Management of hypertensive patients in primary health care setting, auditing the practice

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ABSTRACT

Objectives: To audit the medical care provided to hypertensive patients in a health care center in Riyadh, Kingdom of Saudi Arabia (KSA) and determine the efficient control of hypertension.

Methods: We carried out this cross-sectional study on all patients who visited the Health Care Specialty Center of King Abdul-Aziz Medical City, Riyadh, KSA for hypertension follow-up during the study period from October to December 2004. A representative sample of patients was allocated randomly using simple randomization method. All patient's records were reviewed for proper recording in a designed form.

Results: Out of the 242 records we reviewed, 201 were included in the study. The patients' mean age was 58.3 ± 12.5 years. All were Saudis and 78.6% were females. Most of them (84.3%) received their management at primary care level only. Age, gender, presence of diabetes, level of medical care, blood glucose, lipid levels and drugs used for management of hypertension were sufficiently recorded. Smoking history, body mass index and family history of ischemic heart disease were poorly recorded. Quarter of the hypertensive patients was sufficiently controlled. The factors associated with poor blood pressure (BP) control were advanced age (p=0.008) and presence of diabetes, [odds ratio (95% CI)=2.98 (1.47-6.08)].

Conclusion: The study reflects the deficiencies in BP control and physicians practice. Introducing a checklist or electronic medical records may help the improvement of care. Frequent auditing is recommended to ensure the required development

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Hypertension (HTN) is a challenge for public health bodies all over the world.[1] It is the leading and most important modifiable risk factor for coronary heart diseases, congestive heart failure, stroke, renal diseases and retinopathy.[2-5] More than 100 million office visits related to HTN in one year were reported in the US alone. The treatment of hypertension is a common reason for office visits to physicians.[6,7]

It is evident that the number of death and disability cases resulting from coronary heart diseases and cerebrovascular diseases is increasing so rapidly in developing countries and expected to rank as number one and 4 respectively, as the major causes of the global burden of disease by the year 2020.[8] The prevalence of HTN in industrialized countries is approximately 24%, whereas most surveys in less developed countries reported a lower prevalence.[6,9] In the Eastern Mediterranean Region, HTN is estimated to affect 20-26% of the population over 35 years of age.[10] In Egypt, the estimated prevalence of HTN was 26.3%.[11] On the national level, the prevalence of HTN ranged from 10-30% as indicated in various studies.[12-15] The dramatic transition of Saudi Arabia from a nomadic life style to an urban industrialized society, has driven HTN to emerge as a public health problem.[13,14]

Epidemiological studies have demonstrated a consistent, strong, graded, independent, predictive and etiologically significant relationship between higher levels of both systolic and diastolic blood pressure (DBP) and mortality.[6,7] An increase of 20 mmHg in DBP is associated with a 60% increased risk of death over a 2-year period.[16] On the other hand, other studies have revealed that the risk from raised blood pressure (BP) can be partially reversed if optimal level is achieved.[17-19]

The improvement in diagnosis and treatment of HTN has significantly reduced cardiovascular mortality in several developed countries, over the last decade.[6,12,20] Without a systematic attempt to screen and follow up our patients and audit this process, the "rule of halves" will apply. This rule implies that half of the hypertensive patients will remain undiscovered; half of them will be

treated and only half of those receiving treatment will be adequately controlled.[21]

It is generally accepted that well organized care can improve the outcome of the hypertensive patients by detecting as well as preventing complications early.[22]

This study aims at auditing the medical care provided to hypertensive patients in the main Primary Health Care Center at King Abdul-Aziz Medical City, Riyadh, and determining the efficient control of hypertension.

Methods. Auditing was held in the Health Care Specialty Center (HCSC) in Khasmalaan; the main Primary Health Center under the supervision of the Department of Family and Community Medicine, King Abdul-Aziz Medical City, Riyadh, Kingdom of Saudi Arabia. The HCSC is divided into 2 main sections, the Primary Health Care Clinics, with 14 general practitioners and the Family Medicine Clinics, with 20 family medicine consultants.

