

An assessment of morbidity registers for coronary heart disease in primary care

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SUMMARY

Background. Organised care delivered systematically to all patients with established coronary heart disease (CHD) can reduce their risk factors and improve their quality of life. Therefore, identifying all patients with established CHD in a general practice population is an important first step for delivering this effective healthcare. However, there is little information on how registers are compiled, the factors that predict inclusion on the register or the relationship between registration and level of care provided.

Aim. To assess the completeness of morbidity registers for CHD in primary care, the factors that predict inclusion on the register, and the relationship between registration and level of care provided.

Method. Observational study at baseline of 1979 patients aged 55 to 75 years with established CHD in 18 general practices recruited for a cluster randomised controlled trial.

Results. The proportion of CHD patients correctly identified on practice morbidity registers varied from 29.3% to 100%. Four factors were significantly and independently associated with being on a register: a relevant surgery contact since diagnosis (OR = 2.1, 95% CI = 1.6%–2.9%); a relevant repeat prescription since diagnosis (OR = 1.6, 95% CI = 1.1%–2.3%); a diagnosis of myocardial infarction (OR = 1.5, 95% CI = 1.2%–1.9%); and a revascularisation procedure (OR = 1.5, 95% CI = 1.1%–2.0%). Inclusion on a register was strongly associated with being adequately assessed (i.e. assessed for smoking status, blood pressure, and cholesterol) (OR = 1.8, 95% CI = 1.3%–2.3%) and with treatment with aspirin or a lipid-lowering agent (OR = 1.4 for each agent).

Conclusion. A wide variation in registration levels between practices exists. There is evidence that practices using multiple methods of case detection achieve higher levels of registration. The association between registration and better care does not prove causality but an effective call–recall

system is impossible without complete registration.

Keywords: coronary heart disease; chronic disease management; primary care; morbidity registers; completeness.

Introduction

CORONARY heart disease (CHD) is the single most common cause of premature death in the United Kingdom (UK), accounting for approximately a quarter of all deaths under the age of 75 years. In 1996, CHD caused nearly 60 000 premature deaths in the UK.¹ In an attempt to tackle this problem, the National Heart Forum and the Audit Commission published their recommendations separately in 1995.^{2,3} As a first priority, they recommended focusing on those patients who have developed symptoms of CHD. The rationale for these recommendations is threefold.

First, all patients with established CHD are at increased risk of death, myocardial infarction (MI), and stroke compared with healthy individuals of the same age.⁴ Secondly, effective management focusing on appropriate lifestyle changes and pharmacotherapy can substantially reduce this risk.⁵ Thirdly, organised care delivered systematically to all patients can improve their risk and quality of life.⁶ Identifying all patients with established CHD in a general practice population is an important first step for delivering this effective health care.

The variable rate of patient ascertainment on CHD morbidity registers has previously been noted. In 1987, a study carried out in four general practices in Oxford reported that only 43% of patients who had a diagnosis of MI were identified.⁷ In 1995, in a study of four general practices in the Trent region known for being high recorders of clinical data, rates of identification of CHD cases were found to vary from 47.4% to 91.5%.⁸ A further study of 41 general practices in Scotland estimated that 80% of patients with MI and 60% of those with angina were correctly recorded on practice computers.⁹ However, there is little information on how registers are compiled, the factors that predict inclusion on the register or the relationship between registration and level of care provided. This study aimed to address these issues.

Method

Identification of patients

All 79 general practices in Warwickshire were invited to participate in a randomised controlled trial to compare three methods of promoting secondary prevention of CHD in primary care: audit and feedback, structured recall, and nurse-run clinics. Forty-one practices showed interest. Fifteen of these practices were excluded as they were already running nurse-run clinics and five withdrew as they were already committed to opportunistic care. Of the 21 remaining practices, 18 had CHD morbidity registers and were thus included in this study.

