Cardiovascular risk reduction in men: a nine-year cohort study

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SUMMARY

Cardiovascular risk scores improved in a cohort of 500 males aged 20 to 50 years over a nine-year period. The major component of the risk improvement was a reduction in smoking habits. A disappointing finding is the increased number of obese subjects and those not participating in regular exercise. Altering these trends must now be a priority for all health professionals. The effects of community-based and primary care health promotion are likely to be synergistic with those of national mass media campaigns.

Keywords: *cardiovascular risk factors; smoking; obesity; exercise.*

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Introduction

DEATHS from ischaemic heart disease in Scotland have fallen by 25% over the past 10 years but are still 15% higher than the UK average.[1] The high rates of coronary heart disease (CHD) in Scotland are associated with poor cardiovascular risk profiles and unhealthy lifestyles in men and women of all ages.[2] There is evidence that lifestyle modification and risk factor reduction can retard the development of CHD. General practitioners (GPs) are ideally placed for cardiovascular health promotion, although many cast doubt on the value of such programmes.

General practitioners in a training practice in the West Highland town of Fort William conducted a survey during 1988–1990 into cardiovascular health of male patients on their register aged between 20 and 50 years.[3] Since 1990, the practice has adopted an enthusiastic approach to cardiovascular health promotion and there also exists a small community health awareness programme, the 'Lochaber Health For All' project, initiated in 1992. The purpose of this second study was to determine whether cardiovascular risk had altered in this cohort after a nine-year interval.

Method

The study was undertaken in a four-partner group training practice in Fort William between 1997 and 1999. The list size is 4750 patients with a mixed urban/rural population. The target group was 726 men who had participated in the original study.[3] One of the authors (DB) conducted the interviews and was the original investigator. All the patients were invited by telephone to attend the surgery.

The questionnaire for this study was expanded from the original, recording: personal details; place of birth; years living in Lochaber; employment; social class; home tenure; education; family history of cardiovascular disease; smoking status; change in smoking status noting source of help, sources of healthcare information; alcohol intake; diet change detail; GP attendances during previous year; the checking of blood pressure (BP), cholesterol, and ECG during the past five years; personal history of vascular disease or event and its details; personal view of coronary risk profile; current medication; and details of exercise. Blood pressure, total cholesterol, height, weight, spirometry, urinalysis, and resting ECG were all recorded.

All of the patients were assigned cardiovascular risk scores, using the Nordic Risk Assessment study score (NORA)[4] and the scoring system used in the original study (Anggard *et al*),[5] which is no longer in favour. The two risk scores were highly correlated ($r = 0.80$). All patients had their risk scores explained to them by the interviewer and appropriate lifestyle advice given. Subsequently, each patient received a letter from the interviewer reinforcing the advice.

HOW THIS FITS IN

What do we know?

Individually tailored lifestyle intervention in a primary care setting can reduce cardiovascular risk.

What does this paper add?

Treating obesity and encouraging exercise are the next great challenges for health professionals. A significant proportion of men with elevated cardiovascular risk report that they are unaware of that risk. Men are now more aware of the health hazards of smoking. The influence of family, the media, and the community in changing lifestyles should not be underestimated when compared with the influence of health professionals.

Data handling and statistical analysis

Total risk scores from the two studies and individual risks on continuous scales were compared using paired *t*-tests. Wilcoxon tests were used to compare risks measured as ordered categories. McNemar's tests were used for those risk factors classified as elevated or not. The Stuart–Maxwell test was used for the paired comparison of risk score as low, medium, and elevated. The Highland Health Board Ethics Committee approved the study.

Results

The original study involved 726 male patients. Of these, 154 had left the area and no attempt was made to review them. In the interval between the two studies, eight subjects who had participated in the original study had died, two of cardiovascular causes. Five hundred patients attended out of a possible 564, giving an 89% response rate.

A comparison of variables recorded in the two study periods is shown in Table 1. Percentages of subjects with elevated measurements are presented with confidence intervals for the percentage changes between the studies. There was a significant reduction in the number smoking, with 50 quitting between the studies and only 16 new or restarting smokers. There was also a significant fall in subjects with diastolic hypertension. The percentage of obese patients had substantially increased. There was a significant increase in the percentage taking no exercise, from 16% to 22%. Of 96 subjects who had an elevated Anggard risk score in the original study, 53 (55%) had moved into the medium/low risk categories. Three per cent had had vascular events between the two studies.

In Table 2, the various components of the more conventional NORA risk scores are shown together with percentage changes per year seen in this study, compared with those of the Glasgow MONICA study.[2] A paired *t*-test on the NORA risk scores showed a significant drop of 0.10 (95% confidence interval = 0.04 to 0.15, $P = 0.001$) from 6.69 to 6.59. This corresponds to a drop in NORA risk of –0.17% per year. There were small but statistically significant reductions in mean cholesterol and systolic BP, but there was a significant increase in mean body mass index (BMI). There is also shown a significant reduction in mean diastolic BP; a factor which contributes to the Anggard risk score, but not the NORA risk score.

Cardiovascular risk was correctly estimated as elevated, medium or low by 41% of the subjects. However, nearly one-third of the subjects were unable to categorise their risk. The family was reported as the biggest single source of healthcare information, followed by the media (television and newspapers). The GP was reported as only the fourth most common source of healthcare information.

Discussion

The opportunity of a cohort study in primary care over a nine-year period is unusual but gives us an insight into changes in cardiovascular risk and potential reasons for change. The fact that a community health awareness programme was running concurrently gives an added dimension to the study.

