Preliminary Report

Assessment of Target Organ Damage in Hypertension through a Clinical Audit in Kuwait Family Practice

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ABSTRACT

Objective: To review our progress for delivering effective health care against standard targets. A great amount of work has already been done to change doctor's awareness to adhere to the new guidelines for the diagnosis and management of hypertension according to the Kuwait protocol. In this study we were looking at the doctor's awareness of the importance of checking and recording target organ damage and associated clinical conditions to improve the diagnosis and management of hypertension.
Design: Review of medical records in general practices to identify hypertensive patients, followed up by assessment of the pre- and post-educational management of interventions.
Setting: One family practice centre from Hadiya and another one from Yarmouk, in Kuwait.
Subjects: Two hundred hypertensive patients managed by ten family practitioners were included in the study.
Main Outcome Measured: Improved level of management and care in terms of: 1) better level of recording of history of associated clinical conditions with hypertension including cerebrovascular disease, cardiovascular disease, renovascular disease, peripheral vascular disease and retinopathy; 2) better level of recording of target organ damage including left ventricular hypertrophy by chest X-ray or ECG or echo, urine protein, serum creatinine, fundoscopy and evidence of peripheral atherosclerotic plaque by ultrasound or X-ray and, 3) better follow-up care by the availability of hypertension flow chart.
Results: Improvement (either by reaching the standard target or by showing significant increase) was noted in both clinics in the recording of cerebral, cardiac, renal and retinal diseases as well as recording of left ventricular hypertrophy, serum creatinine, fundoscopy and availability of hypertension flow chart. Urine protein recording was improved in the Yarmouk clinic but not in the Hadiya and vice versa for recording of peripheral vascular diseases. No improvement was noted with regard to recording of evidence of peripheral atherosclerotic plaque in either of the two clinics.
Conclusion: Clinical behaviour of family practitioners can be changed by peer review in terms of a better registration system of simple investigations (such as ECG, urine for protein, etc). Ordering special investigation for specific target organ involvement (such as Doppler study) needs further assessment to see whether it is practical.

KEYWORDS: audit, hypertension, target organ damage

INTRODUCTION

Hypertension (defined as a blood pressure 140/90 mmHg) is a common disease internationally[1]. There is strong evidence that patients with target organ damage associated with hypertension have a higher morbidity and mortality[2-5], which can be reduced by appropriate treatment[6-9]. In addition there is evidence indicating that not all doctors are aware of the importance of checking the risk factors, target organ damage (TOD) and associated clinical conditions (ACC).

The WHO (1999) guidelines for the management of hypertension stressed the importance of checking risk factors, TOD and ACC not only for prevention but also because of their importance in grading and managing hypertension[10]. Knowing the central role of elevated blood pressure in the pathogenesis of both coronary heart disease and stroke, it is clear that one of the challenges facing public health authorities and medical practitioners is the control of hypertension worldwide, both at the individual patients and at the level of the population.

In Kuwait, the most recent data on hypertension showed a prevalence rate of 26.3%[11]. This result was presented in a study conducted in 1999 to update the current status of hypertension in Kuwait. The investigators measured blood pressure in volunteers (18 years and above). The results showed that 745 (26.3%) of 2836 Kuwaitis had hypertension[11]. There are no statistics about the incidence of complications of hypertension in primary health care setting in Kuwait. The assessment of physician's awareness about risk factors of hypertension before and after peer review

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Table 1
Outline of study design

Phase of study Month	Planning 0-2	Phase 1 2-14	Feed back 1 14-16	Phase 2 16-28
Activities	Standard setting	Data collection (1)	Meetings, discussion of results, planning and education	Data collection (2)
Subjects		200 hypertensive patients from the registry of 2 centers		200 hypertensive patients from the registry of 2 centers

Table 2
Agreed standard targets for each qualitative measurement

Standard target	Action if standard target not achieved
(1) 80% of patients to have their history of associated clinical conditions of hypertension recorded in the file including: (1a) cerebral diseases (1b) cardiac diseases (1c) renal diseases (1d) peripheral vascular diseases (1e) retinal abnormality	Increase the level of recording to reach target
(2a) 50% of patients to have their cardiac size assessed by ECG or CXR or echo once during the year of the study phase (2b) 60% of patients to have at least one recording of urine protein during the year of the study phase. (2c) 60% of patients to have at least one recording of serum creatinine during the year of the study phase. (2d) 50% of patients to have fundoscopy once during the year of the study phase. (2e) 30% of patients assessed for evidence of peripheral atherosclerotic plaque by US or X-ray once during the year of the study phase.	Increase the level of appropriate investigation and referral to the specialist with good communication to facilitate the feed back of the referral or investigation or to make the investigation needed available in the clinic to reach the target.
(3) 80% of patients to have hypertension flow charts available in their case notes	Insure hypertension flow chart available in each file

