Audit on cardiovascular disease preventive care in general practice

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ABSTRACT

<u>Introduction</u>: **Cardiovascular disease is a major cause of morbidity and mortality. Primary care doctors as general practitioners (GPs) play a central role in prevention, as they are in contact with a large number of patients in the community through provision of first contact, comprehensive and continuing care. This study aims to assess the adequacy of cardiovascular disease preventive care in general practice through a medical audit.**

<u>Methods</u>: **Nine GPs in Malaysia did a retrospective audit on the records of patients, aged 45 years and above, who attended the clinics in June 2005. The adequacy of cardiovascular disease preventive care was assessed using agreed criteria and standards.**

<u>Results</u>: **Standards achieved included blood pressure recording (92.4 percent), blood sugar screening (72.7 percent) and attaining the latest blood pressure of equal or less than 140/90 mmHg in hypertensive patients (71.3 percent). Achieved standards ranged from 11.1 percent to 66.7 percent in the maintenance of hypertension and diabetic registries, recording of smoking status, height and weight, screening of lipid profile and attaining target blood sugar levels in diabetics.**

<u>Conclusions</u>: **In the nine general practice clinics audited, targets were achieved in three out of ten indicators of cardiovascular preventive care. There were vast differences among individual clinics.**

Keywords: **cardiovascular disease preventive care, cardiovascular risk factors, disease prevention, general practice**

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INTRODUCTION

Cardiovascular disease (CVD) is a major cause of mortality and morbidity worldwide, including Malaysia. An estimated 17 million people die of CVDs each year.[1] It accounted for 7.1% of hospitalisations and 22.9% of the deaths reported (14.5% heart disease and diseases of pulmonary circulation and 8.4% cerebrovascular diseases) in Malaysian government hospitals in 2004.[2] Data analysis of more than 500,000 participants in 14 intervention trials

and three observational studies showed that 80%–90% of patients who developed clinically significant coronary heart disease (CHD) had at least one of four classical risk factors, namely: hypercholesterolaemia (> 6.22 mmol/L), hypertension (systolic blood pressure [BP] > 140 mmHg and/or diastolic BP > 90 mmHg), diabetes mellitus or smoking.[3,4] The INTERHEART study suggested that known conventional risk factors accounted for over 90% of the risk of myocardial infarction in both genders worldwide.[5] Of concern was the increased rate of hypertension, diabetes mellitus and obesity.

There is a huge opportunity for prevention. Risk factor modifications have been unequivocally shown to reduce mortality and morbidity. Smokers have about twice the risk of dying from CHD, compared with lifetime nonsmokers. This excess risk is reduced by about half among ex-smokers after only one year of smoking abstinence.[6] It is estimated that in patients with stage 1 hypertension (systolic BP, 140–159 mmHg and/or diastolic BP, 90–99 mmHg) and additional cardiovascular (CV) risk factors, achieving a sustained 12 mmHg decrease in systolic BP for ten years will prevent one death for every 11 patients treated.[7] In short-term, controlled clinical trials, a 1% reduction in LDL-cholesterol levels with statins on average reduces the risk for hard CHD events (myocardial infarction and CHD death) by approximately 1%.[8] Active exercise produces a 45% reduction in risk and achieving an ideal body weight gives up to a 55% lower risk of heart attack as compared to the obese.

Therefore, a major strategy adopted to reduce the CVD burden is by primary and secondary prevention through the screening and management of CV risk factors, such as cigarette smoking, alcohol intake, physical inactivity, hypertension, obesity, diabetes mellitus, and hyperlipidaemia. The cornerstones of primary prevention include avoidance of tobacco, healthy dietary patterns, weight control, appropriate exercise and controlling hypertension, hyperlipidaemia and diabetes mellitus.[9] General practitioners (GPs) have a central role in the prevention, detection and management of CV risk factors as they are in contact with a large number of patients in the community through provision of first contact, comprehensive and continuing care. Evidenced-based guidelines for the primary prevention of CVD and stroke are available.[9,10] However, it is well known that there is a gap between what is recommended and what is actually practised. There is little locally published data on CVD

Table I. Audit on cardiovascular disease preventive care: indicators of care, criteria and target standards used in the audit.

