

Audit of Hypertension in General Practice

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Summary

An audit of hypertension management was done in October 2004 in nine general practice (GP) clinics. Two structure, ten process and two outcome indicators were assessed. Results showed that targets were achieved in only four indicators, i.e., weight recording (89%), BP monitoring (85.8%), follow-up interval not exceeding 6 months (87.9%) and mean diastolic BP (73.9%). The other indicators (hypertension registry, reminder mechanisms for defaulters, recording of smoking, height, fundoscopy, monitoring of lipid profile, blood sugar, ECG, renal function and achievement of target mean systolic pressure) showed adequacy percentages varying from 22.1 to 68.7. Out of the 1260 patients assessed, 743 (59%) achieved a mean BP \leq 140/90 (or \leq 130/80 mmHg with diabetes mellitus / renal insufficiency) in the last 3 recorded readings. There was a vast difference between individual clinics. Reasons for not achieving targets were discussed and remedial measures for implementation were recommended.

Key Words: Hypertension, Audit, General practice

Introduction

Hypertension is a serious health problem in Malaysia. The second National Health & Morbidity Survey (NHMS) in 1996, found a prevalence of hypertension of 29.9%¹ an increase from 14.4% found in the first NHMS in 1986².

Hypertension is a major risk factor for cardiovascular diseases and complications of hypertension including strokes, myocardial infarction, renal and heart failure are well-known. The morbidity and mortality caused by hypertension is an enormous social and financial burden. The benefits of blood pressure lowering include reducing stroke incidence by 35-40%, myocardial infarction by 20-25% and heart failure by 50%³. Earlier clinical trials confirmed the benefits of treatments to levels of 160 mmHg systolic and 100 mmHg diastolic or less⁴. Newer evidence support the lowering of blood pressures to 140 mmHg systolic and

90 mmHg diastolic, and to even lower levels of 130 / 80 mmHg in high risk groups, such as those with diabetes mellitus (DM) and renal insufficiency (RI)⁵⁻⁸.

Clinical practice guidelines promote optimal care by medical practitioners for hypertensive patients⁹⁻¹¹. However there is evidence of suboptimal patient management even after publication of practice guidelines¹²⁻¹⁴. A study on 669 patients in seven general practices in UK found 21% of those with hypertension did not have a BP recording in the past 5 years¹². Of those who had their BP recorded, 45% had uncontrolled BP (taken as more than and equal 160/100 mmHg). Another study on 740 hypertensive patients in six general practices in London, found that only one third had their BP controlled to a target of < 160/90mmHg and this rose marginally to 36% after 12 months in spite of an intensive audit¹⁴. However improvements were noted in recordings of body mass index, total lipid concentrations and blood electrolytes.

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A more recent study on 1446 hypertensive patients managed by 58 GPs in Adelaide Australia, found that 33% had an average BP of 140/90 mmHg or less in the last 3 recorded readings¹⁵. Another audit in UK general practice found 44% of 882 patients achieved a current BP less than 140/90 mmHg¹⁶. Management of hypertension has been found to be characterized by under-diagnosis, mis-diagnosis, under-treatment, over-treatment and use of inappropriate medications¹⁷.

Local studies indicate that hypertension is amongst the top five most common presenting complaints to primary care both to public primary care clinics (PPCC) and private general practice clinics. In many instances hypertension ranks second only to upper respiratory complaints as the most common presenting complaint^{18,19}. An audit on hypertension care in an outpatient department in a Malaysian government hospital found only 18% of its hypertensive patients achieved adequate BP control, only 5% had target organ damage assessed, and only 2% were screened for other cardiovascular risk factors²⁰. Audits on hypertension in general practice done locally as part of undergraduate medical students projects also found deficiencies in hypertension management²¹.

In the United Kingdom, clinical audit is now done routinely in general practice and audit protocols are available²². In Malaysia, the Ministry of Health have produced national quality indicators for primary care for its PPCC which include assessment of care of patients with diabetes mellitus and asthma. However clinical audits are not compulsory in private general practices. Further many of our general practitioners are not trained in clinical audit²¹. However it is important for all medical practitioners to assess their own performance and rectify any deficiencies found so that patients have optimal care. This study was done by a group of family physicians with the aim of assessing the adequacy of the management of hypertensive patients in their own general practices and to identify deficiencies and remedial measures.