The attended population consists of military personnel and their dependents, including parents and other civilian employees of the Saudi National Guard. The HCSC applies 2 systems, walk-in and appointment systems. Most of the patients are seen as walk-in, wherein the problem-oriented medical records are used. The center has its own medical record section, which is separated from the hospital main department. Both HCSC and hospital records will be available for patients with appointments, while only the HCSC files are available for the walk-in system.

A hypertensive patient usually attends the clinic every (2-3) months for follow-up and prescription. All patients who visited HCSC clinics for HTN follow up during the 3 months period of the study (October-December, 2004) were considered as targeted population for this cross-sectional study. A total of 1500 patients were coded as hypertensive patients in the registry system and considered as sample units. Out of this, 242 patients were calculated as a representative sample size on assumption of a 25% prevalence of controlled BP and degree of precision of 0.05 at 95% level of confidence. The following formula were used:

Calculated sample size = $n \div 1 + n/N$

$$n = \frac{Z\alpha^2\, P(1-P)}{d^2}$$

Where; N = total population = 1500 patients, $Z\alpha^2 = (1.96)^2 = 3.8416$, P = estimated prevalence = 0.25, and d = degree of precision = 0.05

The patients were selected randomly using simple randomization methods through electronic filling search.

The 7th report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of HTN, defined HTN as systolic blood pressure (SBP) of 140 mmHg or more or DBP of 90 mmHg or more, or taking antihypertensive medications.[17]

After revising the evidence-based literatures,[13,17] criteria for good supervision and record efficiency were established and items to be collected for the study were agreed upon. This includes patient's characteristics [age, gender and level of care, such as, HCSC only or HCSC shared with hospital), regular assessment of risk factors (body mass index (BMI), presence of diabetes mellitus (DM), smoking, cholesterol and triglyceride (TG) levels and family history of HTN and ischemic heart disease (IHD)], adverse health indicators and health out-come measures (BP control, past history of IHD, urine dipstick, funduscopy examination, urea and creatinine levels and electrocardiogram (ECG) records) and patients' management.

All patients' files were reviewed for proper and regular recording of these items and data were transferred in a designed data collection form. Data were entered and analyzed using an EPI-INFO program (EPI-13.0). Odds ratio with [95% confidence interval (CI)] and Chi-squire test were used to test the association between qualitative variables. A p value of <0.05 is considered statistically significant.

Results. Out of 242 reviewed patient's records, only 201 records were included in the study. The remaining 41 records were excluded as the patients were misplaced as hypertensive.

Half of the hypertensive patients (49.7%) were at the age group (41-60 years) with the mean age of 58.3 ± 12.5. All were Saudis and 158 (78.6%) were females. Most of them were diabetics (62.7%) and 84.3% received their hypertensive management at primary care level only (**Table 1**). Eleven hypertensive patients (5.5%) were managed by diet alone, 115 (57.8%) by a single drug, 53 (26.6%) by 2 drugs and 20 (10.1%) by 3 drugs or more. Fourteen (11.1%) of the diabetic patients were managed by diet alone, 90 (71.4%) by diet and oral hypoglycemic agents (OHA), 7 (5.6%) by diet and insulin and 15 (11.9%) by diet, OHA and insulin.

The following data; age, gender, presence of diabetes, level of medical care, blood glucose, lipid levels and the number of drugs used for management of hypertension were sufficiently recorded. However, smoking history, body mass index (BMI) and family history of ischemic heart disease (IHD) were poorly recorded in the patient's files (**Table 2**).

Only 51 (25.4%) of the hypertensive patients were sufficiently controlled. The factors associated with poor

BP control were advanced age (p=0.008) and presence of diabetes, [odds ratio (CI) = 2.98 (1.47-6.08). Controlled BP was not affected by gender or level of medical care (p>0.05) (**Table 3**).

