Prevention in practice: results of a 2-year follow-up of routine health promotion interventions in general practice

AC Dowell, JJ Ochera*, SR Hilton*, JM Bland*, T Harris*, DR Jones** and S Katbamna

Background. The effectiveness of health promotion activity in general practice on risk factor reduction for coronary heart disease remains the subject of active debate.

Objective. The study aimed to assess the impact of practice-based health check-ups on health behaviours over a 2-year period.

Method. A general practice cohort of 7123 patients from 18 practices was surveyed. Eight hundred and forty (12%) patients had been offered a health check within a 12-month period from September 1992 and 621 (9%) received one. Two hundred and fifty patients (40%) were asked back for follow-up after their health check.

Results. Over a 2-year period there was no difference in smoking cessation, alcohol consumption, weight loss nor the amount of exercise taken between those who attended for a health check and those who did not. The food score chosen to assess dietary change (Oxcheck) showed a statistically significant 1.16-point rise for the whole sample over the survey period. There was a significant difference in mean food score change between health check attenders and non-attenders (Mann–Whitney U test: \( P < 0.002 \)). Maintenance of dietary improvement over a 2-year period was not affected by health check attendance.

Conclusions. This study confirms the low impact of health checks on the self reported modification of cardiovascular risk factors and shows that maintenance of appropriate health behaviour change is no more likely in those who have received a health check.

Keywords. Health promotion, general practice.

Introduction

A number of research studies have highlighted the modest changes in cardiovascular risk factors achieved by a variety of interventions in general practice settings in England and abroad.1–4 The OXCHECK and Family Heart Study randomized controlled trials identified a 12% reduction in attributable risk as a result of standardized and intensive nurse interventions with the greatest effects in patient behaviour being in dietary modification, increased exercise and reduction in serum cholesterol. Neither study showed a marked change in smoking behaviour. We have previously reported baseline findings from a large cohort study in general practice investigating the effectiveness of health checks in changing behaviour.3,7 The characteristic features of this study which commenced in 1990 are the focus on patient-reported behaviour change and its ‘routine’ general practice setting rather than the more intensive and standardized interventions of other studies. The design, methods and initial findings have been reported in detail elsewhere.7 We report further results from this cohort of patients. The main aims of this phase of the study were to assess the continuing impact of health checks on practice workload and on patients’ health-related behaviour, and whether reported behaviour change is maintained.

Method

The cohort of patients was drawn from 18 group general practices, nine situated in the Wakefield district of Yorkshire Region and nine in the Merton and Sutton
district of South West Thames Region. Practices in the three family health services authority areas were invited to participate in the study. A cross-section was chosen from those who replied on the basis of general practitioner GP:list size ratio, GP:practice nurse ratio, and local social class and ethnic composition. The geographical and social settings represented in the sample span the national picture with the exception of underrepresentation of patients from ethnic minorities. All of the practices operated a call-up system for health checks, which were performed predominantly by practice nurses.

In each practice the original sampling frame consisted of 100 patients who had attended for a practice-based health check in the preceding 12 months selected from the practice records and a further 500 patients selected randomly from the practice age-sex register.

The sample size and composition reflected the need to have a sufficiently large 'health check' sample to allow initial comparison and a sufficiently large control group to perform continuing analysis as new patients were offered health checks.

Between September 1991 and February 1992, 10 600 patients aged between 28 and 67 years were sent self-completion questionnaires about aspects of their health-related behaviours and their attendance at health check clinics (Survey One). A second questionnaire was sent to the 7123 respondents of the first questionnaire between September 1992 and February 1993 (Survey Two).

The follow-up questionnaire (Survey Two) enquired about changes in health-related behaviour in the preceding 12 months and the content of any health check attended during that time. The follow-up questionnaire was sent out prior to the introduction of the present health promotion banding scheme in June 1993.

