

## Original Article

# Improving the Diagnosis of Hypertension and Assessment of Vascular Risk Factors through a Clinical Audit in Kuwait Family Practice

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**ABSTRACT**

**Objectives:** To determine whether family practitioners are aware of the criteria for diagnosis of hypertensive patients. To investigate, if it is possible to change their behaviour in the diagnosis of hypertension and to see, if they could adhere to the new guideline of Kuwait protocol.

**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:** Two family practices (Hadiya and Yarmouk) in Kuwait were included from two major health areas.

**Subjects:** Two hundred hypertensive patients managed by ten family practitioners were included in the study.

**Main Outcome Measures:** Improved level of diagnosis and care in terms of having at least three blood pressure readings before the start of drug treatment; better level of recording of

risk factors of hypertension including: age, gender, smoking history, family history of premature ischaemic heart disease, measurements of total serum cholesterol and glucose levels, and better control of blood pressure.

**Results:** Improvement was noted in the recordings of age, gender, total serum cholesterol and glucose levels in both family practices and family history of premature ischaemic heart disease and good control in one, (Yarmouk) although improvement in these parameters in addition to recording of smoking history was also noted in the second (Hadiya). No improvement was noted in the correct diagnosis in either of the two.

**Conclusion:** Clinical behaviour of family practitioners can be changed by peer review in terms of a better registration system. More complex behavioural changes, which require the cooperation of patients and cognitive actions by family practitioners need further investigation.

KEYWORDS: audit, hypertension, risk factors

**INTRODUCTION**

Hypertension is one of the most common medical problems seen by the primary care doctor and hospital physicians accounting for 26.3% of all medical problems<sup>[1,2]</sup>. Hypertension is a serious public health problem audit<sup>[3]</sup>, as it is a major risk factor for coronary heart disease and stroke<sup>[4-8]</sup>.

In Kuwait, it is believed that the primary care health center is the best place to provide care for uncomplicated hypertension. However, success in accurate diagnosis of an individual patient leaves much to be desired<sup>[9]</sup>. A possible reason is the lack of accepted protocol in practice. Kuwait is a small country located in the northeastern part of the Arabian peninsula. It is divided into five health areas, each area has an average of 15 primary care and family centers. Each center serves an average population of 20,000. These centers are capable of treating hypertensive patients.

This study addresses the importance of the assessment of the risk factors for better diagnosis of hypertension, which is based on the new guidelines of 1999<sup>[10]</sup>. These risk factors are known

to increase the mortality and morbidity due to hypertension.

Our aim was to create a database for complete and accurate diagnosis of hypertension. The availability of new guidelines and a protocol published by the Kuwait primary health care department will improve the standard of care in diagnosis and management of hypertensive patients<sup>[11,12]</sup>.

**SUBJECTS AND METHODS**

We selected two family medicine centers out of eight in two health areas: the capital and Ahmadi. The two centers, Hadiya and Yarmouk, serve a total population of 41,000 (13,000, 28,000 respectively) and represent 20% of registered Kuwaiti population being followed by family medicine centers. One family medicine center was selected from each area.

The subjects were hypertensive patients registered in the clinic records during the period 1998 to 2001. Each family practice registration was reviewed and updated.

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Phase 1 of the study entailed the participant to select systematically every second patient from the hypertensive patients record and to confirm if the patient had at least three blood pressure (BP) records during the period from November 1998 to October 1999.

The study focuses on investigating three issues:

1. Whether initial diagnosis of hypertension was correct (i.e. three BP readings being measured before a patient was classified as hypertensive).
2. Risk factors of hypertension including: (a) age, (b) gender, (c) smoking history, (d) family history of (h/o) premature ischaemic heart disease (IHD), (e) total serum cholesterol level, (f) serum glucose level were recorded in patient files<sup>[10]</sup>.
3. Achievement of BP control as  $< 140/90$  mm Hg<sup>[10,11]</sup>.

Following the data collection, a meeting was held in each practice to plan the study and discuss the outcome of the first phase of the study and to give new guidelines for the diagnosis and management of hypertension (1999)<sup>[10]</sup>. In the second phase (2000-2001), the selection of patients in the two clinics were made in the same way as above and the same earlier procedures followed.