Table 4 indicates that the recording of family and past history of IHD, funduscopy examination, blood glucose level and lipid level were not statistically significantly associated with BP control (p>0.05). Patient's files lacking records about presence of microalbuminuria show better BP control than those having such records (32.2% versus 15.7%), [odds ratio (CI) = 2.56 (1.19-5.56). However, records with reports about ECG (40.8%) and renal function test (78.6%) were associated with better BP control, [odds ratio (CI) = 0.37 (0.18-0.75) and 0.32 (0.10- 0.93).

Patients managed by diet alone had better BP control (54.5%) than those treated by a single drug (27.0%), 2 drugs (20.8%) and 3 drugs or more (10.0%). There is a significant adverse relationship between BP control and the number of drugs taken (p<0.05) (**Table 5**).

Discussion. The audit is an essential step in evaluating and promoting medical practice. This study reflects the proficiency of hypertensive patients' care. It emphasizes the role of primary care physicians in controlling high BP. Al-Owayyed[22] reported that more than 93% of the hypertensive patients were seen only by the general practitioner. Moreover, hypertension has frequently been considered as one of the most common reasons for patients to be seen by primary care physicians.[23]

This study demonstrates poor BP control among hypertensive patients, a finding that is similar to those reported by many international[18,24] and national[25-28] surveys. However, unfortunately, the extent of this finding is worse than few other studies.[22,29]

The greatest obstacle to good BP control is non-compliance. The Canadian Coalition for Blood Pressure Control[30] has reported non-compliance rate of 50%. Non-compliance is the major cause of treatment failure.

The low level of BP control is a warning sign as HTN is a major public health problem worldwide and remains a common and serious problem.[6,31] It is a leading risk factor for coronary heart diseases, congestive heart failure, stroke, ruptured aortic aneurysm, renal diseases and retinopathy.[2,3,5]

The absence of symptoms in most patients with HTN, even at its highest and most dangerous levels, has profound implications for the effective management of this condition in the primary care.[21]

The study shows no statistically significant difference between males and females subjects regarding BP

Table 1 - Demographic characteristics and the risk factors of hypertensive patients in Khasmalaan polyclinic, 2004.

Item		Frequency N=201	Percentage (%)
Age (years)	20-40	14	(7)
	41-60	100	(49.7)
	61-80	79	(39.3)
	>80	8	(4)
	Total	**201**	**(100)**
Gender	Male	43	(21.4)
	Female	158	(78.6)
	Total	**201**	**(100)**
Diabetes mellitus	Yes	126	(62.7)
	No	75	(37.3)
	Total	**201**	**(100)**
Level of care	Primary care	167	(84.3)
	Shared care	31	(15.7)
	Total	**198**	**(98.5)**

Table 2 - Information recorded in the file of hypertensive patients in Khasmalaan polyclinics, 2004.

Data	Recording (%)			
	Yes		No	
Age	**201**	**(100)**	**0**	**(0)**
Gender	**201**	**(100)**	**0**	**(0)**
Diabetes mellitus	**201**	**(100)**	**0**	**(0)**
Blood pressure measurements	**201**	**(100)**	**0**	**(0)**
Number of drugs used for management of hypertension	**201**	**(100)**	**0**	**(0)**
Level of medical care	**198**	**(98.5)**	**3**	**(1.5)**
Blood glucose level	**194**	**(96.5)**	**7**	**(3.5)**
Blood lipid level	**185**	**(92)**	**16**	**(8)**
Renal function test (urea and creatinine)	**158**	**(78.6)**	**43**	**(21.4)**
Presence of microalbuminurea	**83**	**(41.3)**	**118**	**(58.7)**
ECG record	**82**	**(40.8)**	**119**	**(59.2)**
Fundoscopy examination	**37**	**(18.4)**	**164**	**(81.6)**
History of IHD	**13**	**(6.5)**	**188**	**(93.5)**
Family history of IHD	**2**	**(1)**	**199**	**(99)**
Smoking	**1**	**(0.5)**	**200**	**(99.5)**
BMI	**0**	**(0)**	**201**	**(100)**

BMI - body mass index, IHD - ischemic heart disease,

Table 3 - Relationship between blood pressure control and ischemic heart disease risk factors and patient characteristics in Khasmalaan polyclinics, 2004.

