Effect of postal prompts to patients and general practitioners on the quality of primary care after a coronary event (POST): randomised controlled trial

Gene Feder, Chris Griffiths, Sandra Eldridge, Matthew Spence

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Department of General Practice and Primary Care, St Bartholomew's and the Royal London Hospital Medical School, Queen Mary and Westfield College, London E1 4NS

Gene Feder, *senior lecturer*

Chris Griffiths, *senior lecturer*

Matthew Spence, *research associate*

Department of Medical Statistics, Wolfson Institute, St Bartholomew's and the Royal London Hospital Medical School, London EC1M 6BQ

Sandra Eldridge, *lecturer*

Correspondence to: G Feder g.s.feder@mds.qmw.ac.uk

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website *e*xtra

Profiles of the trial and the sample size calculation appear on the BMJ's website

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Abstract

Objectives To determine whether postal prompts to patients who have survived an acute coronary event and to their general practitioners improve secondary prevention of coronary heart disease.

Design Randomised controlled trial.

Setting 52 general practices in east London, 44 of which had received facilitation of local guidelines for coronary heart disease.

Participants 328 patients admitted to hospital for myocardial infarction or unstable angina.

Interventions Postal prompts sent 2 weeks and 3 months after discharge from hospital. The prompts contained recommendations for lowering the risk of another coronary event, including changes to lifestyle, drug treatment, and making an appointment to discuss these issues with the general practitioner or practice nurse.

Main outcome measures Proportion of patients in whom serum cholesterol concentrations were measured; proportion of patients prescribed β blockers (6 months after discharge); and proportion of patients prescribed cholesterol lowering drugs (1 year after discharge).

Results Prescribing of β bockers (odds ratio 1.7, 95% confidence interval 0.8 to 3.0, $P>0.05$) and cholesterol lowering drugs (1.7, 0.8 to 3.4, $P>0.05$) did not differ between intervention and control groups. A higher proportion of patients in the intervention group (64%) than in the control group (38%) had their serum cholesterol concentrations measured (2.9, 1.5 to 5.5, $P<0.001$). Secondary outcomes were significantly improved for consultations for coronary heart disease, the recording of risk factors, and advice given. There were no significant differences in patients' self reported changes to lifestyle or to the belief that it is possible to modify the risk of another coronary event.

Conclusions Postal prompts to patients who had had acute coronary events and to their general practitioners in a locality where guidelines for coronary heart disease had been disseminated did not improve prescribing of effective drugs for secondary prevention or self reported changes to lifestyle. The prompts did increase consultation rates related to coronary heart disease and the recording of risk factors in the practices. Effective secondary prevention of coronary heart disease requires more than postal prompts and the dissemination of guidelines.

Introduction

People with angina or who have had a previous myocardial infarction are at high risk of coronary events that can be substantially reduced by drug treatment and changes to their lifestyle.[1] How best to implement secondary prevention for coronary heart disease is still unknown, but a key role for general practice in caring for such patients is widely advocated.[2]

Implementation of effective secondary prevention of heart disease in general practice varies. Prescribing of aspirin is well established (for example, 97% of patients with coronary heart disease in Oxfordshire,[3] 85% with coronary heart disease in Grampian,[4] and 81% after a myocardial infarction in south west England[5]). The use of β blockers is patchy (for example, 66% in Oxfordshire[3] and 32% in Grampian[4]), as are testing for cholesterol (for example, 51% in Oxfordshire,[3] 24% in Grampian,[4] and 54% in south west England[5]) and prescribing of lipid lowering drugs (for example, 4% in Grampian[4] and 9% in south west England[5]).

Hackney in east London is an inner city area with a deprived, multiethnic population and comparatively underdeveloped general practice. In this area, guidelines disseminated with a practice based educational programme improved the management of diabetes.[6] We extended the dissemination method to guidelines for coronary heart disease. Although a prospective audit in 20 selected practices showed some improvement in disseminating guidelines for coronary heart disease, appropriate prescribing and advice about lifestyle remained poor.[7]

In general practice, failure to review patients after a coronary event, inconsistent prescribing of effective drugs, and insufficient advice about secondary prevention need to be addressed. Multifaceted interventions targeted at barriers to the implementation of guidelines are likely to be more effective than single methods.[8] Our trial tested a simple intervention: postal prompts to consecutive patients after discharge for a coronary event, containing secondary prevention advice and suggesting patients make an appointment for review with their general practitioner. We