Subjects were asked detailed questions about changes in smoking habits, alcohol consumption, exercise, diet and weight, and the relationship of any changes to attendance at a practice-based health check. Dietary change was assessed by means of a previously developed and validated food frequency chart. A composite 'food score' is produced from the fibre, saturated fat and sugar content of the patient's diet. Low scores indicate a diet which has high saturated fat and sugar content, and a low fibre content; a high score indicates one which has a high fibre and low fat and sugar content. The possible range of scores is from -25 to +28.

A check-up was defined in the questionnaire as a 'full health check to help prevent stroke and heart disease (Human MOT)'.

Reported changes in behaviour were calculated for the period between Survey Two and Survey One. Maintenance of changes in health behaviour were evaluated over a 2-year period from the baseline data collected at the time of the first survey.

Results

Response rate and attendance rate
Of 7123 patients who were sent a questionnaire in the second survey, 280 had moved or died in the previous 12 months and there were 1219 non-responders. This gave a usable response of 5624 (82%) questionnaires. The plan of the study and response rates are shown in Figure 1.

![Figure 1 Plan of the study and response rates](https://academic.oup.com/fampra/article-abstract/13/4/357/540516)

There was a reduction in the number of patients receiving a health check throughout the duration of the survey. At the first survey, 1712 (24%) respondents had received a health check in the previous 12 months. Only 842 (15%) of the respondents to the second survey had been offered a health check in the previous 12 months and only 621 (11%) had received one.

Of the 5624 patients in the second survey, 3937 (70%) had had no health check, 1066 (19%) had attended for a health check before the first survey, a further 350 (6%) had had a health check between Surveys One and Two and 271 (5%) had received health checks in each year.
TABLE 1  Changes in health behaviour of whole sample and relationship to attendance at health check

<table>
<thead>
<tr>
<th>Behaviour change between Survey One and Survey Two</th>
<th>No health check</th>
<th>Health check in year 1</th>
<th>Health check in year 2 only</th>
<th>Health checks in years 1 and 2</th>
<th>Chi-squared test P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 3937</td>
<td>n = 1066</td>
<td>n = 350</td>
<td>n = 271</td>
<td></td>
</tr>
<tr>
<td>Stopped smoking</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
</tr>
<tr>
<td></td>
<td>140 (3.6)</td>
<td>39 (3.7)</td>
<td>19 (5.4)</td>
<td>13 (4.8)</td>
<td>0.2</td>
</tr>
<tr>
<td>Reduced/stopped alcohol</td>
<td>492 (12.5)</td>
<td>116 (10.9)</td>
<td>36 (10.3)</td>
<td>34 (12.5)</td>
<td>0.1</td>
</tr>
<tr>
<td>Increased vigorous exercise</td>
<td>596 (15.1)</td>
<td>141 (13.2)</td>
<td>53 (15.1)</td>
<td>41 (15.1)</td>
<td>0.5</td>
</tr>
<tr>
<td>Lost weight: 7lb or more</td>
<td>432 (11.0)</td>
<td>106 (10.0)</td>
<td>48 (14.0)</td>
<td>48 (17.7)</td>
<td>0.01</td>
</tr>
<tr>
<td>Increased food score</td>
<td>2022 (51.8)</td>
<td>533 (50.6)</td>
<td>200 (57.8)</td>
<td>153 (56.5)</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Impact on general practice workload
From Survey One, of 1333 patients attending for a health check, 554 (42%) were asked back for a follow-up. Of 621 patients attending a health check from Survey Two, 252 (41%) were asked back for follow-up. The most common reasons for follow-up were blood pressure check, cholesterol measurement and for discussion of test results.

Calculated changes in reported health-related behaviour between Survey One and Survey Two
A summary of the changes in health-related behaviour and the relationship to health checks are given in Table 1. The results given in this section are for the 5624 respondents to both surveys.

Smoking
At Survey Two, 1345 (24%) respondents said that they smoked regularly. Two hundred and eleven (4%) had stopped smoking since the first survey and 108 (2%) had started smoking. Of the 192 respondents who reported that they had recently stopped smoking in Survey One, 45 (23%) had started again by Survey Two.

