How well do primary care teams identify patients with CHD and diabetes?

The British Women's Heart and Health Study, a prospective cohort study, suggests that as many as half the women identified as having CHD on practice registers (and almost one third of diabetics) appear not to have the condition after a detailed manual review of records. The importance of auditing practice registers is highlighted.

Introduction

In order to ensure appropriate care and secondary prevention of coronary heart disease (CHD) and diabetes, primary care teams need to be able to identify individuals with these conditions. Studies of specific computerised systems suggest generally poor performance with respect to identifying a range of chronic diseases.[1,2] The aim of this study was to assess the ability of British primary care teams to identify patients with CHD and diabetes, by any means (computerised or manual systems). We focussed on CHD and diabetes because of their public health importance and because National Service Frameworks for both of these conditions require primary care to be able to identify these patients.

Br J Cardiol 2005;**12**:468–70

Methods and results

We defined CHD as having either a myocardial infarction (MI) or an angina diagnosis in the primary care medical records (including computerised/written notes and correspondence from secondary care). Diabetes was similarly defined as any recorded diagnosis of type I or II diabetes. Detailed reviews in 1999–2001 of the primary care medical records of 4,286 randomly selected women, aged 60–79 years, from 24 primary care practices in 23 towns in Britain, were undertaken as part of the British Women's Heart and Health Study (BWHHS).[3] Records were searched for any evidence of a diagnosis of MI, angina or diabetes.

In 2003 (two to four years after the medical record reviews), each practice was asked to provide a list of all study participants who they would identify for treatment, secondary prevention or audit purposes, as having either CHD or diabetes. The time gap between the record review (in 1999–2001) and the request (in 2003) for the practices to provide the appropriate list of patients should ensure that all of those who we identified in the record review were later identified by the practices (high sensitivity).

Before asking for these lists we ascertained the vital status and current practice registration details of all study participants. Participants who had left the practices or died in the intervening period were excluded from the analyses.

> ***'Practice systems performed well in terms of identifying women with CHD and diabetes'***

All 24 practices used one or more of three systems for identifying patients with CHD or diabetes for purposes of management and audit – computerised disease register (i.e. a separate database in which participants with disease were listed), computer codes (i.e. patients with a disease were not listed in a specific database but they could be easily identified and listed because of the use of disease codes on the computer) or paper disease register. One practice used all three of these systems, 10 practices used both a computerised register and codes, nine used computerised codes only and four used a computerised register only. Of the 24 practices, 17 (3,096 women after exclusion of those who were dead or had moved practice, n=39) provided lists of participants who they identified as having CHD or diabetes. The remaining seven practices refused to participate with this study.

There was no difference in the baseline prevalence of CHD or diabetes between those who provided lists of patients and those who did not (both p values > 0.7). All remaining analyses are on these 3,096 women. From the medical record reviews there were 367 (11.9%) women with CHD and 145 (4.7%) with diabetes. The sensitivity of the practice system for identifying women with CHD was 71% (95% CI: 66, 76%) and the specificity was 91% (95% CI: 90, 92%) (table 1). The corresponding results for diabetes were 86% (95%CI: 79, 91%) for sensitivity and 98% (95%CI: 97, 99%) for specificity (table 1).

After the baseline examination of BWHHS participants in 1999–2001, practices were informed if the woman's electrocardiogram (ECG) had evidence of a definite MI or ischaemia (based on Minnesota codes) and if their laboratory results confirmed a high fasting blood glucose (≥ 7.0 mmol/L). Of the 240 without CHD in their medical records but who were registered, 17 had definite ECG ischaemia. Of the 58

Table 1. Identification of women with coronary heart disease (CHD) and diabetes: detailed review of medical records (gold standard) versus practice registers

		CHD identified in detailed medical record review (n)		Totals (n)
		Yes	No	
CHD identified in practice register (n)	Yes	261	240	501
	No	106	2,489	2,595
Totals		367	2,729	3,096
		Diabetes identified in detailed medical record review (n)		**Totals (n)**
		Yes	No	
Diabetes identified in practice register (n)	Yes	124	58	182
	No	21	2,893	2,914
Totals (n)		145	2,951	3,096

without diabetes in their medical records but who were registered, 22 had a high fasting glucose. With any woman with definite ECG evidence of ischaemia at baseline treated as a case, along with all other cases, the sensitivity of the CHD register decreased to 59% (95%CI: 54, 63%), with no change in the specificity. With any woman with an elevated fasting glucose at baseline treated as a case, along with all other cases, the sensitivity of the diabetes register decreased to 53% (95%CI: 46, 59%), with no change in the specificity.

Women with CHD on the register were no more likely than those off the register to be receiving aspirin (48.7% *vs.* 48.5%, p=0.97) but there was a tendency for them to be more likely to be receiving a statin (31.0% *vs.* 24.6%, p=0.17). Table 2 shows factors associated with the odds of appearing on the practice registers among those with known CHD. Practices using two or more systems were more likely to identify patients than those using just one. Obese women showed a greater tendency to be on the practice lists, whereas those who lived in Wales or the Midlands and current smokers showed less tendency to be on the lists, though these results were imprecise. When similar analyses were conducted for diabetes, the patterns of association were essentially the same as those for CHD though less precise due to smaller numbers.

