

Original Article

Improving Hypertension Management in Primary Health Care

Najat M Al-Awadhi, Talal K Majbour, Magdy I Al-Orbany
Primary Health Care, Salmiya West Polyclinic, Kuwait

Kuwait Medical Journal 2007, 39 (1): 26-30

ABSTRACT

Objective: To determine whether the implementation of clinical practice guidelines by the primary care physicians, the establishment of a hypertension clinic, electronic medical records with flow sheets and "team" work model has changed the physician's clinical behaviour in relation to the management of hypertension.

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

Setting: Salmiya West Polyclinic, Hawalli Health Area, Kuwait

Subjects: Seven-hundred and twenty hypertensives managed by 14 different general physicians.

Main outcome measures: Improved level of care in terms of better level of documenting hypertension risk factors including age, gender, family history, personal history, current smoking, fasting blood glucose (FBG),

body mass index (BMI), total lipid values (TC, TG, LDL, HDL) and target organ affection (e.g., electrocardiography -ECG) and better blood pressure control by using combination therapy.

Results: Improvement was noted in the level of risk factors' documentation including family history and personal history of hypertension or coronary artery disease, current smoking, FBG, BMI, total lipid values and ECG but not in age and gender which are automatically documented as part of electronic records registration. Improvement was noted in overall blood pressure control, especially in patients using combination therapy of β -blockers and diuretics.

Conclusion: Clinical behaviour of general physicians can be changed by implementation of the clinical practice guidelines, the establishment of hypertension clinic, use of electronic medical records with flow sheets and "team" work model.

KEYWORDS: audit, hypertension, medications, risk factors

INTRODUCTION

Hypertension remains a serious public health problem^[1] as it is a major risk factor for coronary heart disease and stroke^[2], which are the main causes of global morbidity and mortality. Hypertension prevalence is increasing particularly in nations of the developing world.

In Kuwait, hypertension is one of most common medical problems seen. The total prevalence at all levels of care (primary, secondary and tertiary) was found to be 26.3%^[3], whereas its prevalence in primary health care was found to be 6.4% in male and 6.1% in female patients. Mild to moderate hypertension was found in 86% of our subjects^[3].

Appreciation of the crucial role of risk factors in the development of coronary heart disease (CHD) is one of the most significant advances in the understanding of this important disease^[4]. Extensive epidemiological research has established cigarette smoking, diabetes, hyperlipidemia, overweight/

obesity and hypertension as independent as well as synergistic and cumulative major risk factors for CHD^[4-6]. Because of the strength of evidence supporting their role in the pathogenesis of CHD, these five risk factors have often been labeled as "conventional" risk factors^[4]. Clinical Practice Guidelines and WHO (1999) Guidelines for management of hypertension stressed the importance of checking risk factors, not only for prevention but also for their importance in grading and managing hypertension^[7].

Clinical guidelines are increasingly being used as tools to improve the quality of hypertension care. It has been suggested that guidelines developed at local level based on the available evidence from epidemiological studies and clinical trials would be most effective^[7, 8].

The availability of new guidelines^[7] and a protocol published by the Kuwait Primary Healthcare Department^[9] will improve the standard

Address correspondence to:

Dr. Najat Al-Awadhi, RCGP (UK), Consultant Family Medicine, Primary Health Care, Salmiya West Polyclinic, P.O.Box: 1856, Safat, 13019, Kuwait. Tel: (965) 5653294, Mobile: 9070603, Fax: (965) 5653294, E-Mail: dr_nawadhi@hotmail.com, E-Mail: majbour2@hotmail.com

of care and management of hypertensive patients^[10].

This study was designed to investigate the effectiveness of local clinical practice guideline implementation, the establishment of hypertension clinic, electronic medical records with flow sheets and "team" work model in bringing about changes in clinical behavior with respect to management of hypertension in general practice.

SUBJECTS AND METHODS

This study was carried out to evaluate the impact of implementing local Clinical Practice Guidelines for Hypertension (CPGH), the establishment of hypertension clinic, electronic medical records with flow sheets and "team" work model on the management of hypertension provided in the Salmiya West Polyclinic.

The purpose was to assess two major goals of improving the assessment and documentation of risk factors in the records of patients with identified hypertension and better level of blood pressure control encouraging the use of beta-blockers, diuretics, alone or in combinations.

The Salmiya West Polyclinic is located in the Hawalli area and serves a total population of 120,000, which is considered a high number. The Salmiya West Polyclinic has established a hypertension clinic since June 2002 to provide improved level of care according to CPGH prepared by the General Practitioners Committee of the Kuwait Ministry of Health and published in December 2000. The hypertension clinic, as well as the Salmiya West polyclinic, has a fully computerized filing system (The Primary Care Information System established in 2001). Each patient has his own electronic file, which contains all personal and clinical data registered by the treating physicians at each visit, flow charts and appointment cards for follow-up visits. A trained nursing staff is also involved in the hypertension clinic. Fourteen general physicians from the Salmiya West Polyclinic were involved in the management of hypertensive patients. The total number of hypertensive patient records registered in the hypertension clinic was about 3000 in June 2002 and rose upto 4200 records in 2004.