Indicators of care	Criteria	Target standard
<u>Structure</u>		
Register for patients with diabetes mellitus	1. All diabetic patients should be registered in a diabetic register	100%
Hypertension register	2. All hypertensive patients should be registered in a hypertension register	100%
<u>Process</u>		
Assessment and monitoring of cardiovascular risk factors	3. Smoking status should be recorded	70%
	4. Height should be taken & recorded*	70%
	5. Weight should be taken & recorded (at least once)*	70%
	6. Blood pressure should be recorded at least once in the past one year	70%
	7. Blood sugar screening should be done at least once and recorded	70%
	8. Fasting lipid profile should be done at least once and recorded	70%
<u>Outcome</u>		
Blood pressure level	9. For patients with hypertension on follow-up in the past year, the latest blood pressure should be ≤ 140 / 90 mmHg	70%
Blood sugar level	10. For patients with diabetes mellitus on follow-up in the past year, the latest blood sugar should be < 7 mmol/L (fasting) or < 10 mmol/L (random)	70%

* For computation of body mass index

preventive care in general practice. This study aims to assess the adequacy of CVD preventive care in general practice through a medical audit.

METHODS

Between July and August 2005, a sample of family doctors in private practice was invited by the first author to participate in a self-audit on CVD preventive care in their respective clinics. The GP clinics which agreed to participate included three in Perak state (two in Ipoh and one in Batu Gajah), two in Kuala Lumpur, and one each in Malacca, Penang, Johore and Sarawak. All the family physicians were solo practitioners, except one who was in a group practice. All had postgraduate qualifications in general practice and were actively involved in teaching vocational trainees in family practice and/or medical students. As the clinics were scattered throughout Malaysia, all discussion with regard to the study including the methodology, choosing of criteria and standards, discussion of results and remedial measures were done electronically via email correspondence.

A literature search was carried out to look at audits already done and at the current available guidelines in CVD preventive care. These were circulated via email for perusal and discussion. Ten structure, process and outcome indicators of care were then chosen. Criteria and standards were derived (Table I). For the process indicators, the screening for five main modifiable risk factors, i.e.

obesity, hypertension, diabetes mellitus, smoking and hyperlipidaemia, were chosen. Abdominal circumference measurement was suggested but we rejected it, as we were already measuring the height and weight for calculation of body mass index (BMI), although it is now known that abdominal circumference may be a better predictor of CV mortality than BMI. The target standard was set arbitrarily at 70% (for process / outcome criteria), considered by the group as a reasonable standard, especially as some of the practices were doing audits for the first time.

Records of all patients, aged 45 years and above, who attended the GP clinics in the month of June 2005 were traced from the daily prescription book, which was maintained by all GP clinics as required by law. All patients who had registered with the clinic for at least one year and had consulted the doctor at least three times were included, irrespective of whether they did or did not have chronic diseases. As the age to initiate screening for hypertension, blood glucose and lipids in guidelines differs, the authors targeted patients aged 45 years and above, as it was felt that efforts should be concentrated in the population with a higher risk, in view of the limited time for preventive care in general practice as patients' acute problems needed to be addressed. Also, preventive efforts are most efficient when they are directed at those at highest risk. Patients who had been with the clinic for at least one year and had consulted with the GP at least three times were included, because in primary care, the

Table II. Audit on cardiovascular disease preventive care (process indicators).

Criteria	Achieved standard (%) Clinic									Overall adequacy (%)
	I	II	III	IV	V	VI	VII	VIII	IX	
Height	62.9	68.7	7.0	27.5	92.1	50.7	14.2	34.4	91.5	49.9
Weight	63.2	92.0	64.6	45.0	90.2	82.4	14.2	50.4	97.9	66.7
Smoking status	13.9	73.3	10.1	87.5	82.3	48.6	0.0	18.3	23.4	39.7
BP recording	100	99.7	96.0	83.8	98.0	93.0	61.0	100	100	92.4
Blood sugar screening	58.2	84.2	87.8	68.8	98.0	81.0	27.7	69.5	78.7	72.7
Lipid profile	43.2	83.2	40.4	76.3	64.7	83.8	19.9	69.5	76.6	62.0

Table III. Audit on cardiovascular disease preventive care (outcome indicators).

Indicator	Achieved standard (%) Clinic									Overall adequacy (%)
	I	II	III	IV	V	VI	VII	VIII	IX	
Latest BP ≤ 140/90 mmHg	67.1	82.1	66.0	75.0	72.0	79.5	50.0	86.0	64.3	71.3
Latest blood sugar level < 7 mmol/L (fasting) or < 10 mmol/L (random)	52.8	58.7	68.6	54.5	80.0	34.4	25.9	68.8	33.3	53.0

authors felt it was unrealistic for the doctor to screen for risk factors when a patient presented for a single episode of acute illness. A patient, who was regularly seen, would be expected to be screened with the development of a doctor-patient relationship.

