

# Comparison of risk factors for coronary heart disease among attenders and non-attenders at a screening programme

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**SUMMARY.** *Few objective comparative data are available from primary care on the prevalence of risk factors for coronary heart disease among those who do and do not attend screening programmes. This study set out to examine differences in risk factors between attenders and non-attenders at such a coronary heart disease screening programme. The 2402 patients in the age range 25–55 years who attended the original health check were examined by a practice nurse, and a questionnaire about health issues was completed. A one in 10 systematic sample of the 1398 patients who did not attend the original screening programme were approached and after considerable effort 98 were persuaded to attend for the same examination and questionnaire analysis. The 98 non-attenders were found to be older and to have a higher mean body mass index, mean cholesterol level, mean systolic blood pressure and mean diastolic blood pressure than the 2402 attenders. The non-attenders were more likely to be in the lower social classes, to have a personal or family history of coronary heart disease and to smoke than attenders. They were less likely to be highly educated and to have an unacceptably high level of alcohol consumption.*

*The results of this study suggest that clinics that invite patients to attend are likely to attract those with lower risk factor profiles. For coronary heart disease prevention to be effective there is a need to cater for patients opportunistically.*

**Keywords:** *coronary risk factors; GP clinics; health promotion; screening; coronary disease.*

## Introduction

HEALTH promotion clinics are now an integral part of most general practices, although it has been suggested that the incentive to maximize the number of clinics is irrespective of their appropriateness or effectiveness.<sup>1</sup> There is increasing evidence to suggest that even if effective, health promotion clinics will benefit populations at lower risk,<sup>2,3</sup> a further example of the inverse care law.<sup>4</sup> Most studies have compared data from the notes of patients who did not attend a health check with data obtained by measurement of those who did attend.<sup>3,5,6</sup>

Many health promotion clinics, for example well man and well person clinics, hypertension and smoking clinics and healthy lifestyle clinics, focus on issues directly related to coronary heart

disease. Although there is controversy,<sup>7</sup> it is generally accepted that treatment of alterable risk factors can diminish morbidity and mortality from coronary heart disease. Such risk factors include smoking, hypertension, hyperlipidaemia, diabetes, obesity, alcohol and lack of exercise.<sup>8</sup> Although it has been shown that patients most in need are those least likely to attend health checks in general,<sup>9</sup> in terms of coronary heart disease risk factors, little is known about the objective differences in alterable risk factors between attenders and non-attenders at the screening programmes organized in general practice.

This study was a sequel to a coronary heart disease risk factor identification programme organized in 1987.<sup>10</sup> It set out to measure differences in coronary heart disease risk factors between those who accepted an invitation to attend a screening programme and a sample of those who, for whatever reason, did not accept. A further aim was to determine the reasons why people did not accept the invitation to attend. The effort involved in trying to determine the coronary heart disease risk factor profile of the non-attenders is also described.

## Method

The study was carried out in a six partner practice with 10 000 patients in West Glamorgan, Wales. The area covered by the practice is predominantly urban.

Of the 3800 practice patients in the age range 25–55 years, 2402 (63.2%) accepted the invitation to attend a coronary heart disease risk factor screening programme in 1987 (the attenders), and despite repeated invitations, 1398 (36.8%) did not accept (the non-attenders). In 1988 a random selection of non-attenders was obtained using systematic sampling of every 10th name from an alphabetic list of men and women non-attenders, aiming at a group of 140 patients. All the non-attenders were sent another invitation to attend, offering them another chance to accept a 'medical MOT' with particular reference being made to 'heart disease'. They were told they could make an appointment to see the screening nurse on any morning or afternoon. After three weeks any non-respondents were sent another letter with a specific appointment time, stating that if this was inconvenient alternative times could be arranged by contacting the surgery. Any patients who had still not attended after a further three weeks were contacted by telephone by the nurse and if necessary visited at home by the nurse and offered an appointment for a health check.

Patients who attended were seen and examined by the practice nurse in the same way as the attenders in 1987.<sup>10</sup> Blood pressure was measured using a Hawksley random zero sphygmomanometer and the body mass index was determined (weight in kilograms divided by the height in metres squared). The total plasma cholesterol level was measured using a Reflotron (Boehringer Mannheim) on non-fasting finger-prick blood samples. Quality control measurements were analysed at the biochemistry department, Singleton Hospital, Swansea. A questionnaire, completed by the nurse, inquired about health related issues such as smoking and alcohol consumption. Unacceptable alcohol consumption was taken as greater than 14 units per week for women and greater than 21 units per week for men. A family history of coro-

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nary heart disease was recorded when the patients reported that any first degree relative had suffered or died from heart attack, angina, stroke, diabetes or high blood pressure under the age of 55 years. Whether or not the patient had a personal history of coronary heart disease, the patient's occupation and educational level were also recorded. Possible reasons for not accepting the original invitation to attend for screening were listed on the questionnaire for non-attenders and the patients asked to indicate which were appropriate.