was already studied in Kuwait and yielded encouraging results[12]. The aim of this paper was to address the importance of assessment of the TOD and ACC for better diagnosis and management of hypertension. The availability of new guidelines[10] and a protocol published by the Kuwait primary health care department[13] will improve the standard of care in diagnosis and management of hypertensive patients[14].

SUBJECTS AND METHODS

We selected two family medicine centers out of eight in two health districts: Capital and Ahmadi. The two centers are Hadiya, which is the only family medicine center in Ahmadi health district, and Yarmouk, which is one of six family medicine centers in Capital health district that serves the highest number of people. Both centers have established hypertension clinics with a registry. They serve a total population of 41,000 (13,000, 28,000 respectively) and represent 20% of the registered Kuwaiti population being followed by family medicine centers.

The subjects were hypertensive patients registered in the clinic records (identified as those who have an average of three BP readings > = 140/90 mmHg) during the period of 1998–2001. Each family practice registry was reviewed and updated. Phase 1 of the study entailed the systematic selection of every second patient from the hypertensive patients record. The patient is included in the study if he (or she) had at least three blood pressure (BP) records during the period Nov.1998 - Oct. 1999 in both family practices.

The study focused on three issues:

1. Recording of ACC with hypertension including (a) cerebrovascular diseases, (b) cardiovascular diseases, (c) renal diseases, (d) peripheral vascular diseases, and (e) retinal abnormality[10].
2. Assessment of TOD due to hypertension including: (a) left ventricular hypertrophy (LVH) by ECG, echo or chest X-ray (CXR); nephropathy by measurement, (b) random urine protein, (c) serum creatinine, (d) retinopathy by fundoscopy; (e) evidence of atherosclerotic disease and plaque by ultra sound or X-ray[10].
3. Assessment of hypertension follows-up care by the availability of flow charts.

Following the first phase of data collection, a meeting was held in each clinic to discuss the outcome of the first phase of the study in order to implement the new guidelines for diagnosis and management of hypertension (1999)[10]. The educational intervention included meetings to discuss the results of pre-intervention phase, to discuss the new guidelines for diagnosis and management of hypertension and to give each physician the original paper to read about the WHO/International Society of Hypertension guidelines (1999), which were also summarized in the hypertension flow charts. The second phase started during 2000-2001 with the same method of selection of patients in the two clinics

Table 3
Results of the qualitative measurements in the Hadiya and Yarmouk clinics in both phases (given in percentages).

	Standard target(%)	Hadiya clinic			Yarmouk clinic		
		Phase 1	Phase 2	P Value	Phase 1	Phase 2	P Value
1. Recording of associated clinical conditions of hypertension:							
a) cerebral	80	1	66	< 0.01	87	87	NS
b) cardiac	80	11	72	< 0.01	24	43	< 0.05
c) renal	80	2	67	< 0.01	49	73	< 0.05
d) peripheral	80	0	65	< 0.01	2	3	NS
e) retinal	80	3	29	< 0.05	7	29	< 0.05
2. Minimization of target organ damage during treatment:							
a) LVH	50	9	52	< 0.01	18	37	< 0.05
b) Urine protein	60	38	51	NS	9	35	< 0.05
c) Serum creatinine	60	48	60	NS	50	78	< 0.05
d) Fundoscopy	50	4	29	< 0.05	7	29	< 0.05
e) Peripheralatherosclerotic plaque	30	0	0	-	0	0	-
3. Availability of hypertension flow charts	80	71	97	< 0.05	97	99	NS

NS = Not significant, p > 0.05

audited and the same conditions mentioned earlier.

It was agreed that the study will include three main qualitative criteria: documentation in patient case notes of associated clinical conditions of hypertension, target organ damage, and the availability of hypertension flow charts (Table 1). Quantitative measurements and standard targets were then set in each sector (Table 2). Standard targets were set based on pilot study results, practice facilities and team agreement.

Once all patients were identified, a record was made for each standard target set, irrespective of whether it had been achieved or not. Collection of data were performed by a physician in each center because he/she is more qualified for collecting medical information and the only authorized person to look in the patient's file.