Table 1 Practices in study by factors used for stratification

Stratifying variable	Intervention group	Control group
List size (patients/principal)		
Low (<1600)	8	10
Medium (1600-2200)	8	10
High (>2200)	9	7
Practice nurse		
No nurse	8	11
Nurse	17	16
No of partners		
1	11	8
2	6	11
⩾3	8	8
Training status		
Non-training	21	23
Training	4	4
Guidelines for coronary heart disease		
No facilitation	4	5
Facilitation*	21	22
Total	25	27

*At least one education session led by facilitator in past 18 months.

combined this with letters to the patients' general practitioners reminding them about effective interventions and the existence of local guidelines for coronary heart disease.

Participants and methods

We invited all 62 practices in Hackney to join the study; 59 (95%) agreed to participate. We stratified these by practice factors that might influence the effect of the intervention (table 1). Between August 1995 and May 1997 our research assistants aimed to recruit consecutive patients registered with the 59 practices who were admitted to Homerton Hospital in Hackney with a myocardial infarction or unstable angina. Where the diagnosis remained uncertain before discharge, we excluded patients who did not fulfil criteria for myocardial infarction[9] or unstable angina.[10]

When a patient consented to participation, their practice was randomised to either the intervention group or control group with a computerised minimisation program,[11] which distributed the stratification variables equally between the two groups (table 1). Subsequent patients from the same practice were allocated to the group on the basis of the first patient's allocation.

Two weeks and 3 months after discharge we posted leaflets to the patients from the intervention practices, which contained recommendations about lowering the risk of another coronary event, including changes to lifestyle and drug treatment (G Feder et al, unpublished data). The leaflet suggested attending the practice for further discussion. General practitioners in intervention practices were sent letters for each recruited patient 2 weeks and 3 months after discharge, separately from the hospital's discharge summary. The letters contained a summary of effective secondary prevention, with reference to the east London guidelines for coronary heart disease and a review card derived from the guidelines for insertion in the patient's medical record. Patients and general practitioners in the control practices were sent no communication from the study team.

We collected baseline data on prescribing of aspirin and β blockers from practice records, and we collected baseline data on prescribing of cholesterol lowering drugs at discharge at the end of the study from hospital records.

We collected data from practice records and patient questionnaires 6 months after discharge to evaluate the effect of the intervention. We excluded patients from the analysis who had died less than 6 months after discharge. We also collected data on the measurement of cholesterol and the prescribing of cholesterol lowering drugs 1 year after discharge in patients aged under 70 years who were recruited before March 1997. We lacked the resources to extend the study so that prescribing data for cholesterol lowering drugs could be collected for all eligible patients aged under 70 years, 1 year after discharge.

Outcome data collection

Practice medical records

From the medical records we collected data on prescribing, recording of advice on lifestyle, and rates of consultation for coronary heart disease in general practice in the 6 months after discharge. Data were entered into a database by the research associate. If patients were no longer registered with their original practice, we obtained copies of their medical records from the new practices. The notes of patients who had died before data collection but more than 6 months after discharge were examined by the research associate in the health authority archive. All patient data were analysed on the basis of the practice that they were registered with at recruitment to the study. The research associate was blinded to group allocation when the data were abstracted, but he was no longer blinded if the letter or review card was present in the notes of patients from intervention practices.

The accuracy of data collection was tested by assessment of a random sample of one in eight medical records. The research assistant contacted the study office after data entry and was informed if any of the patients had been selected for validation. If the practice had a photocopier, the medical records were copied. At the end of the study, data were independently extracted from these records by two other members of the study team (GF and CG), and the results were compared with the original data extraction.

Questionnaire to patients

Patients were sent a questionnaire 6 months after discharge. Responses to a subset of questions relevant to secondary prevention were analysed. Data from the questionnaires were entered blind to group allocation.

Statistical analysis

We tested differences between outcomes in the intervention and control groups using a χ^2 statistic adjusted for the effect of clustering within practices.[12] We used logistic regression to adjust for prescribing values at baseline. Approval for the study was granted by the local ethics committee.