The hypertension clinic has been operational for 18 months. We divided this total period into two periods of nine months each: Period I from 1/9/2002 upto 30/6/2003 and Period II from 1/7/2003 up to 31/3/2004. During period I, educational interventions were started by holding meetings to discuss the local CPGH, to make sure that all physicians have their own original copies, to stress the importance of following its recommendations, to clarify the benefits of checking and documenting risk factors and to use

the hypertension electronic file and flow charts. Follow up visits and meetings were done during Period I for reinforcement and completeness of data. The same method of follow up visits and meetings was continued during Period II.

The subjects included all hypertensive patients registered in the hypertension clinic electronic records during these two periods of time and met the following criteria:

1. Age 18 years and less than 65 years
2. Identified as having mild to moderate hypertension within the defined two periods under study (those who have an average of three blood pressure readings 140/90 and < 180/110 according to local CPGH).
3. Followed up for at least three clinic visits to the hypertension clinic in each defined period under study.
4. Received any of the primary class of antihypertensive drugs [β - blockers (B-B), Diuretics (D), Calcium Channel Blockers (CCB's), Angiotensin Converting Enzyme inhibitors (ACEI's), Angiotensin Receptor Blockers (ARB's) and centrally acting drugs].

A total of 720 patients were included in our study: 333 patients in Period I and 387 patients in Period II respectively.

Data Collection:

At the beginning, we constructed two data collecting sheets for each period of the study; the first contained patient's name, civil ID number and risk factors documentation (age, gender, personal history, family and smoking history, FBG, TC, TG, LDL, HDL, BMI, ECG and Chest X Ray (CXR). The second contained patient's name, civil ID number, medications used (B-B, D and other medications) and BP control.

The data was collected from the hypertension electronic records saved in The Primary Care Information System according to civil ID number of each patient. Using every third civil ID number, hypertensive patients fulfilling the listed criteria were selected. Thus, there were 333 patients in Period I and 387 patients in Period II.

The audit focused on investigating three issues:

1. Achievement of blood pressure control to < 140/90 mmHg, an average reading over the last three visits.
2. Risk factors of hypertension including: a) age, b) gender, c) smoking history, d) family history, e) personal history, f) serum fasting glucose level, g) total serum lipids, h) electrocardiography, i) chest X ray
3. Percentage of hypertensive patients reaching the control level using B-B, D, and/or their combinations.

Table 1: Quantitative measurements of risk factors in both periods

Risk Factor	Period I %	Period II %	p-value
Age	100	100	NS
Gender	100	100	NS
Family history	35.4	44.7	< 0.05
Personal history	45	50.1	NS
History of smoking	60.9	70.8	< 0.01
BMI	7.2	54.3	< 0.01
TC	20.4	70	< 0.01
TG	19.2	69.5	<0.01
LDL	5.1	23.5	<0.01
HDL	4.5	24.8	<0.01
FBS	22.2	70.2	<0.01
ECG	10.2	19.8	<0.01
CXR	1.8	1.5	NS

Table 3: Total patients on each drug class of medication in both periods

Medications	Percentage of Total Sample		p-value
	Period I	Period II	
B-Blockers	80.18	86	< 0.05
Diuretics	33.6	42.1	< 0.05
B-Blockers & Diuretics	26.7	37.2	< 0.01
ACEI's	10.8	29.45	< 0.01
CCB's	8.7	9.5	NS
ARB's	0.3	1.8	NS
Centrally acting drugs	3.9	5.16	NS

The two groups were studied by investigating all the three issues mentioned above in each group independently.

Statistical Analysis:

Data was collected and analyzed using the chi-square statistical test to compare variables between the two periods. A $p < 0.05$ was used as the cut-off level for statistical significance, while $p < 0.01$ was considered as highly significant

RESULTS

The blood pressure was controlled in 44.4% and 58.4% patients in Period I and II respectively, which indicates a highly significant improvement ($p < 0.01$).

Table 1 shows quantitative measurements of risk factors in both periods. There is a significant improvement in all risk factors documentation except personal history and chest X-ray.

Table 2 shows measurements in controlled hypertensive patients and their correlation with the use of B-B, D and their combinations.

Although there is an increase in the percentage of controlled patients in each class, this increase is only significant in those using B-B and D together without other medications.

