

Practice nurses and the prevention of cardiovascular disease and stroke: the extent of evidence-based practice

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The extent to which practice nurses use the best available evidence to inform their activities in cardiovascular disease (CVD) and stroke prevention is not known. This paper reports on a study designed to explore the extent to which practice nurses use the available evidence in the prevention of CVD and stroke, and to explore the associations between research utilization and other individual and organizational factors. A national survey of practice nurses employed in 11 health authorities was conducted. Self-completion questionnaires were returned by 1187 practice nurses (response rate 60.4%). In relation to the risk factors smoking, hypertension, raised plasma cholesterol and lack of exercise, the majority of practice nurses reported interventions which are supported by research evidence. However, only 66% of the respondents recommended nicotine patches for smoking cessation, 42% referred patients for hypertension at levels above those recommended by national guidelines, and only 3.9% followed the latest recommended guidelines for exercise prescription. Statistically significant associations were found between total research utilization scores and a number of individual and organizational characteristics. The study findings are discussed together with their implications for practice and education.

Key words: cardiovascular disease; evidence-based practice; practice nurses; research utilization

Introduction

The role of the practice nurse has been the subject of a number of descriptive studies since the introduction of the revised GP contract of 1990 (Atkin *et al.*, 1993; Peter, 1993; Robinson and Robinson, 1993; Ross *et al.*, 1994; Hibble, 1995; Jeffreys *et al.*, 1995; Mackereth, 1995). All of them conclude that the role is poorly defined and remarkably varied. However, Atkin's 1992 census (Atkin *et al.*, 1993) indicated that the majority of practice nurses (91%) were engaged in health promotion, and Calnan and Williams' national survey of general practices indicated that most CVD risk assessment in clinics was performed by practice nurses

(Calnan and Williams, 1992). Three trials of nursing consultation in primary care were published in the *British Medical Journal* in 2000 (Kinnersley *et al.*, 2000; Shum *et al.*, 2000; Venning *et al.*, 2000). These trials found little difference in clinical outcomes between patients meeting certain criteria who consulted a general practitioner and patients who consulted a practice nurse/specialist nurse. These studies suggest an expanding role for the practice nurse within primary care.

The extent to which practice nurses are effective in CVD and stroke prevention has been the subject of at least three large randomized controlled trials (British Family Heart Study Group, 1994; Imperial Cancer Research Fund OXCHECK Study Group, 1995; Roderick *et al.*, 1997). These studies demonstrated that modest health gains (particularly in relation to blood pressure and cholesterol levels) can be achieved by the systematic provision of life-style assessment, counselling and follow-up by

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nurses in primary care settings, albeit at a relatively high cost per life year saved. Further studies are currently in progress (Stephoe *et al.*, 1999).

The extent to which practice nurses use the best available evidence to inform their activities in this area is not known. Furthermore, very little is known about the factors which support practice nurses in implementing the findings of research.

This study, which was funded by the NHS Research and Development Executive (Cardiovascular Disease and Stroke Programme), examined the extent to which practice nurses use the available research evidence in the prevention of CVD and stroke (McDonnell *et al.*, 1997a; Davies *et al.*, 1999). Factors which act as barriers to practice nurses using the evidence, or which facilitate evidence-based practice, were also explored. Further findings from Stage One of the study, a national survey of practice nurses, are reported here.

Method

A national survey of practice nurses employed in 11 health authorities was undertaken.

Sampling

A random sample of 30 family health service authorities (FHSAs) in England and Wales was selected. Attempts were made in early 1996 to conduct telephone interviews with the primary care facilitator (or equivalent) in each of these FHSAs, to inform the design of the questionnaire and discuss issues relating to access. A final random sample of 11 health authorities (by April 1996, district health authorities (DHAs) and FHSAs had merged to become new health authorities) was drawn from the cluster sample of 26 authorities for which it had been possible to contact the primary care facilitator.

Questionnaire

Four preventable risk factors for CVD and stroke were identified for study, namely smoking, hypertension, raised plasma cholesterol levels and lack of exercise. These risk factors were selected on the basis that they are potentially modifiable through the interventions of practice nurses. Self-completion questionnaires were mailed to each practice nurse on the lists obtained from the 11

health authorities ($n = 2097$). Two postal reminders were sent.