Materials and Methods

In October 2004, a group of family physicians decided to audit the management of hypertensive patients in their respective clinics with the first author as the coordinator.

The private general practice (GP) clinics audited included seven in Perak (three in Ipoh, one each in Batu Gajah, Parit Buntar, Teluk Intan and Taiping), one in Kelantan (Kota Bharu) and one in Johore (Johore Bharu). All the family physicians were solo practitioners except one who belonged to a group practice of 4 doctors. All except one of the participating family physicians in Perak were also lecturers (fulltime, part-time or honorary) of a private medical college, the Royal College of Medicine Perak.

A literature search looked at audits already done and the current available guidelines in the management of hypertension. Structure, process and outcome indicators of care were then chosen. Criteria and standards were derived (Table I). 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 hypertensive patients who attended the general practices in the 3 months between 1st June 2004 and 31st August 2004 were traced from the daily drug book which was maintained by all GP clinics as required by law. All hypertensive patients on drug treatment and followed-up for at least 6 months in the clinic were included. Excluded were those with secondary hypertension, newly diagnosed hypertensives on follow-up less than 6 months, pregnant hypertensives and those on follow-up elsewhere but came for other complaints or to buy medicines.

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 / identification number, the agreed criteria and standards (Table I) and a column to enter whether each criteria was achieved or not achieved. One format was used for each individual patient 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 completed formats were then sent to the coordinator for compilation.

Data were entered and analyzed using SPSS 12.0 for Windows. Chi square test was applied to see if there was any difference between patients with and without DM /RI achieving the target BP. Results and remedial measures were discussed amongst those involved.

Results

A total of 1260 hypertensive patients were included in the audit. The number of hypertension patients who attended each practice in the 3 months period varied widely from 13 patients to 315 patients (Table II). The family physician in charge of the clinic with 13 patients said that the clinic was situated close to a rural PPCC, so most hypertensive patients preferred to be followed-up in the PPCC as they could get free treatment. Two clinics had 315 hypertensive patients each on their follow-up during the study period.

Six out of 9 general practices had a hypertension register (66.7%). Only 2 clinics (22.2%) had a recall system for defaulters (Table III).

Table IV shows the standards achieved by each clinic in process of care indicators. Overall the clinics achieved the target standard set in 3 criteria - weight recording (89%), blood pressure monitoring (85.8%) and interval between follow-up visits (87.9%). Individual performance varied with clinic VIII achieving target standards in 9 out of 10 process criteria, whilst clinic II achieved target standards in 2 out of 10 criteria. The rest achieved target standards in 3 to 6 criteria.

Table V shows the achieved standards in outcome of care indicators. Seven clinics achieved the target set for mean diastolic BP i.e. BP \leq 90 mmHg in the last 3 follow up visits or \leq 80 mmHg in patients with DM or RI. Overall adequacy was 73.9%. Two clinics achieved target set for mean systolic blood pressure level i.e. mean systolic BP \leq 140 mmHg in the last 3 follow up visits or \leq 130 mmHg in patients with DM or RI. Overall adequacy was 59.4%.

Table VI shows the percentage of patients who achieved both target systolic and diastolic BP i.e. mean BP \leq 140/90 mmHg (or \leq 130/80 mmHg with DM/RI). Patients with DM / RI fared significantly worse with only 26.7% achieving target BP as compared to 70.7% in patients without DM/RI (p value = 0.000). A total of 743 patients (59%) achieved the mean target BP in the last 3 recorded readings (BP \leq 140/90 mmHg or \leq 130/80 mmHg in DM/RI).