Those who had attended a health check were no more likely to have stopped than those who had not.

Alcohol consumption
At Survey Two, 4549 (81%) respondents drank alcohol and 775 (14%) reported drinking over the recommended weekly limit in the week before they were surveyed.

At Survey One, 696 (10%) respondents had reported drinking over the recommended limit in the previous week. Of these 231 (33%) reported drinking less than the weekly recommended limit at Survey Two.

Of the 4298 patients at Survey One who had been drinking below limits 290 (7%) reported drinking over limits at Survey Two.

There was no relationship between attendance at a health check and changes in patterns of alcohol consumption. Only 90 (1.6%) respondents reported that they had been definitely or somewhat influenced to make changes by a health check.

Exercise
At Survey Two 4211 (75%) of the respondents had not taken any vigorous exercise in the previous 2 weeks and 2613 (47%) had not taken any exercise at all. Three thousand one hundred and forty-seven (56%) thought that they did not take enough exercise. Four hundred and thirty-five (8%) had taken vigorous exercise at least twice a week in the previous 2 weeks.

Eight hundred and thirty-one (15%) recorded taking more vigorous exercise than in the previous year and 797 (14%) recorded less. Two hundred and eight (47%) respondents who were taking vigorous exercise more than twice a week in Survey One were still exercising regularly in Survey Two.

Respondents who had had a health check in Survey One were less likely to have increased the amount of vigorous exercise they took by Survey Two than other respondents. Eighty-one (1.4%) respondents said that they had been definitely or somewhat influenced to make changes in the amount of exercise they took by a health check.

Diet
The mean food score for Survey Two was 1.16 points higher than for Survey One. The range of scores at Survey Two was from -20 to +27 with an interquartile range of +4 to +16. Amongst respondents 2908 (52%) recorded a higher score than they had in the previous year and 2091 (37%) recorded a lower score. The food score remained the same in 140 patients.

There were no significant differences in food scores for respondents who reported a health check and those not reporting one. Only 241 (4%) of the respondents thought that they had been definitely or somewhat influenced to change their diet by a health check.
TABLE 2 Maintenance of improved dietary change over 2-year period

<table>
<thead>
<tr>
<th>Health check status</th>
<th>Had decreased food score in year 2</th>
<th>Had maintained or improved food score in year 2</th>
<th>Total: had improved diet in year 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td></td>
</tr>
<tr>
<td>Had a health check in year 1</td>
<td>251 (40)</td>
<td>383 (60)</td>
<td>634</td>
</tr>
<tr>
<td>Never had a health check</td>
<td>868 (61)</td>
<td>560 (39)</td>
<td>1428</td>
</tr>
<tr>
<td>Total</td>
<td>1119</td>
<td>943</td>
<td>2062</td>
</tr>
</tbody>
</table>

Crude risk ratio = 1.01 (0.9-1.13).

TABLE 3 Association between calculated smoking change and attendance at a health check in the last 12 months

<table>
<thead>
<tr>
<th>Health check status</th>
<th>Did not stop smoking No. (%)</th>
<th>Stopped smoking No. (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health check in year 2 only</td>
<td>74 (80)</td>
<td>19 (20%)</td>
<td>93</td>
</tr>
<tr>
<td>No health check</td>
<td>870 (86)</td>
<td>140 (14)</td>
<td>1010</td>
</tr>
<tr>
<td>Total</td>
<td>944</td>
<td>159</td>
<td>1103</td>
</tr>
</tbody>
</table>

Crude risk ratio = 0.92 (0.83-1.03).
This table shows smoking cessation for patients who smoked at least once a day at Survey One.