Table 2: Measurements of Controlled hypertensive patients and their correlation with B-B, D and their combinations

Medications	Percentage of Total Sample		Controlled percentage of each class alone		p-value
	Period I	Period II	Period I	Period II	
B-Blockers alone	48	29.7	59.3	61.7	NS
Diuretics alone	0.3	0.25	0	100	NS
B-Blockers & Diuretics alone	22.2	24.3	41.8	64.6	< 0.01
B-Blockers & other medications	6.9	21.1	30.4	51.2	NS
B-Blockers, Diuretics & other medications	6	11.6	25	42.2	NS
Diuretic & other medications	2.7	3.87	11.1	40	NS

Table 3 shows the total number of patients on each class of medication in both periods. There is a significant increase in the use of D, D and B-blockers combination and ACEIs.

DISCUSSION

Implementation of the local CPGH for diagnosis and treatment of hypertension, the implementation of hypertension clinic, electronic medical records with flow sheets, "team" work model with dedicated nursing staff, appeared to be related to improved blood pressure control. This would be expected to reduce subsequent coronary heart disease, congestive heart failure, renal disease and other complications of uncontrolled hypertension.

In clinical trials, anti-hypertensive therapy has been associated with a reduction in stroke incidence averaging 35-40%; myocardial infarction, 20-25%; and heart failure, more than 50%^[11].

Current control rates in America (SBP < 140 mmHg and DBP < 90 mmHg), though improved, are still far below the Healthy People 2010 goal of 50%; 30% are still unaware that they have hypertension^[12].

In our study, the percentage of controlled patients rose from 44.4 to 58.4% after CPGH implementation, the establishment of hypertension clinic, electronic medical records with flow sheets and "team" work model with dedicated nursing staff. This degree of improvement is impressive from both the clinical and statistical perspective.

Primary Health Care CPGH in Kuwait stressed the importance of risk factors assessment in all hypertensive patients. Management strategies are built on determination of the overall risk profile that allows the physician to decide whether the patient is at low, medium, high or very high risk of cardiovascular disease events^[9].

Unfavorable levels of blood cholesterol and blood pressure, cigarette smoking, overweight/

obesity and diabetes are well established as the major causal factors for CHD^[4,12]. For several of these factors, clinical trials have documented lowered CHD event rates when the factor is detected, treated and reduced^[7,12-13]. These factors independently modify the risk for subsequent cardiovascular disease, and their presence or absence is determined during the routine evaluation of patients with hypertension; *i.e.*, history, physical examination and laboratory tests^[14].

Our study showed that guidelines implementation, the establishment of hypertension clinic, electronic medical records with flow sheets and "team" work model with dedicated nursing staff has succeeded in changing clinical behavior of general practitioners in the Salmiya West polyclinic towards better recording of risk factors including family history, smoking, BMI, lipid profile (TG, TG, LDL, and HDL), FBG, and ECG except for personal history and chest X-ray.

It is increasingly clear that conventional risk factors and their resulting health risks are largely preventable by a healthy lifestyle, which indicates that intense focus on conventional risk factors and the lifestyle behaviors causing them has great potential to decrease the worldwide epidemic of CHD^[20].

The physician and the patient must agree upon BP goals^[15]. When BP is above the goal, alterations in the plan should be documented. BP self-monitoring can also be useful^[12,15].

Primary Health Care CPGH published by the Kuwait Primary Health Care Department recommended D or B-B as initial drugs for uncomplicated hypertension. Diuretics are also recommended in cases of heart failure, isolated systolic hypertension and in older patients, while B-B are recommended in case of post-myocardial infarction^[9].

ACEI's are recommended in cases of diabetes and in heart failure^[9]. Diuretics and B-B recommended in the guidelines because these two classes are effective in reducing cardiovascular events and all-cause mortality among patients with hypertension^[14,19].

Our study showed significant increase in the use of D and B-B and their combinations, as well as ACEIs. This is supported by local and international guidelines.

Recent clinical trials have demonstrated that effective BP control can be achieved in most patients who are hypertensive, but the majority will require two or more antihypertensive drugs^[16-17].

In our study, the percentage of controlled patients who are on B-B and D combination has also significantly increased. This goes well with the recommendation of our local guidelines as well as

international guidelines.

The JNC 7 report suggests initiation of therapy with two drugs (combination therapy) rather than a single agent, if BP is more than 20 mmHg systolic or 10 mmHg diastolic above the treatment goal. Generally, a two-drug regimen should include a diuretic appropriate for the level of renal function.

Failure to titrate or combine medications, despite knowing that the patient is not at goal BP, represents clinical inertia and must be overcome^[12]. Decision support systems (*i.e.*, electronic and paper), flow charts, feedback reminders, and involvement of nurses, clinicians and pharmacists can be helpful^[15].

CONCLUSION

Our study yielded encouraging results and showed that implementation of Primary Health Care CPGH, the establishment of hypertension clinic, electronic medical records with flow sheets and "team" work model with dedicated nursing staff in the Salmiya West Polyclinic improved overall control of hypertension, recording of risk factors, and use of recommended antihypertensive drugs.