Patients with identified risk factors were either given appropriate dietary or lifestyle advice by the nurse or referred, when appropriate, to one of the practice doctors for further investigation or treatment.

Completed questionnaires were returned to the general practice research unit at the surgery for analysis using the *SPSS.PC* software package. Social class was calculated from Office of Population Censuses and Survey data in relation to occupation. Comparisons were made between the attenders and non-attenders by calculating appropriate chi square values, 95% confidence intervals (CIs), or by using the student's *t*-test.

## Results

Of 140 non-attenders at the original screening programme, 98 (70.0%) were eventually persuaded to attend for a health check. Of these 98 patients, 10 responded to the first letter, eight to the second, 34 to a telephone call, 35 to repeated telephone calls and 11 attended after a home visit by a nurse. Forty two patients did not wish to receive a health check even after a home visit.

Complete sets of data were not obtained for all the attenders or non-attenders. There were slightly more women than men in both groups (53.9% of the 2402 attenders were women as were 51.0% of the 98 non-attenders); there was no significant difference in the sex distribution between the two groups. The non-attenders had a mean age of 42.6 years compared with 39.4 years for the attenders ( $P < 0.001$ ; 95% CI of difference 1.50 to 4.88 years). A higher percentage of non-attenders were in social classes 4 and 5 than of attenders (31.0% versus 22.0%) and conversely a higher percentage of attenders were in social classes 1-3M (78.0% versus 68.0%). Attenders were more likely to be better educated than non-attenders — 40.9% had continued beyond secondary education compared with 36.4% of non-attenders (difference not statistically significant).

A personal history of coronary heart disease was significantly more common in the non-attenders than the attenders (12.6% versus 5.7%,  $P < 0.05$ ) but there was no significant difference in the percentage reporting a family history of coronary heart disease (37.5% of non-attenders versus 36.2% of attenders). Unacceptable alcohol consumption was more common among the attenders (12.8%) than the non-attenders (10.6%) although the difference was not statistically significant. The mean body mass index of the non-attenders was 26.5 and of the attenders 24.8 ( $P < 0.01$ ; 95% CI 0.84 to 2.58). The mean cholesterol level was also higher among the non-attenders than the attenders (5.9 mmol l<sup>-1</sup> versus 5.4 mmol l<sup>-1</sup>,  $P < 0.01$ ; 95% CI 0.26 to 0.74). The mean systolic and diastolic blood pressures were higher among non-attenders than attenders — systolic 129.5 mmHg versus 116.9 mmHg, respectively ( $P < 0.001$ ; 95% CI 9.57 to 15.86) and diastolic 79.6 mmHg versus 75.8 mmHg, respectively ( $P < 0.01$ ; 95% CI 1.63 to 5.82). More non-attenders smoked (32.7%) than attenders (31.0%) but the difference was not significant.

The distribution of mean cholesterol level by age is shown in Table 1. Both attenders and non-attenders showed an increase in mean level with age, but the mean level of the non-attenders was higher than that of the attenders in each age group. Mean chole-

sterol levels were found to be higher in the non-attenders than the attenders among both women and men — 6.2 mmol l<sup>-1</sup> among 50 women non-attenders and 5.3 mmol l<sup>-1</sup> in 1294 women attenders ( $P < 0.001$ ); 5.6 mmol l<sup>-1</sup> among 48 men non-attenders and 5.5 mmol l<sup>-1</sup> among 1107 men attenders (not significant).

The reasons given for non-attendance at the original screening programme are shown in Table 2.

Further details were sought for the patients who could not be persuaded to attend. From the practice records for 1988-92 it was determined that three of the patients had moved from the practice and of the remaining 39, 31 (79.5%) had consulted at the surgery during that period. Of the 31 patients who had consulted, 12 had had their cholesterol levels recorded (mean 5.8 mmol l<sup>-1</sup>), 14 had had their body mass index noted (mean 24.7) and 23 their blood pressure recorded (mean 127.4/78.2 mmHg). Five of the 31 were attending a coronary heart disease health promotion clinic at the surgery, one suffered from hypertension, three from diabetes, one from hypercholesterolaemia, one from angina and one was obese.

## Discussion

Non-attenders accounted for 37% of the population of the original screening programme. In this study the effort expended in trying to persuade a subset of this sample to attend for a health check approached intrusion and many would find this ethically unacceptable. Despite several letters, telephone calls and even a visit to the patient's home, the one in 10 sample of non-attenders aimed for was not attained. This type of follow up would prove extremely costly and in practical terms could only be achieved by opportunistic intervention as 90% of a practice population consult their general practitioner within a five year period.<sup>11</sup> This follow up has revealed that 79% of the 39 actual non-attenders consulted at the surgery in the four year period after their invitation, and these patients could be approached for opportunistic screening. It may, however, not always be appropriate and practical to offer opportunistic intervention at every consultation.