The study included the three main qualitative criteria: correctness of diagnosis, documentation in patient case notes with regard to six risk factors of hypertension, and the achievement of BP control (Table 1). Quantitative measurements and standard targets were then set in each sector (Table 2). Once all patients were identified, a record was made for each standard target set, and whether it had been achieved or not. Collection of data were performed by a physician in each center.

Phase 2 was repeated 4-6 months after phase 1. A staff meeting was held in each practice to discuss the outcomes and ways for improvement before the second phase. Phase 2 entailed repeating the same exercise over the next 12 months and 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 Hadiya and Yarmouk clinics in both phases. The total number of hypertensive patients included was 200 from both clinics in each phase. Standard target 1 defined as three separate BP readings before the start of treatment was not achieved in both clinics by the end of phase 2 (Fig. 1). Standard target 2 referred to recording of risk

**Table 1**

Determining diagnosis, risk factors and standards of management of hypertension

Qualitative Criteria	Quantitative Criteria
(1) Correctness of diagnosis	Three separate BP readings on different occasions were taken before initiation of treatment (hypertension defined as BP $>$ or $= 140/90$ mmHg).
(2) Studying risk factors of hypertension and their documentation in patient case notes.	Recording in case notes of age, gender, history of smoking, family h/o premature IHD, total serum cholesterol and glucose levels.
(3) Achievement of BP control	Reduction of BP to $< 140/90$ mmHg.

**Table 2**

Agreed standard targets for each quantitative measurement

Standard target	Action, if standard target not achieved
(1) All patients to have three BP readings before the start of treatment	Stop drug treatment and assess the need for treatment after three BP readings
(2a) All patients to have their age recorded in the file	Increase level of recording to reach target
(2b) All patients to have their gender recorded in the file	
(2c) 80% of patients to have their smoking history recorded in the file	
(2d) 80% of patients to have their family h/o premature IHD recorded in the file	
(2e) 60% of patients to have at least one recording of total serum cholesterol concentration during the year of the study phase	
(2f) 60% of patients to have at least one recording of blood glucose during the year of the study phase	
(3) 50% of treated patients with uncontrolled BP (BP $>$ or $= 140/90$ )	Improve treatment regimens to gain better control.

factors of hypertension was as follows:

1. recording age and gender risk factors achieved the standard target in both clinics in both phases
2. recording smoking risk factor almost reached the standard target with significant increase ( $p < 0.01$ ) in the Hadiya clinic by the end of phase 2, but this was not the case in Yarmouk clinic (Fig. 2).
3. recording of family h/o premature IHD risk factor achieved the standard target in the Yarmouk clinic in both phases and it increased significantly ( $P < 0.01$ ) in Hadiya clinic but did not reach the standard target (Fig. 3).

**Table 3**  
Results of the quantitative measurements in Hadiya and Yarmouk clinics in both phases

	Standard target %	Hadiya Clinic			Yarmouk Clinic		
		Phase 1 %	Phase 2 %	P value	Phase 1 %	Phase 2 %	P value
1. Correctness of diagnosis	100	32	32	NS	7	7	NS
2. Recording of risk factors of							
a. Age	100	100	100	NS	100	100	NS
b. Gender	100	100	100	NS	100	100	NS
c. History of smoking	80	24	76	P < 0.01	50	49	NS
d. Family h/o premature IHD	80	1	34	P < 0.01	84	86	NS
e. Total serum cholesterol	60	50	60	NS	53	81	P < 0.01
f. Blood glucose	60	80	79	NS	52	81	P < 0.01
3. Achievement of BP control	50	27	38	NS	40	49	NS

4. recording total serum cholesterol and glucose levels risk factors achieved the standard target in both clinics by the end of phase 2 and the increase was significant, P < 0.01 in Yarmouk clinic (Fig. 4 & 5).

Standard target 3 of halving the number of treated patient with uncontrolled blood pressure, was almost reached in the Yarmouk clinic by the end of phase 2, but was not in Hadiya clinic (Fig. 6).

