Interpractice audit of diagnosis and management of hypertension in primary care: educational intervention and review of medical records

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Abstract

Objective: To determine whether peer review medical audit in a primary care setting changes clinical behaviour in relation to the management of hypertension.

Design: Review of medical records in general practices to identify hypertensive patients followed up by assessment of the pre-educational and post-educational management of interventions.

Setting: Six general practices in north west London picked at random within defined criteria of geography and size.

Subjects: 740 hypertensive patients managed by 25 different general practitioners.

Main outcome measures: Improved level of care in terms of better diagnosis by having at least three blood pressure readings before the start of drug treatment, better level of recordings of lifestyle parameters as shown by the level of recordings of body mass index and total lipid values, and better control of blood pressure and harm minimisation as shown by the level of recordings of urea and electrolyte values.

Results: Improvement was noted in the level of recordings of body mass index, total lipid concentrations, and urea and electrolyte values but not in better diagnosis or blood pressure control.

Conclusion: Clinical behaviour of general practitioners can be changed by peer review but more complex behavioural changes which require the cooperation of the patients and cognitive actions by the general practitioners need further investigation.

Introduction

Hypertension remains a serious public health problem,¹ as it is a major risk factor for coronary heart disease and stroke.² Management of uncomplicated high blood pressure implies continuing care of some sort (with or without drug treatment) for between 10% and 30% of the adult population.³ In the United Kingdom general practice is best placed to provide planned care for this asymptomatic condition. However, success in the detection and management of individual patients leaves much to be desired.⁴ A possible reason is the lack of accepted consensus on best practice.

It is hoped that the use of well written guidelines will improve standards of care⁵ and provide a degree of consistency in patient management. Indeed, since the 1980s the Royal College of General Practitioners has promoted improvements in the quality of clinical care by peer review and education aimed at achieving a higher standard of service delivery.⁶ The uptake and use of disease management guidelines have also been actively encouraged by the NHS Management Executive.⁷ It has been suggested that guidelines developed at local level with the consensus of clinicians would be most effective.⁶ Medical audit advisory groups have been best placed to develop this theme, and since their inception in 1990 these groups have greatly expanded their role beyond simple audit.⁸ Though medical audit advisory groups have achieved improvements in care,⁹ medical audit in the NHS has been criticised.¹⁰ Its effectiveness in terms of patient outcome as opposed to audit process has rarely been studied and has been the subject of much debate.¹¹

Health gain may not necessarily be the only method of evaluating medical audit. Change in medical attitude acquired by sharing patient information with colleagues may also be a worthwhile outcome target.¹² This remains to be confirmed, however, because most publications on medical audit have been concerned with intrapractice audits, very little having been published on interpractice peer review and its benefits and no publication having been linked with education. Audit in its present form therefore remains largely isolated with very little formal educational feedback to clinicians.

This study was designed to investigate the effectiveness of interpractice peer review audit in bringing about change in clinical behaviour with respect to the detection and management of hypertension in general practice. Cardiovascular disease and stroke remain the main causes of morbidity and mortality in developed countries. Effective treatment reduces morbidity and mortality but choosing interventions from the wide range available is difficult for the individual clinician.

Methods

We selected 25 general practitioners from six of the 54 practices in the district of Hillingdon, north west London. The six practices served 12% (24 700) of the Hillingdon registered population. The practices were

selected on the basis of geographic location and size (1500-6000 patients) to represent a cross section of the resident population. Each practice was initially interviewed by MM, who informed the general practitioners of the nature of the project and workload implications.

Patients, role of lead partner, and study criteria

The study subjects were hypertensive patients with a record of having received any of the five primary classes of antihypertensive drugs (diuretics, β blockers, calcium channel blockers, angiotensin converting enzyme inhibitors, α blockers) during 1993-5. Two practices were neither computerised nor had a disease register, so all 24 700 patients' notes and computer records were examined to establish the diagnosis and current prescriptions of the drugs.