All paper and computer records of patients aged 55 to 75 years in each of the 18 practices were hand searched by six trained external auditors (all with a nursing qualification) between October 1997 and March 1998. They identified all patients with established CHD; that is, those who had a previous diagnosis of

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MI or stable angina pectoris, or who had undergone revascularisation by percutaneous transluminal coronary angioplasty (PTCA) or coronary artery bypass grafting (CABG).

The diagnoses and procedures were defined as follows: (a) MI: confirmed by characteristic electrocardiographic changes or serial cardiac enzyme changes, or both, or, in their absence, a firm clinical diagnosis based on history; (b) stable angina pectoris: established if there was a history of typical chest pain/discomfort brought on by effort and relieved by rest and/or sublingual nitrates. Patients who had single episodes of chest pain diagnosed as possible angina but who were not continued on any anti-anginal therapy were not included in the study; (c) PTCA and CABG: supported by the records containing a hospital discharge letter and 'operation note' to confirm the procedure(s) took place.

The list of patients identified by the audit in each practice was compared with a list produced from the practice's existing register of patients (derived independently) also aged 55 to 75 years. All except one of these registers were held on computer but there was considerable variation in the methods used to identify patients to be included in the register. We therefore asked each lead general practitioner (GP) to report the main methods used for compiling their morbidity register. Their replies were recorded and classified by the interviewer into three main categories (Table 1). There was no independent confirmation of the main methods used for compiling the morbidity registers.

Data collection

The records of the patients identified were also examined for: (a) a record of smoking habit and, if a smoker, a record of review in the past two years; (b) a record of blood pressure (BP) since diagnosis and, if on any occasion the BP was recorded as exceeding 140/90, then a record of a follow-up BP in the past two years; (c) a record of serum cholesterol measurement since diagnosis and, if this was greater than 5.5 mmol/l, then a record of repeat cholesterol measurement in the past two years. A patient was defined as being adequately assessed if all three of these assessment criteria were fulfilled. Data were also collected on the number of patients treated with aspirin, hypotensives, and lipid lowering agents. Information on age, sex, date of diagnosis, and surgery consultations and repeat prescriptions related to the patient's CHD diagnosis or procedure was also collected.

Statistical methods

Data were double-keyed and verified. The analysis was carried out using SPSS for Windows release 8.0, MLwiN version 1.00, and CIA (Confidence Interval Analysis) version 1.1.

Factors significantly associated with being on a CHD morbidity register, or with being assessed or treated, were identified using stepwise multiple logistic regression, with a cut-off for

inclusion of $P < 0.05$, according to the likelihood ratio test. All the measured variables were considered for inclusion in each model. Odds ratios adjusted both for other significant predictors and for the effect of clustering within practices were estimated within random intercepts logistic regression models, which allow the log odds of having a certain outcome to vary across practices.

Ethical approval

The Warwickshire Regional Ethics Committee approved the study. In addition we obtained the consent of the individual GPs.

Results

Comparison between registers and hand search

A total of 1979 cases of established CHD were identified from the two data sources in the 18 participating practices. Of these, 1422 (71.9%) were identified by both the hand search and the practice CHD morbidity registers, 537 (27.1%) by the hand search only, and 20 (1.0%) by the practice registers only. All 20 patients identified by the practice registers were checked and found to be definite cases of CHD as defined in this study. Table 1 shows the three main methods of compiling the CHD morbidity registers reported by the 18 general practices and the percentage of CHD patients correctly identified and put on the register by each practice, which ranged from 29.3% to 100%. Using a combination of repeat prescribing, opportunistic contact, and hospital correspondence to develop the morbidity register led to a CHD patient identification rate significantly higher than that achieved by repeat prescribing alone or by opportunistic contact alone (both $P < 0.0001$, random intercepts logistic regression modelling).

Factors associated with being on a CHD morbidity register

Table 2 shows the percentage of patients with CHD on practice CHD morbidity registers by various patient characteristics. Four factors were significantly and independently associated with being on a register: a relevant surgery contact since diagnosis, a relevant repeat prescription since diagnosis, a diagnosis of MI or a revascularisation procedure. After adjustment for the other three factors, and for clustering within practices, surgery contact showed the strongest association (OR = 2.1, 95% CI = 1.6–2.9%, $P < 0.0001$), with each of the other factors increasing the odds of being on the register by about 50% ($P = 0.01$ for prescription, $P < 0.001$ for MI, and $P = 0.005$ for revascularisation).