**DISCUSSION**

Clear benefits may be obtained by lowering blood pressure by pharmacological means when combined with modifications of life style<sup>[13]</sup>. Life style modifications are the current goal of public health education in many countries<sup>[14]</sup>. Life style modifications should be encouraged among all hypertensive patients as they have beneficial effects<sup>[15,16]</sup>. Smoking is an important reversible risk factor in coronary heart disease and stroke<sup>[13,14,17]</sup>. All large scale trials of mild hypertension have shown that treated hypertensives who smoke tobacco have

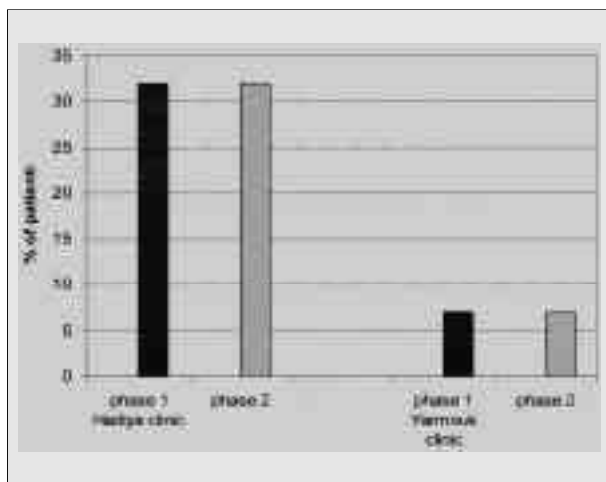


Fig. 1: Percentage of hypertensive patients per clinic who had three BP readings before start of treatment. Standard target was 100%.

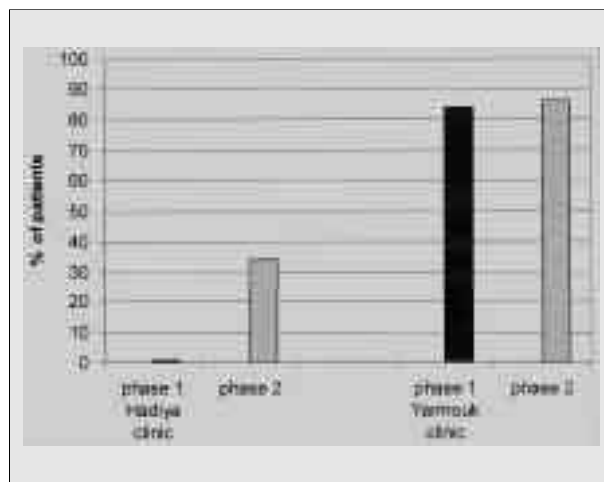


Fig. 3: Percentage of hypertensive patients per clinic who had their family history of IHD recorded in the file. Standard target was 80%.

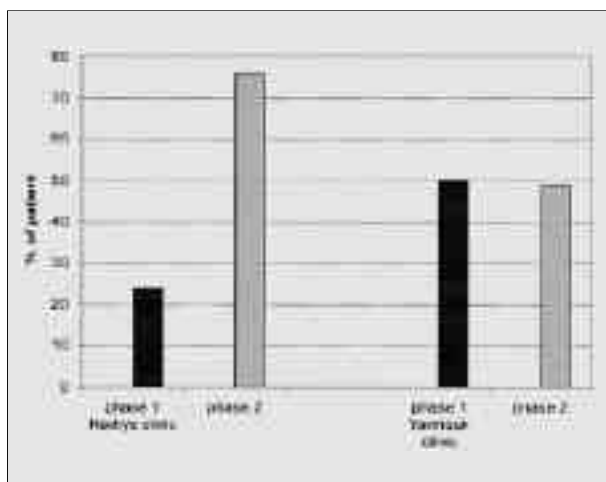


Fig. 2: Percentage of hypertensive patients per clinic who had their smoking history recorded in the file. Standard target was 80%.