We have demonstrated that the profile of cardiovascular risk has improved, as demonstrated by the reduction in Anggard and NORA risk scores. This can be mainly attributed to a reduction in the proportion smoking and small but statistically significant reductions in mean cholesterol and diastolic blood pressure. The drop of 0.1 in the NORA score in nine years is more modest, but of the same order of magnitude as the drop of 0.14 in five years found in Glasgow.[4] Although there was a small reduction in mean systolic blood pressure, the actual percentage of those subjects with systolic measurements of 160 mmHg or more showed a small increase. This is perhaps not surprising, in view of increasing age and obesity within the cohort over almost a decade. Among those with a previous elevated risk score, more than half have improved. However, there has been an overall

*Table 1. Comparison of variables recorded in cohort (*n *= 500) in the study periods 1988–1990 and 1997–1999. (Anggard cardiovascular risk scores).*

	1988–1990		1997–1999		Mean difference (95% CI)	Significance (*P*-value)
	n	%	*n*	%		
Smokers	206	41	172	34	–7.6 (–10.9 to –4.3)	<0.001
Systolic BP ≥160 mmHg	18	4	33	7	3.0 (0.7 to 5.3)	0.017
Diastolic BP ≥95 mmHg	65	13	43	9	–4.4 (–7.7 to –1.1)	0.013
BMI ≥30	49	10	97	19	9.6 (6.7 to 12.5)	<0.001
Cholesterol >5.2 mmol/l	272	54	266	53	–1.2 (–5.6 to 3.2)	0.65
Alcohol intake >21 unit/week	107	21	97	19	–2.0 (–5.9 to 1.8)	0.36
Cardiovascular risk score <6 (low)	212	42	235	47		
Cardiovascular risk score 6–9 (medium)	192	38	199	40		Stuart–Maxwell $P = 0.002$
Cardiovascular risk score ≥10 (elevated)	96	19	66	13		

Table 2. Changes in risk factors between 1988–1990, and 1997–1999, displayed as individual components of the NORA risk score and diastolic BP. Results are displayed as absolute change (mean and 95% CI) and as annual percentage change from 1988 baseline.

	Fort William (Lochaber)				MONICA Glasgow	
	Mean (1988)	Mean (1997)	Mean difference (95% CI)	Change per year	Mean (1995)	Change per year
Anggard risk score	6.5	6.1	–0.4 (–0.6 to –0.1)	–0.04	–	–
NORA risk score (MONICA)	6.69	6.59	–0.10 (–0.15 to –0.04)	–0.01	7.3	–
Smoking (%)	41	34	–7.6 (–10.9 to –4.3)	–1.90	41	–1.17
Systolic BP (mmHg)	130	129	–1.5 (–2.8 to –0.2)	–0.17	133	–0.70
Total cholesterol (mmol/l)	5.45	5.28	–0.17 (–0.26 to –0.09)	–0.019	6.1	–0.011
BMI kg/m^2	25.4	26.8	1.4 (1.2 to 1.6)	+0.16	26.8	+0.12
Diastolic BP (mmHg)	80	78	–1.8 (–2.9 to –0.7)	–0.04	–	–

increase in BMI and a fall in the proportion taking exercise.

The excellent response rate highlights the willingness of our subjects to participate in a local practice-initiated study. A similar response rate may be difficult to achieve in an urban setting.

The change in smoking behaviour is a key factor in the overall reduction, in those subjects with an elevated cardiovascular risk score. When compared with men of similar age in the 1998 Scottish Health Survey,[6] the cohort at a similar point had 6% fewer smokers (34% versus 40%). The percentage change per year is higher in Lochaber (–1.9%) than in the Glasgow MONICA study (–1.2%).

As in the original study, self-reporting for smoking status was relied upon, with its recognised limitations and no biochemical validation. The subjects were aware that their medical records were available for inspection to verify the responses. We believe that the majority of subjects answered truthfully as it is difficult to conceal smoking habits in a small community.

Hypertension is an important risk factor for CHD. It is encouraging to see a significant reduction in the diastolic blood pressure of our subjects. Overall, the mean systolic blood pressure has shown a small reduction, but the percentage of subjects with a systolic BP of 160 mmHg or more has increased by 3% over the study period. This compares very favourably with the age-adjusted Scottish average.[6] The improved mean blood pressure results cannot be attributed entirely to an increase in the proportion of subjects on antihypertensive medication, which was only 5%.

The small but significant reduction in mean total cholesterol of the cohort is likely to be owing to improved diet, as only 2.6% were taking prescribed lipid-lowering therapy.

A disappointing finding in this latest study of the original cohort was a significant increase in the percentage taking no exercise. It is similar to the overall Scottish figure.[6] Lack of exercise may also be a major factor in the alarming tendency to obesity within the cohort in the nine-year follow up, despite the improvement in local leisure facilities.

In the nine years of follow-up there has been a significant reduction of the number in the elevated risk group, but among them no significant improvement in their self-awareness of risk. Evidence continues to emerge of the importance of more sensitive matching of interventions to individuals and of the need to take 'readiness to change' into account.

We have therefore been able to demonstrate a change for the better in overall cardiovascular risk profiles but the determinants of this change are multifactorial. Over half of the cohort reported 'family' as being the most important source of health information. Television and newspapers were the next most common source, followed by the GP. The influence of the media in changing lifestyles should not be underestimated.

In conclusion, health education messages are getting through to many men in this age group although there are still a minority who remain unwilling to acknowledge their high risk of cardiovascular disease. Without a control population it is hard to assess the contribution of opportunistic health promotion by GPs targeting the elevated risk subjects. We believe the value of a concomitant community health awareness programme is likely to be synergistic. The high response rate in this study clearly indicates some willingness for involvement in health issues at a local level. Further success in lowering male cardiovascular risk may be possible if obesity and exercise are given higher priority in future health education campaigns.

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