Each practice nominated a lead partner, whose role was to represent the views of colleagues, study key publications, and discuss with the rest of the practice doctors and nurses the outcomes during each phase of the study. Each lead partner was given the original papers to read during the initial interview; these included the British Hypertension Society consensus guidelines (1993), the World Health Organisation/International Society of Hypertension guidelines (1993), and the fifth report of the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (1993).¹³⁻¹⁵ During the knowledge acquisition phase (0-2 months; fig 1) lead partners were expected to have read all the publications and to have discussed them with other members of their practice.

At the end of the second month a planning meeting was held at which the lead partners presented the consensus views of their respective practices on the potential design of the study. It was generally agreed to keep the audit simple by using only four criteria from each decision making sector in the detection and treatment of hypertension. These were qualitative criteria, from each of which one quantitative measurement was drawn (box 1).

Several other criteria were discussed, such as smoking, alcohol consumption, and exercise, but consensus was not reached on the inclusion of these. The audit had to be simple, and total consensus was essential to provide ownership by the participants. It was agreed that the study would be restricted to the four quantitative measurements listed in box 1, and standard targets were then set in each sector (box 2).

Study schedule

Phase 1 of the study entailed each participant practice going through all its patient records to identify those hypertensive patients receiving treatment (data collection phase 1; fig 1). Four practices were fully computerised. Despite this, individual case notes were checked both manually and from the computer to ensure that data collection was complete. Checking through the notes was long and tedious. After being trained and given a written structured protocol by MM each practice spent an average of 36.5 hours of staff time for every 500 notes. All patients receiving treatment for hypertension were included and those receiving the same drugs for other reasons excluded. Once all the patients were identified a record was made of each standard target set and whether it had been achieved.

Fig 1 Outline of study design, based on 24 month duration with four meetings of participants facilitated by MM

Feedback on data collection was given to each lead partner at a first review meeting (month 12, feedback 1; fig 1), at which information was shared among the practices. Phase 2 entailed repeating the same exercise over the next 12 months to see if any changes had occurred. Phase 2 concluded with a final review meeting of the lead partners (month 24, feedback 2; fig 1).

Statistical analysis

Results are presented as means and standard error of means with 95% confidence intervals. Comparisons between means were tested with the χ^2 statistic and $P < 0.05$ was taken as significant.

Results

The total number of patients receiving antihypertensive treatment fell from 783 in phase 1 to 759 in phase 2 (table 1). This small reduction emanated from four practices. In two practices there was a small increase in the numbers of patients in phase 2 (from 99 (12.6%) to 105 (13.4%) in practice 5; from 163 (20.8%) to 173 (22.0%) in practice 6 (table 1)).

Standard target 1 was defined as three separate blood pressure readings before the start of treatment (box 2), hypertension being taken as blood pressure $> 160/90$ mm Hg. The overall mean number of blood pressure recordings taken in the two phases of the study was around four (table 1). Four practices (1, 3, 5, and 6) achieved virtually the 100% target on

Box 1—Determining diagnosis and standards of management of hypertension

Qualitative criteria

- (1) Correctness of diagnosis
- (2) Documentation in patient case notes
- (3) Achievement of blood pressure control
- (4) Minimisation of metabolic derangement during treatment

Quantitative criteria

- Three separate blood pressure readings on different occasions taken before initiation of treatment. Hypertension was defined as $> 160/90$ mm Hg
- Recording in case notes of body mass index and total cholesterol concentration
- Reduction of blood pressure to $< 160/90$ mm Hg
- Recording in case notes of plasma urea and electrolyte concentrations

Box 2—Agreed standard targets for each quantitative measurement

Standard target

- (1) All patients to have three blood pressure readings before start of treatment
- (2a) 80% of patients to have at least one body mass index recording over two years leading to time of data collection within each of the two phases
- (2b) 60% of patients to have at least one recording of total serum cholesterol concentration over two years leading to time of data collection within each of the two phases
- (3) Halve number of treated patients with uncontrolled blood pressure (that is, > 160/90 mm Hg)
- (4) Half of patients to have at least one measurement of plasma urea and electrolyte concentrations over five years leading to time of data collection within each of the two phases