Each clinic was arbitrarily given a clinic code number which was entered into a data collection format. The format also included the patient's name and identification number, the agreed criteria and standards (Table I) and a column to enter whether or not each criterion was achieved. One format was used for individual patients and one for the overall clinic. As this was meant to be an internal audit, each family physician assessed his/her own patients' records, based on the criteria selected. The family physician who was in a group practice audited patients who were seen by him only. The completed formats were then sent to the first author for compilation and entry into the Statistical Package for Social Sciences version 12.0 (SPSS Inc, Chicago, IL, USA) for analysis. Chi square test was applied to determine if there were any significant difference between patients' gender, age group, ethnicity, disease presentation (acute versus chronic) and achieving the various criteria set (significant if p-value < 0.05). Results and remedial measures were then discussed among those involved via email.

RESULTS

A total of 1,345 patients were included in the audit. Among these patients were 558 hypertensive and 234 diabetic patients who were on follow-up for at least one year in the clinics. The rest of the patients came with a wide spectrum of illnesses ranging from acute minor illnesses, such as upper respiratory tract infections and dyspepsia, to other chronic conditions, such as gout and bronchial asthma. Some came for medical check-ups. The number of patients audited in each clinic varied from 47 to 374, and the percentage in relationship to the total number of patients for the month of June was between 8.7% and 34.4%. This reflected the large variation in case mix and workload of the clinics that participated in this audit.

For structure of care indicators, only one out of the nine GP clinics had up-to-date registers for hypertensive and diabetic patients. Two other clinics had started the registers but these were not updated. The standards achieved by each clinic in process and outcome of care indicators are shown in Tables II and III. For BP recording, eight out of nine clinics achieved target standards. Overall adequacy was 92.4%. The sole clinic that did not achieve the target of 70% had achieved 61%. For assessment of smoking status, the achieved standards ranged from 0 to 87.5% (Table II), with three clinics achieving the target standard of 70%. Four clinics achieved the target in the recording of weight (overall 66.7%, range 14.2%–97.9%). For recording of height, the achieved standard ranged from 14.2% to 91.5%, with two clinics achieving the target set. Overall adequacy was 49.9%. Five clinics achieved target standard in blood sugar screening (overall 72.7%, range 27.7%–98%). Screening of lipid profile was achieved in four of the clinics (overall adequacy 62%, range 19.9%–83.8%).

Table IV. Audit on cardiovascular disease preventive care: patients presenting with acute versus chronic problems (n = 1,345).

Criteria	Patients presenting with acute problem (n = 355)		Patients presenting with chronic problem (n = 990)	
	No. achieving criteria	Percentage achieved	No. achieving criteria	Percentage achieved
Height	96	27	594	60
Weight	148	41.7	769	77.7
Smoking status	82	23.1	460	46.5
BP recording	305	85.9	957	96.7
Blood sugar screening	149	42	803	81.1
Lipid profile	140	39.4	704	71.1

As for outcome of care indicators, five clinics achieved target set for latest BP ≤ 140/90 mmHg (overall 71.3%, range 50%–86%). Only one clinic achieved target blood sugar levels. Overall adequacy was 53% (range 25.9%–80%). Overall the clinics achieved the target standard set in three of the ten criteria, i.e. blood pressure recording (92.4%), blood sugar screening (72.7%) and achieving target blood pressure of ≤ BP 140/90 mmHg (71.3%) in hypertensive patients. There was no significant difference between patients' gender, ethnicity and age group and all the other criteria assessed. However, there was a significant difference in the screening of CV risk factors among patients presenting with chronic versus acute diseases (Table IV). Those who presented with chronic illnesses were more likely to have their CV risk factors screened (p-value < 0.01). There was a vast difference between individual clinics in their performance with regard to adequacy in achieving the various criteria (Tables II & III). On the average, individual clinics achieved target standards in four of the criteria set (range 0–7 criteria).

DISCUSSION

A register is beneficial for the organisation of systematic care for hypertensive and diabetic patients. It aids in the review and recall of patients ensuring regular follow-up and defaulter identification. The single clinic with an updated register for patients with hypertension and diabetes mellitus had been involved in audits before. Another clinic had registers set up after an audit but did not maintain them. One clinic had just started a register but the data was incomplete. The reasons given by other clinics for not having registers included time constraints, unsure of how to set up such a register and not being convinced of its usefulness.