Discussion

In general, the practice systems performed well in terms of identifying women with CHD and diabetes (compared to a gold standard of a detailed manual review of computer and paper records). Of concern, however is the inflation of practice registers with women without CHD and without diabetes (nearly 50% of those identified by the practice appeared not to have CHD, with a corresponding result of 31% for diabetes). Whether these women represent failures of medical records to identify correctly all women with relevant diagnoses, failures of the registration systems or the inclusion of related diagnoses (e.g. peripheral arterial disease) remains to be clarified. However, our findings highlight the importance of auditing practice registers both to ensure that all patients with disease are included and to ensure their accuracy in terms of those without disease.

The prevalence of CHD and diabetes found among participants in this study are similar to those of older women in the nationally representative Health Survey for England. Whilst the practices involved in this study have participated in the British Regional Heart Study for over 20 years, there has never been any attempt to influence the management of heart disease or diabetes and, specific to this study, there has never been any advice provided to the practices with respect to managing disease registers. It is possible that practices participating in research such as this will perform better than primary care practices as a whole across the UK. Further, findings in older women may not be generalisable to other groups such as men or younger individuals.

Our work is unable to determine the particular difficulties that primary health care practitioners might have in maintaining accurate chronic disease registers. For example, adding patients to a register after a first consultation where the diagnosis is first considered is useful in ensuring that the majority of patients are entered onto a register. But if there is no system to ensure that individuals are removed upon the receipt of results from further investigations refuting the diagnosis, there will be increasing numbers of individuals on the register without the specific disease. Thus, further research to explore specific factors associated with accurate use and maintenance of registers would be valuable.

> ***'Of concern is the inflation of practice registers with women without CHD and diabetes'***

There are plans to develop common coding practices and computerised systems across primary and secondary care. Such practices should result in greater accuracy of chronic disease registers and with continued follow-up of the BWHHS participants, and a repeat of analyses similar to those presented here, we will be in a position to assess the impact of these new initiatives. In previous publications from this cohort we demonstrated poor levels of secondary prevention in patients with CHD and diabetes at the baseline assessment.[4,5] The results presented here suggest that being on a register is associated with increased likelihood of receiving statins among those with CHD. With continued follow-up we shall be in a position to determine whether the National Service

Table 2. Factors associated with being identified as having coronary heart disease (CHD) by primary care practices (n=17) among women with CHD (n=367)

		Number	Unadjusted OR (95% CI) of being identified	Adjusted* OR (95% CI) of being identified
Age group	60–69 years	223	1	1
	70–79 years	144	0.98 (0.62, 1.55)	1.13 (0.70, 1.84)
Year of diagnosis of CHD	Before 1995	211	1	1
	1995 or later	156	1.00 (0.64, 1.58)	1.03 (0.64, 1.66)
Area of residence	South East England	101	1	1
	Wales or Midlands	88	0.74 (0.40, 1.39)	0.61 (0.31, 1.20)
	North England	124	0.89 (0.50, 1.60)	0.89 (0.48, 1.63)
	Scotland	51	1.04 (0.49, 2.21)	1.33 (0.61, 2.91)
Adult social class	Non-manual	98	1	1
	Manual	269	1.20 (0.72, 1.98)	1.33 (0.79, 2.25)
Smoking	Never	188	1	1
	Past	142	1.36 (0.82, 2.23)	1.39 (0.83, 2.31)
	Current	37	0.60 (0.29, 1.26)	0.65 (0.30, 1.40)
Obese	BMI < 30 kg/m^2	268	1	1
	BMI ≥ 30 kg/m^2	99	1.87 (1.07, 3.25)	1.61 (0.91, 1.40)
Number of systems used by women's practice to identify patients	1 only	223	1	1
	2 or 3	144	1.37 (0.86, 2.20)	1.72 (1.00, 2.96)

Key: * = Simultaneous adjustment for all other variables in first column

Frameworks for CHD and diabetes, and the new General Medical Services contract, will have had an effect on practices' abilities to identify women with these conditions and on levels of secondary prevention. Our results suggest that practices using multiple systems to identify patients with CHD and diabetes perform somewhat better. Randomised controlled trials are required to determine whether multiple systems result in better treatment and prevention.

Acknowledgements

The BWHHS is co-directed by Professor Peter Whincup, Dr Goya Wannamethee and two of the authors (SE and DAL). We thank Carol Bedford, Alison Emerton, Nicola Freck-nall, Karen Jones, Mark Taylor and Katherine Wornell for collecting and entering data, David Montaner who helped with some early analyses, the general practitioners and their staff who have supported data collection, and the women who participated in the study.

Funding

The BWHHS is funded by the (UK) Department of Health and British Heart Foundation. DAL is funded by a (UK) Department of Health Career Scientist Award. The views expressed in this publication are those of the authors and not necessarily those of any of the funding bodies. The funding bodies have had no influence over the scientific work or its publication.

Conflict of interest

None declared.

Ethics

The BWHHS has received local and multi-centre research ethics committee approval. All of the subjects included in these analyses gave written informed consent for their medical records to be accessed.

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