Action if standard target not achieved

Stop drug treatment and assess need for treatment after three blood pressure readings

Increase level of recording to reach target

Improve treatment regimens to gain better control

Increase level of recordings to reach target

completion of phase 2. One practice (practice 2) achieved a mean of only 1.1 recordings in phase 1 but increased this to 2.0 in phase 2. The number of patients in practice 2 with more than three readings was 13 (13.8%), which increased to 38 (42.7%) in phase 2 ($P < 0.05$). Practice 5 increased its mean number of measurements from 3.6 in phase 1 to 6.0 in phase 2, and the number of patients in this practice with more than three readings increased from 75 (75.8%) in phase 1 to 105 (100.0%) in phase 2 ($P < 0.05$). When data from all practices were aggregated the overall increase in the number of patients with more than three readings increased from 618 (78.9%) in phase 1 to 699 (92.1%) in phase 2.

Standard target 2a referred to body mass index recordings in the patient case notes and was set at 80% (box 2). In four practices (1, 2, 3, and 5) target 2a was not achieved by the end of phase 1 (fig 2). However, target 2a was achieved in all practices by the end of phase 2 (fig 2). Three practices had a significant ($P < 0.05$) increase between phases 1 and 2 in the numbers of patient notes with recordings of body mass index: practice 1 from 92 (60.1% (SEM 8)) to 114 (83.2% (6)), practice 3 from 150 (67.0% (7)) to 192

Fig 2 Percentage of hypertensive patients per practice with recording of body mass index in their case notes at least once up to conclusion of each phase of study. Standard target was 80% (bold line). Bars are 95% confidence intervals

(91.9% (4)), and practice 6 from 124 (76.1% (6)) to 171 (98.8% (1)).

Standard target 2b referred to recordings of total serum cholesterol concentration in the patient case notes, the standard target being set at 60% (box 2). Three practices (1, 2, and 5) had not achieved this target by the end of phase 1 but all six achieved the target by the end of phase 2 (fig 3). Practice 3 seemed to have a special interest in lipid values and had a recording in 199 (88.8% (SEM 4)) case notes at the end of phase 1, which fell to 190 (90.9% (3)) at the end of phase 2 (NS). Practice 6 increased its level of recording from 85 (52.1% (8)) case notes in phase 1 to 137 (79.2% (7)) case notes at the end of phase 2 ($P < 0.05$).

Standard target 3 referred to halving the number of treated patients with uncontrolled blood pressure (box 2). The number of patients whose blood pressure was uncontrolled by treatment (that is, not lowered to < 160/90 mm Hg) was 542 (69.2% (SEM 2)) at the end of phase 1. This figure was more or less unchanged at the end of phase 2 (484 patients (63.7% (2))); NS). On assessing the achievement of target 3 none of the practices was found to have halved the proportion of patients with uncontrolled blood pressure (table 2). Practice 2 achieved a percentage reduction from 98% to 62%, which though significant ($P < 0.05$) still did not reach the target of twofold improvement.

Standard target 4 referred to urea and electrolyte values being recorded at least once in the patient case notes during the five years before the conclusion of each phase of the study. The target was 50% (box 2).

Table 1 Number of hypertensive patients in each practice, mean number of blood pressure recordings, and proportion of patients with more than three readings during the two phases of study