Assessment and treatment of patients on, and not on, CHD morbidity registers

Table 1. Practice rates of CHD registration according to three different methods of compiling the morbidity register.

	Mainly repeat prescribing	Mainly opportunistic contact	Repeat prescribing, opportunistic contact, and hospital correspondence	Total
Numbers of practices	5	6	7	18
Proportion (%) of CHD patients on register in each practice	65/96 (68) 61/123 (50) 18/38 (47) 44/91 (48) 37/84 (44)	17/58 (29) 91/121 (75) 18/28 (64) 40/94 (43) 244/244 (100) 107/160 (67)	119/127 (94) 43/56 (77) 113/140 (81) 108/138 (78) 116/136 (85) 105/114 (92) 96/131 (73)	
All patients	225/432 (52)	517/705 (73)	700/842 (83)	1442/1979 (73)

Table 2. Inclusion on a CHD morbidity register according to patient characteristics.

	Total	On register n (%)	Crude OR (95% CI)	Adjusted OR ^a (95% CI)
Surgery contact ^b				
Yes	1630	1244 (76.3)	2.6	2.1
No	330	183 (55.5)	(2.0%–3.3%)	(1.6%–2.9%)
Repeat prescription ^b				
Yes	1774	1320 (74.4)	2.0	1.6
No	205	122 (59.5)	(1.5%–2.7%)	(1.1%–2.3%)
Diagnosis of MI				
Yes	981	745 (75.9)	1.4	1.5
No	998	697 (69.8)	(1.1%–1.7%)	(1.2%–1.9%)
Revascularisation procedure ^c				
Yes	452	357 (79.0)	1.5	1.5
No	1527	1085 (71.1)	(1.2%–2.0%)	(1.1%–2.0%)
Diagnosis of angina				
Yes	1647	1210 (73.5)	1.2	-
No	332	232 (69.9)	(0.9%–1.6%)	
Year of diagnosis				
Up to 1990	838	592 (70.6)	0.8	-
After 1990	1141	850 (74.5)	(0.7%–1.0%)	
Age (years)				
55–64	678	496 (73.2)	1.0	-
65–75	1301	946 (72.7)	(0.8%–1.3%)	
Sex				
Male	1346	987 (73.3)	1.1	-
Female	633	455 (71.9)	(0.9%–1.3%)	

^aAdjusted for the other three factors shown and for clustering within practices; ^bsurgery contact/repeat prescription indicates that a patient has had one or more relevant contacts or prescriptions since diagnosis. Numbers with surgery contact do not add to total because of missing values; ^crevascularisation procedure: either PTCA or CABG. Patients may have more than one diagnosis or procedure.

Table 3 shows that patients on a CHD morbidity register were generally more likely than those not on a register to have been both assessed and treated, although there was no evidence of this for treatment with hypotensive agents. After adjustment for other significant factors, and for clustering within practices, being on a register increased the odds of being adequately assessed (i.e. assessed for smoking status, blood pressure, and cholesterol) by 80% (OR = 1.8, 95% CI = 1.3%–2.3%, $P < 0.0001$). The odds of being treated with aspirin or a lipid-lowering agent were increased for those on the register by 40% ($P = 0.006$ for aspirin, $P = 0.01$ for lipid-lowering agent).

There was no evidence that MI patients were more likely to receive cardiac rehabilitation if they were on a register than if they were not. Similarly, for patients with a clinical diagnosis of heart failure, those on a register were no more likely than others to be prescribed angiotensin-converting enzyme (ACE) inhibitors.