Assessment and monitoring of CV risk factors are important as a combination of risk factors increase the risk for development of CV events manifold.[11] The results showed that BP was routinely recorded in most of the clinics. The only barrier appeared to be failure to document the recorded BP. For smoking status, the doctors gave the following reasons for not achieving the set target: failure of documentation, gender bias with less female patients being asked, and tendency only to selectively ask patients with chronic diseases. The data showed a significant difference between genders with regard to physician enquiry about their smoking status. 51% of the male patients were asked about their smoking status, as compared to 32% of the females (p < 0.01). The doctors tend to assume their female patients do not smoke. One physician did not ask his female patients, stating that his female patients were irritated by such a question. Another family physician selectively asked patients with coronary artery disease, hypertension and diabetes mellitus, but forgot to ask patients presenting with other complaints such as upper respiratory tract infection. For clinic VII, the doctor, including his locums, did not ask about smoking in all the patients.

For the recording of height and weight, the reasons given for not reaching the set target included failure to record and time constraints. One physician felt that obesity was obvious by appearance. In blood sugar screening, the barriers identified included patients' fear of blood tests and patient's refusal to pay for the additional cost of the laboratory tests, especially for the lipid profile which was more expensive than a random blood sugar (RBS) test. In addition, one family physician said his patients were not keen on venepuncture for the lipid profile test as compared to a finger prick for RBS. For outcome of care indicators, the blood sugar level, and not HbA1c level, was chosen for this audit as an outcome indicator, because RBS was routinely done on diabetic patients in the clinics, being convenient for patients, the results are known immediately and it was also inexpensive, as compared to HbA1c, where the blood had to be sent to the laboratory. Many patients were unwilling / could not afford to pay for the HbA1c test.

A significant difference was found in the screening of CV risk factors among patients presenting with chronic diseases, as compared to those presenting with acute problems (Table IV). Those presenting with chronic illnesses were more likely to have their CV risk factors screened (p < 0.01). This finding was expected as the management of chronic diseases mandates the assessment of overall CV risks. In patients with acute conditions, doctors tend to attend to their acute problem first, and due to time constraints, may forget the preventive aspects of care. Computerisation with flagging of patients needing

preventive care would be ideal.

Remedial measures to be undertaken included a checklist for the screening of CV risk factors mentioned, and for the measurement of height and weight to be delegated to the nurse as a part of the routine in patient registration. Patients should be encouraged through education to have a preventive outlook and have blood glucose and cholesterol tests done on a regular basis. HbA1c should preferably be done as part of the assessment of diabetic control although financial constraint would be a constant barrier. All clinics should set up a disease register for patients with hypertension and diabetes mellitus and this should be updated regularly. A repeat audit would be done to assess the success of remedial measures.

One limitation of the study is that it was an internal audit depending on the participants' own review of their records without an external assessor. However, the first author did carry out an external audit on one of the clinics and she found the results to be reliable. The results of this audit cannot be extrapolated as it was done by family physicians with postgraduate qualifications in general practice, selected by convenience sampling. Therefore an audit done by random sampling of GP clinics would unlikely yield similar results. A systematic random sampling of clinics would be needed to assess the real overall situation. However, this audit did reveal what a group of interested family physicians do in CV preventative care in a fee-for-service environment. It also revealed what barriers they face in attempting to incorporate preventive care into their practice, which is generally geared towards acute care. Understanding and overcoming these barriers would be a step towards better quality care.

Although vast distances separated the participants, it is possible for busy family physicians nationwide to actively participate in an audit, without having to come together physically for meetings. There is also a vast difference in performance between individual clinics, as the participants were a mixed group comprising those experienced in audits as well as novices. They also have a different case mix and varied workload. It is possible that doctors in clinics with a smaller workload had more time for preventive care. The family physicians of the various clinics need to analyse their own performance and rectify their own deficiencies. This difference in performance was also found in previous audits done on diabetes mellitus and hypertension management in general practice.[12,13]

There is a need to standardise and ensure minimum standards of care in general practice. The majority of GP clinics do not audit their performance, and indeed, many lack the knowledge to do so. Audits allow GPs to compare their performance with evidence-based standards, identify deficiencies and implement remedial measures with the intent of improving patient outcomes. These efforts should be recognised and incentives should be given to encourage these quality initiatives by doctors. In the context of CV preventive care, there are enormous benefits for the patients and substantial economic savings for the country, if the huge burden of CVD can be reduced, as secondary and tertiary care for CVD are expensive.

In conclusion, in the nine GP clinics audited, targets were achieved in three out of ten indicators of care, i.e. blood pressure recording (92.4%), blood sugar monitoring (72.7%), and 71.3% achieved the target blood pressure of ≤ 140/90 mmHg. There was a vast difference between individual clinics. Remedial measures include the setting up of disease registers, protocols in the form of checklists, and patient education.

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