Results

Recruitment

Overall, 59 of the 62 practices (95%) agreed to join our study (see website), and 354 of 427 consecutive patients

Table 2 Patient characteristics at baseline. Values are percentages (numbers) unless stated otherwise

Variable	Intervention group (n=172)	Control group (n=156)
Mean age (years)	66.4	64.8
Male	62 (107)	56 (87)
Initial diagnosis		
Myocardial infarction	60 (103)	58 (91)
Unstable angina	40 (69)	42 (66)
Initial prescribing		
Aspirin	88 (144/164)	83 (128/154)
Contraindications to aspirin*	6 (10/168)	7 (11/153)
β blockers	33 (54/164)	23 (35/154)
Contraindications to β blockers	2 (3/164)	3 (5/154)
Cholesterol lowering drugs†	11 (11/98)	9 (7/79)
Smoking		
Smoker	42 (68/161)	35 (49/140)
History		
Myocardial infarction or unstable angina	54 (90/167)	51 (76/149)
Diabetes	21 (35/168)	30 (45/151)

*Includes data for contraindications from 6 months after discharge.
†Excludes patients aged ⩾70 years.

(83%) from 54 of these practices presented with an acute coronary event and were eligible for our study (see website). We failed to recruit 73 patients: 12 declined, 18 were discharged before they could be recruited, six were non-English speaking and did not have an interpreter available, 11 died before discharge, three had terminal illnesses, 17 were not capable of giving informed consent, four were about to leave the locality, one was used for collecting data in a pilot of the study, and one was participating in another study. After randomisation, we excluded another 26 patients—22 who had died in the first 6 months, two who did not have a genuine diagnosis of acute coronary syndrome, and two who were not randomised correctly—leaving 328 patients and 52 practices in our trial. Most practice characteristics (table 1) and patient characteristics (table 2) were well balanced between intervention and control groups, although intervention practices had a larger proportion of smokers and patients on β blockers, and control practices had a larger proportion of patients with diabetes.

All but five of the general practice records were traced at 6 months. At 12 months after discharge, 164 records of 195 patients eligible for cholesterol testing and treatment were available.

Twenty three patients declined to be sent a questionnaire and 24 had either died or were terminally ill, giving a response rate of 220 out of 281 (78%). Responders and non-responders had similar characteristics, except for a higher proportion of smokers among non-responders. Eighteen patients requested translations of postal prompts into Turkish and three patients requested translations into Bengali. Although translations were not available for the other nine first languages, these patients said they could read English or had someone to translate for them.

Copies of 25 sets of notes were available for validation of data collection. The mean level of concordance between the research assistant's and the reviewers' data entry for all variables was 93%. The only variable with less than 80% concordance was the number of consultations related to coronary heart disease (68%). Concordance was 100% on whether the patient had ever had a consultation related to coronary heart disease within 6 months of discharge. Therefore, we converted this into a dichotomous variable for the analysis.

Principle outcome measures

The proportion of patients prescribed β blockers 6 months after discharge and a cholesterol lowering drug 1 year after discharge did not differ significantly between intervention and control groups (table 3). The results for β blockers did not alter when we accounted for baseline prescription (logistic regression odds ratio 1.1, 95% confidence interval 0.5 to 2.4). Prescribing rates were poor for both β blockers and cholesterol lowering drugs in contrast to the high proportion of

Table 3 Outcome variables by intervention. Values are percentages (numbers) unless stated otherwise

Variable	Intervention group (n=172)	Control group (n=156)	Estimated intracluster correlation coefficients	Adjusted odds ratio (95% CI)	Adjusted χ^2 statistic	P value
Prescribing						
Cholesterol lowering drugs	28 (23/81)	19 (16/83)	–0.047†	1.7 (0.8 to 3.4)	1.9	>0.05
β blocker*	38 (60/157)	27 (38/142)	0.060	1.7 (0.9 to 3.0)	0.9	>0.05
Aspirin*	90 (141/157)	91 (127/139)	–0.018†	0.9 (0.4 to 1.9)	0.0	>0.05
Recorded risk factor measurement and advice						
Cholesterol	67 (54/81)	39 (32/83)	0.013	4.0 (1.9 to 8.2)	12.2	<0.001
Weight	44 (74/169)	21 (32/154)	0.098	3.0 (1.5 to 5.8)	10.5	<0.01
Weight loss or diet advice	27 (46/169)	14 (22/154)	0.053	2.4 (1.2 to 4.7)	6.2	<0.05
Exercise advice	30 (51/169)	7 (11/154)	0.162	5.7 (2.0 to 16.3)	11.7	<0.001
Blood pressure	90 (152/169)	84 (129/154)	–0.020†	1.7 (0.9 to 3.3)	2.6	>0.05
Smoking habit	68 (115/169)	55 (85/154)	0.135	1.9 (1.0 to 3.8)	3.9	<0.05
Smoking advice	69 (42/61)	44 (20/45)	0.076	2.8 (1.1 to 6.8)	6.4	<0.05
Consultation for coronary heart disease						
Coronary heart disease related consultation with doctor or nurse	70 (118/169)	53 (82/154)	0.105	2.1 (1.1 to 3.9)	5.3	<0.05
Patient's self report						
Made change to food, drugs, or exercise	83 (92/111)	83 (91/109)	–0.020†	1.0 (0.5 to 2.1)	0.0	>0.05
Think can do something to reduce risk	60 (64/106)	58 (60/103)	–0.015†	1.1 (0.6 to 1.9)	0.1	>0.05
Gave up smoking since discharge	40 (18/45)	41 (14/34)	0.283	0.8 (0.3 to 2.4)	0.1	>0.05