The questionnaire focused on practice nurses' activities in relation to the identification and monitoring of the four selected risk factors and the subsequent interventions that they made. The quality of the evidence to support different interventions varied enormously. Some interventions, such as the use of nicotine patches for smoking cessation, were supported by rigorous evidence from systematic reviews. However, other interventions were underpinned by evidence which was undeniably weaker and related to professionals other than practice nurses. In the absence of the more robust forms of evidence to support an intervention, a range of indicators for practice were identified on the basis of the best evidence available, and these were incorporated into the questionnaire. Full details of the literature review and the indicators identified are reported elsewhere (Crookes *et al.*, 1997; McDonnell *et al.*, 1997b). Responses to the questionnaire identified the extent to which the activities of practice nurses were supported by the research evidence available at the time. The questionnaire also collected information on individual characteristics and contextual information about the employing practice. This information allowed the exploration of potential associations between research utilization and other factors, such as reported educational preparation and organizational climate.

Results

Following two reminders, the survey of 2097 practice nurses in 11 health authorities yielded a response rate of 60.4% ($n = 1187$). In order to explore any possible response bias, a random sample of 100 nonresponders was selected, and up to three attempts were made to contact each nurse by telephone. In total, 20 of these nonresponders were found not to have met our original inclusion criteria, and 13 nonresponders could not be confirmed as being in post. A total of 25 nurses agreed to participate in a brief telephone interview and were asked three questions from the questionnaire. Their responses were comparable to those of responders.

Characteristics of respondents

The demographic characteristics of the respondents are shown in Table 1.

The majority of the respondents were employed on a part-time basis, with 70% employed for less than 30 hours per week ($n = 827$). Just under a quarter of respondents (24%, $n = 283$) were employed for less than 18 hours per week.

Characteristics of the employing practices

Half of the respondents described the locality of their practice as urban/town, with the remainder approximately equally divided between rural (17%), inner-city (18%) and mixed locations (15%) ($n = 1181$). In total, 43% of the respondents ($n = 508$) were employed in fundholding practices at the time of the survey, with 39% ($n = 453$) employed in GP training practices and 12.8% ($n = 151$) employed in single-handed practices.

Practice policies in relation to CVD and stroke prevention

In total, 52% of the respondents ($n = 597$) indicated that their practice had a policy of follow-up for patients with a history of CVD and/or stroke. When asked to give details, most respondents described systematic, planned or regular follow-up. Some commented that they were not involved in this follow-up, which was undertaken by GPs or health visitors.

In total, 67% of the respondents ($n = 774$) reported that their employing practice operated a screening policy for CVD and stroke risk. Their comments suggested that such policies ranged from opportunistic screening to screening all *new* patients, to screening *all* patients. Very few respondents (6.9%, $n = 79$) reported that they used any form of assessment tool to determine a patient's risk of cardiovascular disease. Those that were mentioned included the Dundee score and the Shaper score.

Role of practice nurses in CVD and stroke prevention

Responses to the questionnaire suggested that practice nurses are involved extensively in activities aimed at the prevention of CVD and stroke. When asked to estimate the proportion of the working week which they usually spend in activities aimed at the prevention of CVD and stroke, the vast majority (71%, $n = 815$) indicated that they spend a moderate amount of time on such activities. In total, 11% of respondents ($n = 132$) suggested that they spend a great deal of time in CVD and stroke prevention, with 17% ($n = 200$) suggesting that these activities take up very little of their time.

Respondents were also asked to indicate on a 10-cm visual analogue scale the extent to which they felt prepared to undertake health promotion in relation to CVD and stroke. Analysis of their responses suggested that the majority of practice nurses feel reasonably well prepared for this role (interquartile range 4.8–7.6, median 6.4, $n = 1139$).

Important gaps in the knowledge base of some practice nurses in relation to CVD and stroke prevention were found. For example, 39% ($n = 459$) were unable to identify all four major risk factors for CVD and stroke.