Discussion

A register is beneficial for organization of systematic care for hypertensive patients. It aids in the review and

recall of patients ensuring regular follow-up and defaulter identification²³. In this study 66.7% had a hypertension register but only 22.2% had a recall system for defaulters. Reasons given for not having a recall system, included time constraints of a busy clinic and concern about defaulters' reaction. Some doctors were concerned patients might misinterpret the gesture as soliciting for patients. They also felt that private patients had a right to choose their doctors and they would come back for follow-up if they wanted to. To overcome this problem, the group decided as a remedial measure to obtain prior permission from patients during consultation, to contact them should they miss their appointment.

Assessment and monitoring of cardiovascular risk factors are important as additional risk factors increase the risk for development of cardiovascular events manifold²⁴. Identification of concomitant DM, another major cardiovascular risk factor, lowers the treatment threshold for high blood pressure⁷⁻¹¹. In this audit, the cardiovascular risk factors assessed were smoking, body mass index (height and weight), lipid profile and blood glucose monitoring.

For smoking the achieved standards ranged from 0 to 100% (Table IV), with 3 clinics achieving the target standard of 70%. Reasons given by those who did not achieve the target set included failure to record although patients were asked their smoking status and failure to ask female patients especially elderly ones citing past experience when similar patients were irritated by such questions. One family physician felt he knew his patients so well that he could tell who was a smoker when the patient walked into the consultation room.

For body mass index, all clinics achieved the target in monitoring and recording of weight (overall 89%, range 77.4% to 100%). For recording of height, the achieved standards ranged from 0 to 88.6%, with essentially 4 clinics achieving the target set (including clinic IV 69.9%). Again reasons given for not reaching the target set included failure to record. One doctor felt he could roughly estimate each patient's body mass index by the patients' appearance.

Monitoring of lipid profile and blood sugar (done at least once in the past 2 years) showed standards were achieved in only 2 and 3 of the clinics respectively. The overall adequacy were 53.9% and 68.7% respectively. Reasons given for not achieving the target set included patients' refusal to pay for the additional cost of the

Table I: Indicators of care, criteria and target standards in audit of hypertension

Indicators of Care	Criteria	Target Standard
STRUCTURE		
Hypertension register	1. All hypertensive patients should be registered in a hypertension register	100%
Reminder mechanism for defaulters	2. There should be a reminder system for patients who defaulted follow-up (> 2 weeks)	100%
PROCESS		
Assessment and monitoring of cardiovascular risk factors	3. Smoking status should be recorded For body mass index:	70%
	4. Height should be taken & recorded	70%
	5. Weight should be taken & recorded (at least once in the past 2 years)	70%
	6. Lipid profile should be done and recorded (at least once in the past 2 years)	70%
	7. Blood sugar (fasting or random) should be done and recorded (at least once in the past 2 years)	70%
Assessment of target organ damage in hypertensive patients	8. Fundoscopy should be done at least once after diagnosis of hypertension and recorded	70%
	9. ECG should be done at least once after diagnosis of hypertension and results recorded	70%
	10. Renal function (urine dipstick/ FEME or blood urea or serum creatinine) should be done and recorded (at least once in the past 2 years)	70%
Blood pressure monitoring	11. Blood pressure should be taken and recorded in all follow-up visits in the past 6 months	70%
Review at regular intervals	12. The interval between follow-up visits should not exceed 6 months in the past 2 years	70%
OUTCOME		
Blood Pressure Level	13. Mean systolic BP should be \leq 140 mmHg in the last 3 follow up visits (\leq 130 mmHg in patients with diabetes mellitus or renal insufficiency)	70%
	14. Mean diastolic BP should be \leq 90 mmHg in the last 3 follow up visits (\leq 80 mmHg in patients with diabetes mellitus or renal insufficiency)	70%

Table II: Number of hypertensive patients in audit of hypertension

	Clinic									Total
	I	II	III	IV	V	VI	VII	VIII	IX	
Number of patients	68	162	315	93	13	179	43	315	72	1260

Table III: Results of audit of hypertension in 9 general practice clinics (structure indicators)

Criteria	Clinic									Overall adequacy %
	I	II	III	IV	V	VI	VII	VIII	IX	
Hypertension Register	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	66.7
Reminder mechanism	No	No	No	Yes	No	Yes	No	No	No	22.2