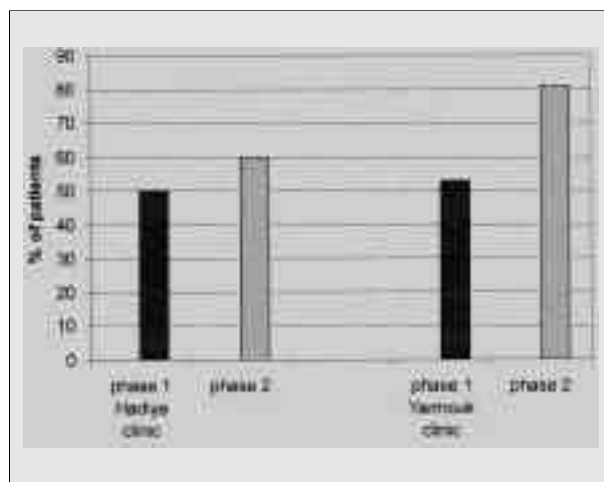


Fig. 4: Percentage of hypertensive patients per clinic who had their total serum cholesterol level recorded in the file. Standard target was 60%.

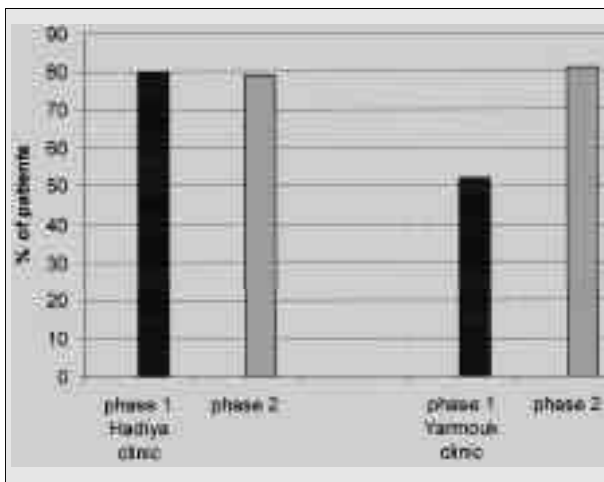


Fig. 5: Percentage of hypertensive patients per clinic who had their blood glucose level recorded in the file. Standard target was 60%.

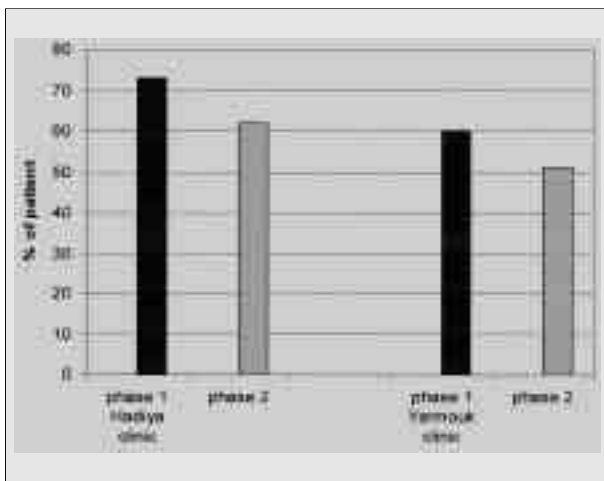


Fig. 6: Percentage of treated patients with uncontrolled blood pressure (> 140 / 90). Standard target was 50%.

a higher incidence of stroke and heart attacks<sup>[18]</sup>. The risk is synergistic<sup>[19]</sup>. Diabetes is a potent risk factor for vascular disease especially in the presence of hypertension and vice versa<sup>[18,20-22]</sup>. In the presence of diabetes, the treatment thresholds for hypertension are lower<sup>[7,13,18,22-24]</sup>. Hypercholesterolaemia is a major risk for cardiovascular disease<sup>[4,15]</sup>. There is good evidence to show that lowering raised serum cholesterol with drugs in patients with established coronary artery disease lowers mortality and morbidity<sup>[25]</sup>. A family history of premature cardiovascular disease is a risk factor<sup>[7,21]</sup>. Although an adverse family history cannot be altered, it should be taken into account when making decisions about treatment and further evaluation such as a lipid screen.