Phase 2 was repeated after 4-6 months from the first phase of collection during which a staff meeting was held in each practice to discuss the outcomes and ways to improve before the second phase. Phase 2 entailed repeating the same exercise over the next 12 months. Phase 2 was concluded with a final review meeting.

STATISTICAL ANALYSIS

Results are presented as a proportion. Comparisons between the two proportions were performed with the normal Z - test using p 0.05 as the cut-off level for statistical significance.

RESULTS

Table 3 shows results of the quantitative measurements in the Hadiya and the Yarmouk clinics in both phases. The total number of hypertensive patients included was 200, from both clinics in each phase. The first standard target was reached in the Yarmouk clinic in both phases and it increased significantly ($p < 0.01$) by the end of phase 2. In the Hadiya clinic, recording the history of cerebrovascular complications was not acheived. Recording the history of cardiac and renovascular complications did not achieve the first standard target in both clinics in the two phases, but it increased significantly in the Hadiya and the Yarmouk clinics ($p < 0.01$, < 0.05 respectively) by the end of phase 2. The standard target was also not reached in both clinics when considering the history of peripheral vascular complication, but it increased significantly ($p < 0.01$) in the Hadiya clinic by the end of phase 2. Similarly the standard target was also not reached in both phases, when considering the history of retinal complications; it again increased significantly ($p < 0.05$) in both the clinics by the end of phase 2.

The second standard target referred to minimization of target organ damage during treatment included: the standard target acheived in the recording of LVH in the Hadiya clinic with significant increase in both clinics (Hadiya $p < 0.01$, Yarmouk $p < 0.05$) by the end of phase 2. Recording of urine protein increased significantly in the Yarmouk clinic ($p < 0.05$) but did not reach the standard target in both clinics in both phases. Recording of serum creatinine achieved the standard target in both clinics by the end of phase 2 and the increase was significant in the Yarmouk clinic. Recording of fundoscopy increased

significantly, $p < 0.05$ in both clinics by the end of phase 2 but did not reach the standard target. Recording of evidence of peripheral atherosclerotic plaque remained 0% in both clinics in both phases.

The third standard target referred to the availability of hypertension flow chart, achieved the standard target in both clinics by the end of phase 2 and the increase was significant ($p < 0.05$) in the Hadiya clinic.

DISCUSSION

There is evidence that patients with target organ damage associated with hypertension have a higher morbidity and mortality[2-5], which can be reduced by accurate evaluation and management of hypertension[6-9]. The assessment of alterations in the function and structure of these organs is therefore, an important part of the evaluation of hypertensive patients before the onset of clinical symptoms[7].

For cardiac disease, clinical evidence should be sought for past or present angina, myocardial infarction and heart failure[15], or there may be documented event in the medical records. A clinical examination should be carried out to detect cardiomegaly and left ventricular hypertrophy. The presence of LVH is a poorer prognosis with increase in the risk of heart attack and stroke[4,5,7,16-19]. Various grades of hypertensive retinopathy are recognized from minor vessel changes to exudates, haemorrhages and papilloedema[20]. When retinopathy is present, better control and treatment is always indicated. Albuminuria, reflecting systemic microvascular damage, and left ventricular geometric abnormalities have both been shown to predict increased cardiovascular morbidity and mortality[2]. The WHO/ISH guidelines[15] classify protinurea and raised creatinine as factors that should influence the decision to treat. All major guidelines recommend the routine measurement of serum creatinine in hypertensive patients[15,21,22].

Consensus guidelines for the management of hypertension are widely used. 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[23,24]. It is hoped that the use of well-written guidelines will improve standards of care and provide a degree of consistency in patient management[14]. Indeed, since the 1980s, the Royal college of General Practitioners in UK has promoted improvements in the quality of clinical care by peer review and education aimed at achieving a higher standard of service delivery[24]. The uptake and use of disease management guidelines have also been actively encouraged by the NHS Management Executive[25]. Though medical audit advisory groups have achieved improvement in care[26], medical audit in the NHS has been criticized[27]. Its effectiveness in terms of patient outcome as opposed to audit process has rarely been studied and has been the subject of much a debate[28]. The study which was conducted by Mashru *et al* to investigate the process of increasing the knowledge base of a group of primary care clinicians in addition to peer review audit, in bringing about changes in clinical behaviour with respect to the detection and management of hypertension in six general practices in north west London, yielded encouraging results[23]. Our study investigated the process of increasing the knowledge base of a group of family practitioners in an attempt to bring about a change in practice.