Practice profiles		Absolute No (%) of patients receiving antihypertensive treatment		Mean No of blood pressure recordings in hypertensive patients		Absolute No (%) of patients who achieved target	
Practice No	Size (No of patients)	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
1	3 050	153 (19.5)	137 (17.5)	3.6	3.7	135 (88.2)	137 (100.0)
2	2 750	94 (12.0)	89 (11.3)	1.1	2.0	13 (13.8)	38 (42.7)
3	5 180	224 (28.6)	209 (26.7)	4.9	4.6	206 (92.0)	207 (99.0)
4	1 650	50 (6.4)	46 (5.9)	5.4	4.3	46 (92.0)	39 (84.8)
5	6 100	99 (12.6)	105 (13.4)	3.6	6.0	75 (75.8)	105 (100.0)
6	5 970	163 (20.8)	173 (22.0)	3.6	3.8	143 (87.7)	173 (100.0)
Total	24 700	783 (100.0)	759 (97.0)			618 (78.9)	699 (92.1)
Mean (SEM)				3.8 (1.0)	4.1 (1.0)		

Table 2 Achievement of standard target 3 in six practices in the two phases of study expressed as numbers of patients (% (SEM)) having treatment whose blood pressure was uncontrolled (>160/90 mm Hg)

Practice No	Absolute No (% (SEM)) of patients with blood pressure >160/90 mm Hg	
	Phase 1	Phase 2
1	86 (56 (4))	67 (49 (4))
2	92 (98 (2))	55 (62 (7))
3	172 (77 (2))	159 (76 (3))
4	28 (56 (6))	24 (53 (7))
5	50 (50 (5))	58 (55 (4))
6	114 (70 (4))	121 (70 (3))
Total	542 (69 (2))	484 (64 (2))

Three practices (2, 4, and 6) had not reached the target at the end of phase 1 but all practices reached the target by the end of phase 2 (fig 4). Practices 1 and 6 showed a significant increase in number of recordings: practice 1, 99 (64.7% (SEM 7)) to 115 (83.9% (6)); practice 6, 60 (36.8% (8)) to 95 (54.9% (7)). Overall aggregated recordings also showed a significant increase, from 399 (51.0% (4)) to 478 (63.0% (3)) ($P < 0.05$).

Discussion

Clear benefits can be gained from lowering blood pressure by pharmacological means when combined with modifications to lifestyle. Lifestyle modifications are current goals of public health education in many countries.¹⁶ Lifestyle modifications should be encouraged among all hypertensive patients as they have beneficial effects. This education, however, is time consuming.³ Unfortunately, despite extensive debate among participants in this study agreement was not forthcoming on including information on smoking and alcohol. Smoking is an important reversible risk factor in coronary heart disease and stroke, and some studies have shown that advice on stopping smoking given by general practitioners is successful in 5% of smokers at one year.¹⁷ The same applies to alcohol. Alcohol has a direct impact on blood pressure control, and advice given by general practitioners has been shown convincingly to be effective.¹⁸

Consensus guidelines for the management of hypertension are widely used and there is a considerable growth industry in this domain. The value of these guidelines in changing clinical behaviour is largely untested. Success depends on how the guidelines have been constructed and the methods used for their implementation.⁶ This study investigated the process of increasing the knowledge base of a group of primary care clinicians in addition to peer review audit in bringing about change in practice. The audit was conducted as an open study with the performance of each practice in the second year being compared with its baseline performance in year 1. Results were analysed with respect to targets set by the participants. Numbers of patients fell between phases 1 and 2, but the differences were not significant. This finding is similar to that of other community studies conducted over two years.¹⁹ Drop outs are due to deaths, emigration, and patients regaining normotensive status without using drugs. New hypertensive patients are identified and added to the list; this

dynamic equilibrium is inevitable in studies that run over a period of time.

Target 1 referred to the accuracy of diagnosis. At the outset only two of the six practices reached the 100% target. Of the other four, one that had low achievement made substantial improvements but still did not reach 100% by the end of phase 2. Four practices achieved this target by the end of phase 2. These results suggest that the key issue of diagnosing hypertension correctly, though considered important by all participants, was not achieved by two practices despite peer education.

Target 2 referred to risk factor identification, which showed the greatest level of improvement during the study. Levels of recording of body mass index and total lipid values in all six practices showed significant improvement over the second 12 months. Two practices that had already reached the targets at the outset continued to improve. This suggests that the educational process and peer review were continuing to influence behaviour with respect to these measurements beyond the impact of fulfilling specified targets.