More than a quarter of the respondents (25.8%, $n = 307$) indicated that they did not have easy

Table 1 Demographic characteristics of respondents

	<i>n</i>	%
Age range (years)		
24–34	212	(18.2)
35–44	437	(37.5)
45–54	395	(33.9)
55–64	117	(10)
65–70	5	(0.4)
Total	1166	
Ethnicity		
White	1122	(95.5)
Indian	15	(1.3)
Black-Caribbean	14	(1.2)
Chinese	6	(0.5)
Pakistani	2	(0.2)
Black-African	1	(0.1)
Other	15	(1.3)
Total	1175	
Clinical grade		
D	7	(0.6)
E	41	(3.5)
F	366	(31.7)
G	679	(58.7)
H	62	(5.4)
I	1	(0.1)
Total	1156	

access to a nursing or medical library. Some respondents indicated that they incurred charges as non-health-authority employees. Practical difficulties such as distance, opening hours and problems with parking were also highlighted.

Extent of application of research-based knowledge

A scoring system for research utilization was developed in relation to the interventions made by practice nurses, and this was applied to the survey responses. Respondents were assessed in relation to 23 interventions based on sound research evidence. They were asked to indicate whether they usually made each intervention in consultations with patients who meet specified criteria. These scores were then added to give a score for research utilization in relation to each of the main risk factors, and an overall research utilization score (range 0–23). These scores are arguably a crude indicator of research utilization, since it was not possible to determine all aspects of the scale's validity and reliability within the context of the research. Therefore scores were assumed to have only ordinal properties.

The total research utilization scores for the respondents are shown in Figure 1.

The median scores for research utilization by area of activity are shown in Table 2.

In relation to the risk factors, namely smoking, hypertension, raised plasma cholesterol levels and lack of exercise, the majority of the practice nurses reported interventions that were supported by research evidence. However, wide variation in practice was reported in relation to the following key areas.

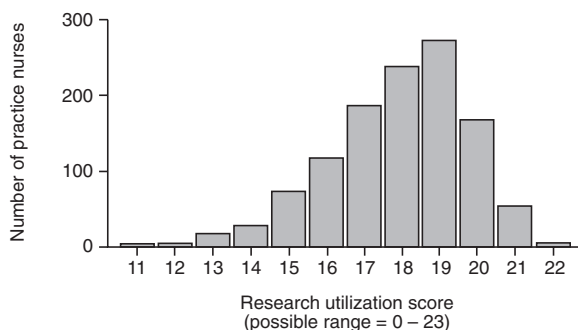


Figure 1 Practice nurses' total scores for research utilization ($n = 1166$).

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Table 2 Median scores obtained for research utilization by area of activity

Area of activity (minimum to maximum possible score)	Median score (IQR)	n
Smoking (0–7)	5 (5–6)	1179
Hypertension (0–8)	7 (7–8)	1179
Cholesterol level (0–5)	5 (4–5)	1178
Exercise (0–2)	1 (1–1)	1179
Risk assessment (0–1)	0 (0–0)	1184
Total (0–23)	18 (17–19)	1166 ^a

^aThis figure is less than that shown for each separate activity, due to missing data.

- In total, 33% of respondents ($n = 361$) did not recommend nicotine replacements for smoking cessation.
- The mean (SD) level of blood pressure (sustained over a 3-month period) at which respondents reported they would refer a patient aged 65 years to the GP was systolic 164.9 mmHg (11.72), diastolic 95.2 mmHg (5.17). In total, 42% of respondents ($n = 488$) reported making referrals above 160/90–100 mmHg – the level at which the British Hypertension Society Guidelines recommend the commencement of pharmacological treatment (Sever *et al.*, 1993).
- The proportion of respondents who reported using exercise prescriptions that conformed to either the Health Education Authority recommendations detailed in the *Better Living, Better Life* manual (Department of Health, 1993) or the more recent recommendations detailed in the Fit for Life campaign (Killoran *et al.*, 1995) was 2.3% ($n = 24$) and 3.9% ($n = 40$), respectively.

The proportion of respondents who reported that their activities in relation to CVD and stroke prevention were guided by a written protocol or guidelines varied widely. In each case the proportion who reported any involvement in the development of the guidelines used was much lower.

The extent to which the research utilization

Table 3 Associations between individual and organizational factors and total research utilization score

Variable	<i>n</i>	<i>P</i> -value
Undertaken CVD study day in previous 2 years	1127	0.006 ^a
Health promotion banding	1101	0.013 ^b
Whether practice follows up patients with CVD	1003	<0.0001 ^b
Whether practice has a screening policy for CVD	1060	0.002 ^b
Proportion of practice nurse time spent on CVD and stroke prevention	1147	<0.0001 ^b

^aChi-square test.