Discussion

This study shows, first, a wide variation between practices in the proportion of patients with established CHD included in practice-based morbidity disease registers. Secondly, practices using more than one method of case detection (repeat prescribing, opportunistic contact or hospital correspondence) generally achieved higher registration levels. Thirdly, patients who had had contact with their practice, who were receiving repeat prescriptions or who were hospitalised for MI or a revascularisation procedure (PTCA and/or CABG) were more likely to be included on the register. Interestingly, hospitalisation did not appear to be a particularly strong predictor of inclusion on the register, even though this would normally trigger correspondence with the GP.

Finally, patients included in disease registers were more likely to have been both assessed and treated.

Since 1996, the Warwickshire Medical Audit Advisory Group has encouraged better care of patients with established CHD, including payments to practices on the basis of audits of the care of the patients on their disease register. Therefore, this study may well overestimate the level of care of CHD patients compared with other geographical areas. Moreover, because the practices in this study had volunteered for inclusion in a larger trial it may tend to include the more interested practices. However, practices that were already running nurse-led clinics were specifically excluded.

In terms of the completeness of registration, the results found in this study are similar to those found in Oxfordshire in 1987,⁷ in the Trent Region in 1995,⁸ and in Scotland in 1996.⁹ However, none of these studies explored the ways that patients were entered on a disease register or the care that such patients were receiving. Creating a disease register of only those patients who are being seen or are receiving treatment is likely to detect those with more symptoms or more severe disease. However, all patients who have established CHD, even if asymptomatic, are at increased risk of a subsequent vascular event, and this risk can be reduced by appropriate management. Systematically inviting these patients to a nurse-run clinic can reduce their risk factors and improve their quality of life.^{6,7}

This study suggests that being on a register is associated with being adequately assessed and treated but it cannot determine the direction of this association. However, it is clear that adequate care will not be given unless a patient has been identified as having CHD, so registration is a necessary first step.

Our results mean that audit results based on the care provided for identified patients will overestimate the care provided for the

Table 3. Assessment and treatment of patients according to registration status.

	Total	Assessed or treated n (%)	Crude OR (95% CI)	Adjusted OR ^a (95% CI)
Assessed — smoking status				
On register:				
Yes	1442	1103 (76.5)	2.1	1.6
No	537	328 (61.1)	(1.7%–2.6%)	(1.2%–2.0%)
Assessed — blood pressure				
On register:				
Yes	1442	1261 (87.4)	2.0	1.5
No	537	415 (77.3)	(1.6%–2.6%)	(1.1%–2.0%)
Assessed — cholesterol				
On register:				
Yes	1442	688 (47.7)	2.0	1.5
No	537	171 (31.8)	(1.6%–2.4%)	(1.2%–1.9%)
Assessed — all three factors				
On register:				
Yes	1442	494 (34.3)	2.5	1.8
No	537	93 (17.3)	(1.9%–3.2%)	(1.3%–2.3%)
Treated — aspirin				
On register:				
Yes	1442	1137 (78.8)	1.9	1.4
No	537	357 (66.5)	(1.5%–2.3%)	(1.1%–1.8%)
Treated — lipid-lowering agent				
On register:				
Yes	1442	383 (26.6)	1.7	1.4
No	537	94 (17.5)	(1.3%–2.2%)	(1.1%–1.9%)
Treated — hypotensive agent				
On register:				
Yes	1442	767 (53.2)	1.1	-
No	537	270 (50.3)	(0.9%–1.4%)	
MI patients — cardiac rehabilitation				
On register: ^b				
Yes	744	110 (14.8)	1.5	-
No	236	25 (10.6)	(0.9%–2.3%)	
Heart failure patients — ACE inhibitor prescribed				
On register:				
Yes	167	110 (65.9)	1.0	-
No	41	27 (65.9)	(0.5%–2.1%)	

^aAdjusted for other significant factors and for clustering within practices; ^bcardiac rehabilitation not known for one patient.

whole population if the identification is incomplete. Achieving complete morbidity disease registers must therefore be a priority for the development of clinical governance in relation to the National Strategic Framework for CHD. This may ensure that many more patients are receiving better quality care and enjoying better health.

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