Target 3 was to halve the number of treated patients with uncontrolled blood pressure. The findings were similar to those of other studies and support the "rule of halves," which indicates suboptimal health care standards in hypertension, first described in the United States in the 1970s. This highly unsatisfactory state of affairs was confirmed by a study in Scotland,²⁰ which showed that only half of treated hypertensive patients were rendered normotensive. In our study only one third of treated hypertensive patients had their blood pressure controlled to a target of <160/90 mm Hg at the end of phase 1, and this rose marginally to 36% at the end of phase 2. These results are poorer than those in the Scottish study, but this could be accounted for by different definitions of normotension. The findings of

Fig 3 Percentage of hypertensive patients who had at least one recording of total serum cholesterol in case notes up to conclusion of each phase of study. Standard target was 60% (bold line). Bars are 95% confidence intervals

Fig 4 Percentage of hypertensive patients per practice who had at least one recording of urea and electrolyte values in case notes up to conclusion of each phase of study. Standard target was 50% (bold line). Bars are 95% confidence intervals

Key messages

- Peer review can significantly change the clinical behaviour of general practitioners with respect to undertaking simple diagnostic procedures, recording lifestyle variables, and carrying out laboratory measurements
- Attempts to improve control of blood pressure by general practitioners is a target less easily achieved
- A primary care study has shown that despite an active education programme over two years the proportion of treated patients whose blood pressure was controlled to < 160/90 mm Hg remained at only one third

the third national health and nutrition survey in the United States showed that only 14-25% of treated hypertensive adults had achieved effective blood pressure control; that study used a more stringent target of < 140/90 mm Hg.²¹

Target 4 was selected as a criterion for audit that would give information on baseline measurements of blood urea and electrolyte concentrations and allow assessment of initial and subsequent end organ damage. Knowledge of basal renal function is also of prime importance when choosing an antihypertensive drug. The target was set at 50% by the group, as it was perceived as a more stringent target that might less readily be achieved. All practices achieved this target by the end of the study.

Should targets be easier?

Interestingly, targets 1 and 3, which lie at the very centre of diagnosis and successful management of hypertension, were the two domains that did not meet expectations. This parallels the findings of audit studies in other diseases, in which despite recognition of the importance of good management the record of achievement is poor. For example, a primary care audit in diabetes showed that a target of improving the glycated haemoglobin concentration was inadequately achieved.²² The authors of that study suggested that failure might have been due to a "top down" approach having been used in dictating the desired outcome. We used a "bottom up" approach, but still the fundamental outcomes of diagnosis and control of blood pressure were not achieved satisfactorily.

It has been suggested that if successful behaviour change is to be achieved by clinicians, then the goals need to be short range and easier ones should be tackled first.²³ Targets 2 and 4 in our study were short range and easy and were indeed achieved. This result is consistent with studies that included better maintenance of case records over the short term, in which local guidelines with practice based education improved management of diabetes.²⁴ However, patient outcomes were not looked at in this study. Targets 1 and 3 required a much more complex change of behaviour on the part of the clinician as well as cooperation of the patient. Research in "self efficiency" suggests that the inclination to engage in challenging activities is affected by individuals' beliefs about personal capabilities.²⁵ It seems that primary care physicians' beliefs about the real value of long term blood pressure control need to be reviewed and strengthened. We should accept that control of blood pressure is difficult even when total commitment is

present; other risk factors need to be emphasised²⁵ and the role of patient compliance needs reviewing.

In conclusion, this study, which investigated over two years a particular type of educational intervention and peer review with respect to diagnosis and management of hypertension, yielded encouraging results when it came to improving general practice recordings of fairly simple measurements, such as body mass index and results of blood analyses. However, more refined measurements that required responses on the part of clinicians, including reaction to the degree of blood pressure control, fared badly. More studies are needed to investigate the type of educational interventions required to bring about complex change in clinical behaviour.

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