*Patients with contraindications were removed from these analyses.
†To calculate adjusted odds ratios, confidence intervals, and χ^2 statistics, intracluster correlation coefficients were set to zero for these variables.

patients in both intervention and control groups prescribed aspirin. The proportion of patients with a serum cholesterol measurement was significantly increased in intervention groups.

Secondary outcome measures

The measurement and recording of coronary risk factors were significantly increased in intervention groups, as was the recording of advice on risk factors for coronary heart disease (table 3). Patients from the intervention practices were more likely than patients from the control practices to have at least one consultation about coronary heart disease with their general practitioner or practice nurse. There was no difference in the proportion of patients who stopped smoking, made other changes to lifestyle, or thought that they could modify their risk of another coronary event.

Discussion

The extent of effective prescribing and relevant advice on lifestyle for these high risk patients was poor for both intervention and control groups. Although postal prompts increased the frequency of review, cholesterol testing, and recording of risk factor advice, we did not detect significant improvements in two of the three principle outcome measures: prescribing of either β blockers or cholesterol lowering drugs. Self reported changes in lifestyle or confidence about reducing risk did not differ between intervention and control groups.

We recruited the majority of practices and most eligible patients in one locality. With the exception of prescribing of β blockers and the proportion of either smokers or patients with diabetes, the distribution of practice and patient characteristics was similar in intervention and control groups. The proportion of smokers was not an outcome variable in the analysis, and we adjusted for baseline differences in prescribing of β blockers. Prescribing of β blockers and cholesterol lowering drugs are robust intermediate outcome measures directly linked to improved outcome for patients with coronary heart disease.[13]

The largest source of potential bias in our study was the research associate's awareness of a practice's allocation[14] if he came across evidence of the intervention in the medical records. The results of the validation exercise are reassuring for inaccuracies in data extraction, although it is still possible that all three investigators were unconsciously biased towards noticing positive data in the records of intervention practices.

Grimshaw and Russell's systematic review of the effect of clinical guidelines highlighted the value of reminders to clinicians within the consultation.[15] We sent a review card for coronary heart disease to intervention practices for inclusion in the patient's medical record. These cards or computer templates were used for 55 (32%) patients in the intervention practices.

Our trial was adequately powered to detect anticipated differences in prescribing of β blockers and measurement of serum cholesterol. For prescription of cholesterol lowering drugs, we would have been able to detect an absolute difference of 20% (19% to 39%) with 80% power at a 5% significance level. We had underestimated the secular trend towards increased prescribing of statins,[16] which affected both intervention and control groups. The overall prescribing of both β blockers and cholesterol lowering drugs was still low.

Key messages

- Postal prompts to patients and their general practitioners about effective secondary prevention after a myocardial infarction did not improve the prescribing of cholesterol lowering drugs and β blockers
- The prompts did improve general practice recording of cardiovascular risk factors and lifestyle advice given to patients, but they made no difference to patients' reports of changes to lifestyle
- Other methods are needed to improve the quality of secondary prevention of coronary heart disease in general practice

Printed educational materials alone are comparatively ineffective in changing the behaviour of healthcare professionals.[17] Research on the effect of postal prompts to patients on their quality of care suggests that, particularly if combined with other interventions, patient reminders can result in improved care.[18] Most previous studies had weak study designs and addressed uptake of periodic health screening or other preventive activities.[19]