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<sup>[14,26]</sup>. This study investigated the process of increasing the knowledge of a group

of family practitioners in order to bring about change in practice.

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

Target 1 referred to the accuracy of diagnosis. None of the two practices reached the standard target of 100%. None even showed an increase in the target by the end of phase 2. These results suggest that the key issue of correctly diagnosing hypertension was not achieved by the two practices. This could be explained by the difficulty of stopping medication of already known hypertensive patients. Target 2 referred to risk factor identification and included six factors. Risk factor (a) and (b) which represent age and gender reached the standard target of 100% in both practices and in both phases and this was expected because each patient case notes contained these parameters. Risk factor (c), which studied the recorded history of smoking nearly reached standard target in the Hadiya clinic, but did not change in the Yarmouk clinic. This suggests the influence of educational process on physician's behaviour was more visible in Hadiya clinic. The cultural difficulties in obtaining and thus recording a patient's smoking habit could explain the result in Yarmouk clinic for this risk factor not reaching the standard target.

Risk factor (d), which studied the recorded family history of premature IHD, reached the standard in both phases in the Yarmouk clinic and this reflects the awareness of physicians in this aspect, as special notes on risk factor were present in the chart. Hadiya clinic did not reach the standard target by the end of second phase but the significant improvement in the target level in the second phase reflects the educational process influence.

For risk factors (e) and (f), that referred to the recording of total serum cholesterol and glucose levels respectively, both practices reached the standard target by the end of second phase. This suggests that the educational process continued to influence the behaviour.

Target 3 was to halve the number of treated patients with uncontrolled blood pressure. The findings were similar to those of other studies<sup>[27]</sup> and support the "rule of halves" which indicated sub optimal health care standards in hypertension. In our study, the Hadiya clinic showed that 38% of treated patients had their BP controlled to a target of < 140/90 mm Hg<sup>[10,11]</sup> at the end of phase 2, while Yarmouk clinic the percentage was 49% at the end of phase 2. The Third National Health and Nutrition

Survey in the United States showed that only 14-25% of treated hypertensive adults achieved effective blood pressure control of < 140/90 mm Hg<sup>[28]</sup>.

In the Hadiya clinic, the targets which met the standard criteria by the end of the second phase were: risk factors of recording age and gender, recording of total serum cholesterol and glucose levels. Targets that showed significant improvement by the end of second phase but not reaching the standard target were: recording history of smoking and family h/o premature IHD.

In the Yarmouk clinic, the targets which met the standard criteria by the end of the second phase were: risk factors of recording age and gender, recording family h/o premature IHD, recording of total serum cholesterol and glucose levels and having 50% of treated patients with controlled BP.

Our expectations were met with regard to improvement of the recording system in both clinics by reaching the standard or by showing significant improvement. The improved parameters included recording of all the risk factors of hypertension: age, gender, smoking history, family h/o premature IHD and measurement of total serum cholesterol and glucose levels. Control of BP was met in Yarmouk clinic but not in Hadiya clinic, although it was improved. The correctness of diagnosis did not meet our expectations as it required more complex change of behaviour of clinicians as well cooperation of patients.

Although hypertension is a potent cardiovascular risk factor, it is substantially modified by additional risk factors<sup>[27]</sup>. For instance the presence of smoking, high cholesterol and hypertension combined increases the risk of vascular events by 20 fold<sup>[4,5,6,29]</sup>. This emphasises that the management of hypertension cannot be divorced from the management of other vascular risk factors: a multifactorial approach is essential<sup>[3]</sup>. The presence of additional risk factors lowers the treatment thresholds for high blood pressure<sup>[7,13,18,20,24,30]</sup>.

This study yielded encouraging results and showed improvement in the writing up of medical records, in the examination, in the investigations as well as in recording of risk factors. There was a good control of BP in one of the practices (Yarmouk). However the results were not encouraging when diagnosis of BP and doctor's reaction to the degree of blood pressure control are considered. More studies are needed to investigate the type of educational intervention required to bring about complex changes in clinical behaviour.

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