**Table 1.** Mean cholesterol level by age for attenders and non-attenders.

Age (years)	Mean cholesterol level (mmol l <sup>-1</sup> )	
	Attenders	Non-attenders
25-30 ( <i>n</i> = 356/10)	4.7	5.3
31-35 ( <i>n</i> = 397/14)	5.0	5.7
36-40 ( <i>n</i> = 540/19)	5.3	5.6
41-45 ( <i>n</i> = 376/17)	5.4	5.8
46-50 ( <i>n</i> = 320/12)	5.7	6.2
51-55 ( <i>n</i> = 287/15)	5.9	6.6

*n* = number of attenders/non-attenders in age group.

**Table 2.** Reasons given for not attending the original screening programme.

Reason for not attending	% of non-attenders ( <i>n</i> = 98) <sup>a</sup>
Did not receive letter	36.7
Practical reason	26.5
Unnecessary because feeling well	18.4
Already under medical care	12.2
Aware of having certain risk factors	10.2
Apathy	10.2
Afraid <sup>b</sup>	7.1
Did not remember to attend	4.1

*n* = number of non-attenders. <sup>a</sup>Respondents could select more than one reason. <sup>b</sup>Of doctors, needles or finding something wrong.

Thirty eight per cent of the 98 non-attender respondents claimed not to have received the original letter of invitation but it would seem most unlikely that these could all be cases of problems of delivery and a range of other reasons from forgetfulness and misplaced letters to apathy probably account for a large part of this percentage. No one, however, responded that their reason for non-attendance was 'waste of public money' or 'too time consuming' which suggests an aversion to screening in practice rather than in principle. The percentage of non-attenders (27%) claiming practical reasons for non-attendance complements the findings of another study<sup>9</sup> and may be attributed to an inability to get time off work or unavailability of transport, as may be expected because of the lower social class profile of the group.

Several sub-groups of non-attenders can be identified in this study: those with an accurate self-assessment of a low risk where intervention was not necessary; those who were already under medical care with coronary heart disease so prevention was not relevant; those with a poor lifestyle but who are not concerned; and those at high or moderate risk who are concerned and for whom intervention is most effective. In this study the subjective feeling of the study team was that the final sub-group was the most common among non-attenders.

This study provides objective evidence of increased alterable risk factors for coronary heart disease such as raised blood pressure, smoking, obesity and raised cholesterol level in patients who did not accept an invitation for a health check. The non-attenders were more likely to be in the lower social classes, were older, less likely to be well educated and more likely to have a personal and family history of coronary heart disease than attenders. This supports other findings<sup>12,13</sup> and again highlights the problem of people most in need of health care being the least likely to take the steps to receive it.

These results, together with those of other workers,<sup>3,5,6</sup> suggest that advocating mass screening of patients by invitation to health promotion clinics for coronary heart disease could waste valuable resources. Such resources could be better utilized in an opportunistic programme which could highlight those with identifiable and treatable risk factors. Such an opportunistic programme needs a carefully planned practice protocol with a readily available intervention nurse who could give advice straight away and implement follow up. Such an intervention programme would need to be continuous, as in this study some patients did not consult over a four year period.

The principle of supporting a 'health promotion approved practice' within the new contact<sup>1</sup> would seem therefore to be advisable provided that a properly audited opportunistic model is incorporated.

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# RCGP

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The Scientific Foundation Board's definition of research is catholic and includes educational research, observational as well as experimental studies, and accepts the methodologies of social science as valid. It is not in a position to fund educational activities.

If the study involves any intervention or raises issues of confidentiality it is wise to obtain advance approval from an appropriate research ethics committee otherwise a decision to award a grant may be conditional upon such approval.

Studies which do not, in the opinion of the Board, offer a reasonable chance of answering the question posed will be rejected. It may sometimes be useful to seek expert advice on protocol design before submitting an application.

Care should be taken to ensure that cost are accurately forecast and that matters such as inflation and salary increases are included.

The annual sum of money available is not large by absolute standards and grant applications for sums in excess of £15,000 are unlikely to be considered.

Chairman's action can be taken between meetings to approve grants of up to £1000. These may be particularly appropriate to fund pilot studies.

Application forms are obtainable for the Clerk to the Board at: The Scientific Foundation Board, 14 Princes Gate, London SW7 1PU. *The closing date for receipt of completed applications is 24 September 1993; any forms received after that date will, unfortunately, be ineligible for consideration.*