How do the results of our intervention compare with other methods of improving secondary prevention of coronary heart disease in general practice? In the Grampian region nurse led secondary prevention clinics in primary care improved prescribing of appropriate drugs and uptake of exercise and dietary advice by patients.[20] In the south of England a liaison nurse led support programme in general practice for patients with coronary heart disease diagnosed in hospital did not improve prescribing nor other outcomes.[21]

Conclusion

We conclude that postal prompts to patients and their general practitioners have a marginal role in improving the secondary prevention of coronary heart disease. Most patients, even in practices that had been part of a facilitator led dissemination programme for guidelines, were still not benefiting from effective treatment. Interviews with a sample of patients in our trial and with other general practitioners in east London suggest that both groups are confused about responsibility for care after a coronary event and that there is insufficient coordination with hospital clinicians after discharge.[22] We require a more systematic approach to the secondary prevention of coronary heart disease, with explicit agreement between primary and secondary care about respective responsibilities in an integrated programme of care after a coronary event.

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Contributors: GF had the original idea for the study and designed it with CG and SE. MS helped refine the design and carried out patient recruitment, randomisation, data collection, data entry, and initial analysis of the questionnaire data. SE carried out the statistical analysis. GF wrote the first draft of the paper, and all the authors contributed to the revisions. GF will

act as guarantor for the paper. We thank Juliet Formby for assistance with patient recruitment, Dan Tunstall-Pedoe for supporting the study in its early stages, Maureen Barry for help with identification of patients, and Marcia Tubbs for help with manuscript preparation.

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A neglected but prevalent tragedy

Aminata, aged 24, was admitted as an emergency suffering from fever and severe pelvic pain in February 1998. Medical examination showed signs of peritonitis and foetid leucorrhoea. She told the doctor that she had had an illegal abortion after 12 weeks of amenorrhoea. An emergency laparotomy detected an abdominal cavity filled with pus (>300 ml), many adhesions, and a 3 cm perforation of the uterus around the isthmus.

She had a hysterectomy, a left annexectomy, and a right salpingectomy. Careful peritoneal cleaning, prolonged drainage, and a long course of strong antibiotics simplified the postoperative procedure. She returned home two weeks later.

Aminata was born in Dakar. She received several years of primary education, married at the age of 17, and had two children. She divorced in 1993 and now lives with her aunt and cousins. She has had two relationships since her divorce. The first began in February 1997, and she decided to use contraception because she did not want another child. She went to a family planning centre to obtain oral contraceptives, but she did not take them regularly. This first relationship ended. In September 1997 she met a married man in regular employment. She did not plan to have a baby with him but she used no contraception. She had her last period at the end of November. She attended a clinic at the start of January although her period was only one week late. With no medical examination, she was given a prescription to "start the period."

One week later she visited another medical centre, where a midwife confirmed that she was in the early stages of pregnancy. She had already decided not to continue with the pregnancy and told her partner of her decision. He refused to accept it and left. She then contacted a childhood friend, who gave her the address of a man who performed abortions. The price was set at CFA20 000 (£25). It took her two weeks to obtain the money.

On 28 January she went to the man's house in a run down area of town. She lay down on a mattress on the floor. The man, who was alone, said that he was going to "scrape out the womb with two instruments," that she "would bleed," and that it "would hurt." An hour later she went home.

Over the next three days she lost a large amount of blood. The bleeding subsided, but she then suffered severe pelvic pain. Given the deterioration in her health, her family decided to take her to a medical centre. Without any medical examination, she was diagnosed as having acute malaria and was treated by quinine perfusion. Back home, her condition deteriorated rapidly and her mother decided to take her to the hospital, where she was admitted on 6 February.

The recent estimates suggest that between one third and a half of the 600 000 maternal deaths that occur each year result from abortion complications.[1-3] We must add to this overwhelmingly sad statistic the millions of women who are traumatised and mutilated, victims of inertia and fatalism.[4]

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Fadel Diadhiou, Nathalie Goyaux, Ousseynou Faye, Patrick Thonneau, *department of gynaecology and obstetrics, University Hospital Le Dantac, Dakar, Senegal*

We welcome articles up to 600 words on topics such as *A memorable patient, A paper that changed my practice, My most unfortunate mistake,* or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk. Permission is needed from the patient or a relative if an identifiable patient is referred to. We also welcome contributions for "Endpieces," consisting of quotations of up to 80 words (but most are considerably shorter) from any source, ancient or modern, which have appealed to the reader.