^bKruskal–Wallis test.

score for each practice nurse was associated with a range of factors was explored using appropriate statistical tests. Statistically significant associations were found between total research utilization scores and a number of *individual* and *organizational* characteristics, although where statistically significant correlations were found these were weak for individual variables. These associations are summarized in Tables 3 and 4.

Although there was a significant association between clinical grade and research utilization score, there was no association between possession

Table 4 Associations between individual and organizational factors and total research utilization score (correlations)

Variable	<i>n</i>	<i>r</i>	<i>P</i> -value
Clinical grade (D–I)	1135	0.1110	<0.0001 ^a
Time in post (months)	1160	0.1224	<0.0001 ^b
Time in general practice (months)	1161	0.1224	<0.0001 ^b
Preparedness for health promotion (10-cm visual analogue scale)	1120	0.1969	<0.0001 ^b
Number of areas in which training needs were identified	1149	–0.2307	<0.0001 ^a
Number of journals read regularly	1048	0.1158	<0.0001 ^b

^aKendall’s tau.

^bSpearman’s rho.

of additional post-basic nursing qualifications and research utilization scores. Similarly, although there was a significant association between having undertaken a study day on CVD and stroke prevention within the previous 2 years and research utilization score, there was no association with attendance at study days on research.

Statistically significant associations were also found between research utilization scores for smoking, hypertension and exercise and the use of protocols to guide practice (see Table 5).

In an attempt to assess the interrelationships between variables that contribute to the total score, regression analyses were performed. Forward step-wise regression identified four statistically significant variables ($P \leq 0.01$) (number of journals read, health promotion banding of the practice, proportion of the working week spent on activities aimed at the prevention of CVD, and number of health promotion roles). However, the predictive power of the resultant regression model was poor (11%), and these variables appear to explain very little of the total variation. Closer examination of the model reveals that these variables, although statistically significant, contribute little to the equation, which is itself dominated by the constant term. It was considered that explaining further variation in the data would be complex, and that in the absence of additional variables of significance, further exploration would not yield meaningful results.

Discussion

Preparation for health promotion

Associations between the extent of evidence-based practice and factors such as the level of

Table 5 Associations between use of protocols and research utilization subscales

Research utilization subscale	<i>n</i>	<i>P</i> -value
Smoking	1166	<0.0001 ^a
Hypertension	1165	0.001 ^a
Cholesterol level	1132	NS ^b
Exercise	1154	0.011 ^a

^aChi-square test.

^bNot significant.

preparation for health promotion (as perceived by the nurses themselves) and reported training needs, although weak, suggest that continuing professional education for practice nurses may be an important factor in the promotion of research-based practice. As a consequence of the rapid development of the practice nurse role within a short period of time, relevant education and training are crucial, yet in many areas there are no systematic strategies for identifying the educational needs of practice nurses. In addition, the majority of practice nurses work part-time, and therefore training costs may be disproportionately high compared to those for a workforce of full-time staff. Without increases in budgets for staff training within general practice, the costs of developing a solid knowledge base may be prohibitive.

The association between research utilization scores and attendance at study days on CVD and stroke prevention contrasts with the lack of any evidence of a link between evidence-based practice and possession of additional post-basic nursing qualifications, or attendance at study days on research. This suggests that educational input which is focused on the prevention and management of specific conditions may be effective in altering practice, rather than more general preparation.

The association between the proportion of time spent in activities relating to CVD and stroke prevention and the extent of evidence-based practice in this field may provide an argument for practice nurses to specialize. However, this needs to be considered in the light of the survey finding that 25% of practice nurses work alone within a practice.

Organizational factors

The findings of the survey suggest that organizational factors such as systematic approaches to screening may be important in supporting research-based practice. More widespread availability and use of computerized patient information systems are likely to encourage such approaches (Brown *et al.*, 1999).

This study found wide variation in the use and availability of protocols. Practice nurses were most likely to have access to protocols with regard to the identification and management of hypertension (76%). In contrast, a minority of respondents (22%) used protocols when assessing and advising about exercise.