Table IV: Results of audit of hypertension in 9 general practice clinics (process indicators)

Criteria	Achieved standard %									Overall adequacy %
	I	II	III	IV	V	VI	VII	VIII	IX	
Smoking status	36.8	62.3	0	57	100	60	79.1	71.1	22.2	52.1
Height	54.4	30.9	0	69.9	46	77.9	65	80.3	88.6	57
Weight	89.7	82.1	100	77.4	100	81	83.7	100	87.1	89
Lipid profile	79.4	28.4	43.8	66.7	53.8	60.3	32.5	81.6	38.9	53.9
Blood sugar	97.1	46.3	60	62.4	100	68.7	46.5	83.5	54.3	68.7
Fundoscopy	29.4	1.9	0.6	35.3	0	64.8	27.9	21	18.1	22.1
ECG	29.4	24.1	31.1	77.4	30.7	69.3	20.9	72.7	37.5	43.7
Renal function	79.4	40.7	47.3	86	100	60.9	48.8	81.6	63.9	67.6
BP monitoring	100	37	83.8	68.8	100	90	97.7	97.8	97.2	85.8
Follow-up interval	100	87.9	87.6	63.4	69	96	100	98.4	88.9	87.9

Table V: Results of audit of hypertension in 9 general practice clinics (outcome indicators)

Indicator	Achieved standard %									Overall adequacy %
	Clinic									
	I	II	III	IV	V	VI	VII	VIII	IX	
Mean systolic BP	66.2	64.2	56.2	76.3	23.1	71.5	58.1	68.9	50.0	59.4
Mean diastolic BP	80.9	61.1	87.9	76.3	38.5	73.7	81.4	91.4	73.6	73.9

Table VI: Percentage of patients who achieved both target systolic and diastolic blood pressures

Hypertensive patients	Percentage achieving target BP									% / total achieving target BP
	Clinic									
	I	II	III	IV	V	VI	VII	VIII	IX	
Without DM / RI (target mean BP ≤ 140/90 mmHg) N=923	71.4	59.6	67.4	82.7	22.2	75.4	65.7	78.9	54.3	70.7 N=653
With DM / RI (target mean BP ≤ 130/80 mmHg) N=337	38.5	17.0	22.3	38.9	25.0	36.5	12.5	30.8	13.3	26.7 N=90
Total (with & without DM/RI) achieving target BP N=1260	58.8	45.7	54.0	74.2	23.1	66.5	55.8	67.0	45.8	59.0 N=743

DM = diabetes mellitus, RI = renal insufficiency

laboratory tests. Also some patients did not want their skin pricked for blood to be taken. Another reason was the inconvenience of having to come back after fasting overnight for the blood test. In one clinic (II), the patients did not do a full lipid profile but a finger prick test for total cholesterol and triglyceride.

The group decided as remedial measure to have a checklist for monitoring the cardiovascular risk factors mentioned and to encourage patients through patient education to have the laboratory investigations done on a regular basis.

Assessment of target organ damage is important as hypertensive patients with target organ damage have a higher morbidity and mortality, which can be reduced by appropriate treatment^{3, 25}. Left ventricular hypertrophy (LVH) is a powerful predictor of outcome with an increased risk of myocardial infarct and stroke²⁶. Although echocardiography is the best way of detecting LVH, availability is limited in primary care, so electrocardiography (ECG) is used as one of the initial investigations for assessment of target organ damage⁹.

In this audit, fundoscopy, ECG and renal function (at least once in past 2 years) were assessed. Fundoscopy had the lowest overall adequacy of 22.1% (range 0% to 64.8%). None of the clinics achieved the target set. Reasons given by not doing fundoscopy included lack of time in a busy clinic and patients' refusal for dilatation of pupils.

The overall adequacy for ECG done was 43.7% with 2 clinics achieving the target set. Reasons given for not doing ECG was the cost factor and refusal by some female patients. A remedial measure suggested was to train the clinic nurses to do ECGs, similar to what the PPCC nurses are doing. This would overcome the embarrassment felt by some female patients.