It seems very likely that the implementation efforts of doctors and their desire to improve care of hypertension accounted for the improved outcome.

Perhaps because of the "team" care model, special emphasis was placed on accurate recording of current blood pressure medications. These simple "office system" strategies have been shown in other studies to improve care for other chronic diseases, and may be usefully applied in other clinical settings^[15].

REFERENCES

1. Neaton JD, Grimm RH Jr., Prineas RJ, *et al.* Treatment of mild hypertension study. Final results. Treatment of mild hypertension study Research group. *JAMA* 1993; 270:713-724.
2. Collins R, Peto R, MacMahon S, *et al.* Blood pressure, stroke, and coronary heart disease. Part 2, short-term reductions in blood pressure: overview of randomized drug trials in epidemiological context. *Lancet* 1990; 335:827-838.
3. El Reshid K, Al-Owish R, Diab A. Hypertension in Kuwait: the past, present and future. *Saudi J Kidney Dis Transplant* 1999; 10:357-364.
4. Khot UN, Khot MB, Bajzer CT, *et al.* Prevalence of conventional risk factors in patients with coronary heart disease. *JAMA* 2003; 290:898-904.
5. Grundy SM, Pasternak R, Greenland P, Smith S Jr, Fuster V. Assessment of cardiovascular risk by use of multiple- risk-factor equation: a statement for health care professional from the American Heart Association and the American College of Cardiology. *Circulation* 1999; 100:1481-1492.
6. Pasternak RC, Grundy SM, Levy D, Thompson PD. 27th Bethesda Conference: matching the intensity of risk factor management with the hazard for coronary disease events: task force 3: spectrum of risk factors for coronary heart

- disease. *J Am Coll Cardiol* 1996; 27:978-990.
7. 1999 World Health Organization -International Society of Hypertension Guidelines for the management of Hypertension. Guidelines Subcommittee. *J Hypertens* 1999; 17:151-183.
 8. Mashru M, Lant A. Interpractice audit of diagnosis and management of hypertension in primary care: educational intervention and review of medical records. *BMJ* 1997; 314:942-946.
 9. Primary Health Care Clinical Practice Guidelines series: Hypertension, Kuwait. Ministry of Health, Central Department of Primary Health Care 2001; 2.
 10. Implementing clinical practice guidelines. (Effective health care, No 8). Leeds: University of Leeds, 1995.
 11. Neal B, MacMahon S, Chapman N. Blood Pressure Lowering Treatment Trialists' Collaboration. Effects of ACE inhibitors, calcium antagonists, and other blood-pressure-lowering drugs: Results of prospectively designed overviews of randomized trials. Blood Pressure Lowering Treatment Trialists' Collaboration. *Lancet* 2000; 356:1955-1964.
 12. Chobanian AV, Bakris GL, Black HR, *et al.* "Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National Heart, Lung, and Blood Institute; National High Blood Pressure Education Program Coordinating Committee. *Hypertension* 2003; 42:1206-1252.
 13. Expert Panel on Detection, Evaluation, and treatment of high blood cholesterol in adults. Executive summary of the third report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and treatment of high blood cholesterol in adults (Adult Treatment Panel III). *JAMA* 2001; 285:2486-2497.
 14. Schwartz G, Canzanello V, Woolley A, O'Connor P, Kulmann B, Klein D. Health Care Guidelines: Hypertension Diagnosis and Treatment. Institute for Clinical Systems Improvement ICSI. Ninth Edition /February 2004.
 15. Boulware LE, Daumit GL, Frick KD, *et al.* An evidence-based review of patient-centered behavioral interventions for hypertension. *Am J Prev Med* 2001; 21:221-232.
 16. Cushman WC, Ford CE, Cutler JA, *et al.* Success and predictors of blood pressure control in diverse North American settings: The Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT). *J Clin Hypertens (Greenwich)* 2002; 4:393-404.
 17. Black HR, Elliott WJ, Neaton JD, *et al.* Baseline characteristics and elderly blood pressure control in the CONVINCE trial. *Hypertension* 2001; 37:12-18.
 18. Phillips LS, Branch WT, Cook CB, *et al.* Clinical inertia. *Ann Intern Med* 2001; 135:825-834.
 19. Ronald MacWalter, Graham Wat, Philip Cotton, *et al.* SIGN guidelines for hypertension in older patients. Update 2002: 192-201.
 20. Pearson TA, Blair SN, Daniels SR, *et al.* For the American Heart Association Science Advisory and Coordinating Committee. AHA guidelines for primary prevention of cardiovascular disease and stroke: 2002 updates: consensus panel guide to comprehensive risk reduction for adult patients without coronary or other atherosclerotic vascular disease. *Circulation* 2002; 106:388-391.