TABLE 4 Association between reducing alcohol consumption and attendance at a health check in the last 12 months

<table>
<thead>
<tr>
<th>Health check status</th>
<th>Did not reduce alcohol consumption below limits No. (%)</th>
<th>Reduced alcohol consumption below limits No. (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health check in year 2 only</td>
<td>36 (73)</td>
<td>13 (27)</td>
<td>49</td>
</tr>
<tr>
<td>No health check</td>
<td>364 (63)</td>
<td>212 (37)</td>
<td>576</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>225</td>
<td>625</td>
</tr>
</tbody>
</table>

Crude risk ratio = 1.16 (0.97-1.39).
This table shows reduction in alcohol consumption for patients who drank over recommended limits at in the week before Survey One.

TABLE 5 Association between increase in exercise and attendance at a health check in the last 12 months

<table>
<thead>
<tr>
<th>Health check status</th>
<th>Did not increase vigorous exercise No. (%)</th>
<th>Increased vigorous exercise No. (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health check in year 2 only</td>
<td>274 (85)</td>
<td>50 (15)</td>
<td>324</td>
</tr>
<tr>
<td>Did not have a health check</td>
<td>3126 (85)</td>
<td>555 (15)</td>
<td>3681</td>
</tr>
<tr>
<td>Total</td>
<td>3400</td>
<td>605</td>
<td>4005</td>
</tr>
</tbody>
</table>

Crude risk ratio = 1.00 (0.95-1.05).
This table shows increase in vigorous exercise for patients who had taken vigorous exercise less than three times per week in the 2 weeks before Survey One.

Body Mass Index (BMI)
According to self-reported weight and height, 341 (6%) of the respondents to Survey Two were underweight (BMI < 20.0 kg m\(^2\)). Two thousand seven hundred and fifty (49%) were of normal weight (BMI 20-24 kg m\(^2\)), 1868 (33%) were overweight (BMI 25-29 kg m\(^2\)) and 518 (9%) were obese (BMI > 29 kg m\(^2\)). The data needed to calculate the BMI were missing for 147 respondents.

One hundred and twenty-five (32%) of the 394 overweight and obese respondents who had recently lost weight at Survey One, had gained over 7 lb by Survey Two. Four hundred and twenty-one (19%) of the 2257 respondents who were overweight or obese at Survey One, had lost over 7 lb by Survey Two. However, 458 (20%) had gained over 7 lb and 1326 (59%) had made no major change. Data were missing for 52 respondents.

There was no significant difference in the mean weight change of overweight and obese respondents between those who had and those who had not had a health check (Table 2). One hundred and fifty-six respondents (3%) said that they had been definitely or somewhat influenced to lose weight by health check.

Effects of health check attendance on changes made by patients with risk behaviours
Analysis compared the effects of health check attendance on those subgroups of patients with a particular risk behaviour. Patients who reported a health check between Survey One and Survey Two were compared with those who reported no check at all. The remaining 1337 patients who reported a health check in the year before the first survey were excluded from this part of the analysis. The results of this analysis are presented in Tables 3-6.

For changes in smoking, alcohol consumption and exercise, we restricted our attention to respondents who reported smoking daily, consuming more than recommended levels of alcohol (higher than 14 units/week
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TABLE 6 Association between median weight change and mean change in food score and attendance at a health check

<table>
<thead>
<tr>
<th>Health check status</th>
<th>Median weight change</th>
<th>Interquartile range</th>
<th>Mean change in food score</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health check in year 2 only</td>
<td>0</td>
<td>-5 to +6</td>
<td>+2.16</td>
<td>5.46</td>
</tr>
<tr>
<td>Did not have a health check</td>
<td>0</td>
<td>-4 to +5</td>
<td>+1.10</td>
<td>6.40</td>
</tr>
</tbody>
</table>

This table shows median change in weight of patients who were overweight or obese at Survey One and mean change in food score for all patients in the relevant categories.

Mann-Whitney U test (weight change): \( P = 0.4235 \).
Mann-Whitney U test (change in food score): \( P = 0.0019 \).

for women and over 21 units/week for men) and taking vigorous exercise less than three times per week at Survey One. The crude risk ratios represent the risk of a patient continuing the behaviour if they reported a health check divided by the risk of continuing the behaviour if they had not.