The clinics had better results in renal function monitoring (at least once in past 2 years) with an overall adequacy of 67.6% (range 40.7% to 100%). Four clinics reached the target set. Urine dipstick used in GP clinics cost much less than blood tests and ECG and did not require pricking of the skin like in blood tests. This probably explains the better results.

Monitoring and recording of BP allows the physician to evaluate the efficacy of treatment and give appropriate treatment. The criterion chosen was recording of BP on every follow-up visit in the past 6 months. The overall

adequacy was 85.8% with eight clinics achieving the target set.

Follow-up of hypertensive patients at regular intervals not exceeding 6 months is recommended⁹. Failure to follow-up is associated with poor outcome. Two studies found only 56% and 61% had a follow-up reading after a raised BP reading^{27, 12}. In this audit, the overall adequacy was 87.9% (range 63.4% to 100%) with seven clinics achieving the target set.

BP reduction is associated with lowering risks of cardiovascular deaths, stroke and myocardial infarction. The benefits are greatest in those well controlled²⁸. The recommended systolic BP is ≤ 140 mmHg (≤ 130 mmHg in patients with DM or RI) and diastolic BP is ≤ 90 mmHg (≤ 80 mmHg in patients with DM or RI)^{4,8}. In this audit the overall adequacy for mean systolic BP and mean diastolic BP were 59.4% and 73.9% respectively. Fifty nine percent (743 patients) achieved a mean BP $\leq 140/90$ mmHg (or $\leq 130/80$ mmHg in DM/RI) in last 3 recorded readings. These results were better than those reported in studies mentioned earlier where 33-44% achieved BP $\leq 140/90$ mmHg^{15,16}. However, there is a lot more room for improvement.

Because of the stricter criteria applied to patients with DM or RI, there was a significant difference in the numbers of patients who achieved target blood pressure: 26.7% or 90 out of 337 patients with DM/RI as compared to 70.7% or 653 out of 923 patients without DM/RI (p value = 0.000, Table VI). An analysis of the results showed that if BP $\leq 140/90$ mmHg were also taken as the target BP for those with DM / RI, 65% (217/337) would have achieved the target BP and this adds to an overall of 69.2% who would have achieved BP 140/90 mmHg or less. This means family physicians have to be more aggressive in the management of patients with concomitant DM/RI to reduce BP levels to $\leq 130/80$ mmHg.

Although the mean diastolic pressure reached target standards (overall adequacy 73.9%) there is still room for improvement, especially in achieving target systolic blood pressure which has been identified as an important determinant of cardiovascular risk²⁹. Again a more aggressive approach in patient education and treatment is needed to achieve the target blood pressures recommended.

There is also a vast difference in performance between individual clinics. The family physicians of the various

clinics should analyse their own performance and rectify their own deficiencies. Although the cost of investigations and patients' factors such as unwillingness to undergo certain examinations/investigations, contributed to the deficiencies, family physicians should try through patient education to overcome some of these issues.

A limitation of this study is that the results are dependent on the participants own review of their records. It should also be noted that the participating doctors were a highly selected group of general practitioners, all possessing post-graduate general practice degrees. Most are involved in teaching at the undergraduate level and are expected to be aware of the latest hypertension guidelines. The results should be read in this context. It is likely that the results would be different if the audit was done on a random sample of GP clinics.

Conclusion

This audit on hypertension management done in 9 GP clinics found four out of the 14 criteria assessed, met target standards i.e. recording of weight (89%), blood pressure monitoring (85.8%), follow-up interval not exceeding 6 months (87.9%) and mean diastolic blood pressure (73.9%). Out of the 1260 patients assessed, 743 (59%) achieved a mean BP \leq 140/90 mmHg (or \leq 130/80 mmHg in DM/RI) in the last 3 recorded readings. Performance of individual clinics varied. Checklists, patient education and more aggressive treatment to reduce BP have been suggested as remedial measures and a re-audit to be done after one year.

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