The study findings suggest an association between the use of a protocol and evidence-based practice in relation to smoking, hypertension and exercise. However, the findings do not reveal what it is about protocols that may affect practice change.

These findings concur with the body of evidence in relation to nurses' use of research, which suggests that organizational climate is a strong factor in determining whether or not practice is research based (Funk *et al.*, 1991; Lacey 1994).

Accessibility of research

The association between the number of journals which the practice nurse reads regularly and scores for research utilization is important, given the difficulties which many nurses have in accessing library facilities. However, facilitating library access is unlikely to alleviate all of the difficulties which practice nurses have in accessing up-to-date and relevant information. Many respondents cited problems of distance and lack of time for visiting libraries, and there is a need to consider alternative approaches for making such information available in the workplace. This is particularly important given that many practice nurses work part-time.

Limitations of the study

The response rate of 60% was disappointing when compared with previous surveys of practice nurses (Calnan and Williams, 1992; Atkin *et al.*, 1993). This is likely to be in part a consequence of inaccuracies in practice nurse lists, but it may also reflect the increasing volume of research in primary care. None the less, the survey produced detailed information from more than 1000 practice nurses.

The survey relied on self-report, and in the absence of observational data we cannot be sure that our findings accurately reflect the interventions made by practice nurses. It is likely that responses overestimate the extent of evidence-based practice, due to the 'socially desirable response' factor. The limitations of the research utilization score have already been discussed.

Recommendations

The following recommendations for promoting evidence-based primary care by practice nurses in

the prevention of CVD and stroke are based directly on the research findings presented within this paper. Key recommendations are supplemented with further recommendations, based on evidence presented within the study, for moving towards their achievement.

Recommendations for practice

- 1) *The development of clinical guidelines and protocols should be encouraged within general practice settings.*
 - Guidelines on the management of hypertension should include explicit guidance on the levels of diastolic and systolic blood pressure at which practice nurses should refer individual patients for medical assessment.
 - Guidelines for exercise should include explicit guidance on exercise prescriptions for individual patients.
 - Guidelines for smoking cessation should include specific recommendations on the use of nicotine replacement therapy.
- 2) *General practices should be encouraged to establish systematic approaches to the screening of their practice populations for CVD and stroke risk.*
 - Utilization and development of existing information systems should be encouraged in order to facilitate systematic screening.
- 3) *General practices should be encouraged to establish systematic approaches to the follow-up of patients with a previous history of CVD or stroke.*
 - Utilization and development of existing information systems should be encouraged in order to facilitate systematic identification and follow-up of patients with existing CVD or stroke.

Recommendations for education

- 5) *Practice nurses should be involved in identifying their own educational needs.*
- 6) *A systematic approach to the identification of the educational needs of practice nurses should be adopted.*
 - Primary care facilitators (or their equivalent) should be involved in developing and implementing strategies for identifying appropriate educational opportunities for practice nurses.
- 7) *Focused educational interventions around*

the prevention of CVD and stroke should be promoted.

- Educational programmes should address the knowledge base of practice nurses on risk factors for CVD and stroke.
 - Educational programmes should address the knowledge base of practice nurses on the beneficial effects of risk factor modification for primary and secondary prevention of CVD and stroke.
 - Educational programmes should include up-to-date information and recommendations about the use of risk assessment tools such as the Dundee Risk Disc or Shaper Score.
 - Educational programmes should include up-to-date information and specific recommendations with regard to interventions such as:
 - exercise prescriptions for individual patients;
 - the levels of diastolic and systolic blood pressure at which patients should be referred to the GP;
 - the use of nicotine replacement therapy
- 8) *Practice nurses should be given full access to health services library facilities.*
 - Practice nurses should be advised of the accessibility of libraries within health authority health promotion departments.

Conclusion

The rapid pace of change in the organization of primary care means that the context of CVD and stroke prevention for practice nurses has already altered since this study was conducted. None the less, this research makes an important contribution to our understanding of the role of practice nurses in the prevention of CVD and stroke, and the multifaceted influences on nursing practice within a primary care setting. The findings also highlight the complexities of interpreting the influence of single factors which are likely to interact to contribute to a climate which supports evidence-based practice within primary care settings.

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