made substantial contributions to conception and design, acquisition of data, and analysis and interpretation of data. J.D. also revised the manuscript critically for important intellectual content.

J.G.P.T. made substantial contributions to conception and design, and analysis and interpretation of data. J.G.P.T. also revised the manuscript critically for important intellectual content.

R.J.G.P. made substantial contributions to conception and design, and analysis and interpretation of data. R.J.G.P. also drafted and revised the manuscript critically.

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