The audit was conducted as a two-phase study with the performance of each family medicine practice in the second phase being compared with its first phase performance. The results were analyzed with respect to the targets set by the participants.

Target 1 referred to associated clinical conditions of hypertension and included five conditions viz, (a) cerebral, (b) cardiac, (c) renal, (d) peripheral and (e) retinal diseases. In the Hadiya clinic, all the above conditions showed significant increase in the percentage of recording by the end of phase 2 but did not reach the standard target. This reflects increased awareness of physicians in this aspect.

In the Yarmouk clinic, the associated condition (a), which represents cerebrovascular complications achieved the standard in both phases, and reflects improved awareness of physicians in this aspect. In case of associated conditions (b), (c), and (e) which represent cardiovascular, renovascular and retinal conditions respectively, it showed significant increase in the percentage of recording although it did not reach the standard target. This suggests the influence of educational process on physician's behaviour. Although recording of retinal conditions showed significant increase in both clinics, it fell short of the target. This is because the physicians could not ensure the presence of hypertensive retinal conditions from history alone without evidence of fundoscopy. For associated condition (d), which represented peripheral vascular condition, no increase was noted by the end of the second phase and this may be due to the fact that the physicians were not aware of its association with hypertension. Another possible explanation is that the physicians knew that cerebral and cardiac conditions are more commonly associated with hypertension than peripheral vascular diseases,

and they may have forgotten or ignored that the latter condition is also associated with hypertension.

Target (2) referred to target organ damage assessment and included five investigations. The first (a), which represents recording of LVH, reached the standard target in the Hadiya clinic and showed significant increase in the Yarmouk and this result was helped by the availability of ECG machines in both clinics. Test (b), which represents recording of urine protein, showed increase in both clinics by the end of the second phase with significant increase in the Yarmouk clinic but did not reach standard target. This result was obtained because of the availability of urine test in both clinics. Test (c), which represents recording of serum creatinine, reached the standard target in both clinics by the end of the second phase and this suggests, increased awareness of physicians in this aspect. Test (d), which represents fundoscopy, showed a significant increase by the end of the second phase in both clinics but did not reach the standard target. This could be explained by the presence of some obstacles, in referring to opthalmologists, in getting feed back, and also, patient's compliance. Test (e) which represents assessment of peripheral atherosclerotic plaque actually remained 0% in both clinics in both phases. This suggests poor awareness of physicians in this aspect and/or the difficulty in getting the investigation for peripheral vascular disease (Doppler U/S study or X-ray).

Target (3) referred to the assessment of hypertension follow-up care by the availability of flow charts. It reached the standard target in the Hadiya clinic by the end of the second phase and was above the standard target in the Yarmouk clinic from the first phase. This suggests the increased awareness of physicians in this aspect.

In the Hadiya clinic, the targets that met the standard criteria by the end of the second phase were: recording of LVH and serum creatinine and the availability of hypertension flow chart. There were targets that showed significant improvement by the end of the second phase but not reaching the standard target. These were: recording of all associated clinical conditions of hypertension (cerebral, cardiac, renal, peripheral and retinal diseases) and fundoscopy.

In the Yarmouk clinic, the targets that met the standard criteria by the end of the second phase were: recording of cerebrovascular condition and serum creatinine, and the availability of hypertensive flow chart. There were targets that showed significant improvement by the end of the second phase but not reaching the standard target. These were: recording of associated clinical conditions of hypertension including cardiac, renal and retinal diseases and recording of LVH, urine protein and fundoscopy.

Our expectations were met with regards to improvement of the recording system in both clinics, whether by reaching the standard or by showing a significant improvement. This included all the associated clinical conditions of hypertension with regards to cerebral, cardiac, renal, peripheral and retinal diseases, recording of target organ damage with regard to LVH, urine protein, serum creatinine and fundoscopy and availability of hypertension flow chart. The non-recording of peripheral vascular conditions in the Yarmouk clinic and the non-recording of evidence of peripheral atherosclerotic plaque in both clinics suggest that the problem may be due to the difficulty involved in requesting investigations for these conditions.

This study yielded promising results towards improving general practice, history taking and recording the associated clinical conditions of hypertension and requesting investigations such as urine protein, serum creatinine, ECG and fundoscopy. However, the results were not encouraging in relation to recording of evidence of peripheral atherosclerotic plaque. This requires more educational interventions and assessment of the practicality of further investigations.

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