Health check recipients were slightly more likely to give up smoking and slightly less likely to reduce alcohol consumption but these differences were not significant. There were no differences in changes in exercise.

Weight changes had a non-normal distribution with a few very large decreases and a few large increases. These were analysed using non-parametric tests (Mann-Whitney U). The median weight change was zero in each group. Both groups showed an increase in mean food score. The group of patients who reported a health check had a mean change which was over a point higher and the difference between the two means was statistically significant.

**Maintenance of behaviour change over 2-year period**
Health check attendance was analysed with regard to maintenance of improvements in risk factor behaviour (Tables 6 and 7).

**Diet**
Of 2204 patients who had improved their dietary score prior to the first survey there was no difference between those who attended a health check in year 1 and those who never had a health check in terms of maintenance of improvements over a 2-year period (relative risk = 1.01; confidence interval = 0.9-1.13).

**Smoking**
Of 193 patients who stopped smoking prior to Survey One, there was no difference in maintenance of smoking cessation between those who attended a health check in year 1 and those who never had a health check (relative risk = 1.32; confidence interval = 0.77-2.26).

As for diet and smoking, no difference was demonstrated for maintenance of any other risk factor.

**Discussion**
This study provides further data to inform the debate about the effectiveness of general practice-based health promotion. Several surveys\(^1\)\(^-\)\(^3\) have concluded that health promotion activities carried out in 'health checks' by practice nurses have limited impact on behaviour change. The OXCHECK and Family Heart Studies incorporated intensive and expensive nurse interventions. Our own previously reported studies suggested that equivalent results are achieved with less intensive interventions offered routinely as part of the previous health promotion clinic system.

General practice-based health promotion may have contributed to the climate of awareness producing any overall improvements in healthy behaviour although this effect has been difficult to prove.

This study which compared changes in reported health behaviour in a cohort of 5624 general practice patients demonstrated a mixed pattern of changes in the measured health behaviours between the two surveys. Although smoking rates had decreased and the overall mean food score had increased, reported BMI had increased, as well as the number of patients drinking over the recommended alcohol limits.

Attendance at a health check did not lead to significant improvements in behaviour change. Patients attending a health check were more likely to lose weight than those who did not (Table 1), but analysis of weight change in overweight patients shows no difference between attenders and non-attenders. The only exception was that patients who had attended a check were more likely to have an improved food score.

An important point highlighted by our study is that changes in cardiovascular risk factor behaviour may be erratic and positive changes are subject to reversal.\(^4\) A quarter of all those who had given up smoking at the time of the first survey had started again at the time.
of the second, and 37% had started drinking again after stopping. 

The ability to maintain appropriate changes over a 2-year period was not enhanced by attendance at a health check. This is disappointing, since even though it is known that interventions might have a low initial impact there was the possibility that any changes that did occur were more likely to be sustained.

These results describe the impact reported by patients of 2 years of health promotion activity in a cross-section of general practices. We believe that the results are representative of general practice as a whole and are complementary to the findings of the OXCHECK and Family Heart Studies. Health promotion check-ups have a low initial impact on cardiovascular risk reduction and participation in current health promotion efforts appears to offer no benefit in sustaining positive behaviour changes. This is in contrast to health promotion directed at those with known cardiovascular disease where health education has been shown to increase exercise and improve dietary habits in those with angina.9

There is currently much interest in the application of various models of behaviour change to health promotion10 and also the need to target high risk groups.11 Further studies are required to examine underlying reasons for success or failure of adopting healthy behaviours in individual patients.12

Compared with the findings of our first survey a year earlier, the rate at which health checks were being performed was reported as much reduced, even though this was prior to the announcement of the change to the health promotion banding system. Our surveys also showed that more than 40% of patients required at least one follow-up attendance following their health check. The introduction of the ‘health check’ systems was received with caution and some scepticism by general practice and subsequent health promotion policy changes have proved unpopular.13 The findings from this survey set in the context of increasing general practice workload indicate that any further changes must be carefully considered if they are to be received positively.

Acknowledgements

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References