Patient characteristics/Risk factors		Blood pressure control (%)						Odds ratio (CI)	*p*-value
		Controlled		Not controlled		Total N=201			
Age (years)	20-40	6	(42.9)	8	(57.1)	14	(7)	-	0.008
	41-60	32	(32)	68	(68)	100	(49.7)		
	61-80	10	(12.7)	69	(87.3)	79	(39.3)		
	>80	3	(37.5)	5	(62.5)	8	(4)		
	Total	**51**	**(25.4)**	**150**	**(74.6)**	**201**	**(100)**		
Gender	Male	8	(18.6)	35	(81.4)	43	(21.4)	0.61	0.25
	Female	43	(27.2)	115	(72.8)	158	(78.6)	(0.24-1.52)	
	Total	**51**	**(25.4)**	**150**	**(74.6)**	**201**	**(100)**		
Level of care	Primary care	43	(25.7)	124	(74.3)	167	(84.3)	1	**0.99**
	Shared care	8	(25.8)	23	(74.2)	31	(15.7)	(0.38-2.66)	
	Total	**51**	**(25.8)**	**147**	**(74.2)**	**198**	**(98.5)**		
Diabetes mellitus	Present	22	(17.5)	104	(82.5)	126	(62.7)	2.98	**0.0008**
	Absent	29	(38.7)	46	(61.3)	75	(37.3)	(1.47-6.08)	
	Total	**51**	**(25.4)**	**150**	**(74.6)**	**201**	**(100)**		

Table 4 - Effect of data recording on controlling blood pressure in Khasmalaan polyclinics, 2004.

Data recorded		Blood pressure control (%)						Odds ratio (95% CI)	*p*-value
		Controlled		Not controlled		Total N=201			
Family history of IHD	Not recorded	51	(25.6)	148	(74.4)	199	(99)	-	0.99
	Recorded	0	(0)	2	(100)	2	(1)		
Funduscopy examination	Not recorded	44	(26.8)	120	(73.2)	164	(81.6)	1.57	0.32
	Recorded	7	(18.9)	30	(81.1)	37	(18.4)	(0.60-4.29)	
History of IHD	Not recorded	48	(25.5)	140	(74.5)	188	(93.5)	1.14	0.84
	Recorded	3	(23.1)	10	(76.9)	13	(6.5)	(0.27-5.55)	
Presence of microalbuminuria	Not recorded	38	(32.2)	80	(67.8)	118	(58.7)	2.56	0.008
	Recorded	13	(15.7)	70	(84.3)	83	(41.3)	(1.19-5.56)	
Blood glucose level	Not recorded	1	(14.3)	6	(85.7)	7	(3.5)	0.48	0.5
	Recorded	50	(25.8)	144	(74.2)	194	(96.5)	(0.02-4.24)	
ECG record	Not recorded	21	(17.6)	98	(82.4)	119	(59.2)	0.37	0.002
	Recorded	30	(36.6)	52	(63.4)	82	(40.8)	(0.18-0.75)	
Renal function test	Not recorded	5	(11.6)	38	(88.4)	43	(21.4)	0.32	0.019
	Recorded	46	(29.1)	112	(70.9)	158	(78.6)	(0.10-0.93)	
Blood lipid level	Not recorded	3	(18.7)	13	(81.3)	16	(8)	0.66	0.53
	Recorded	48	(25.9)	137	(74.1)	185	(92)	(0.14-2.66)	
	Total	**51**	**(25.4)**	**150**	**(74.6)**	**201**	**(100)**	-	-

IHD- ischemic heart disease, ECG - echocardiogram, CI - confidence interval

Table 5 - Relationship between blood pressure control and the type of hypertension management in Khasmalaan polyclinics, 2004.

Management	Blood pressure control (%)						*p*-value
	Controlled		Not controlled		Total		
Diet alone	6	(54.5)	5	(45.5)	11	(5.5)	
Single drug	31	(27)	84	(73)	115	(57.8)	
Two drug	11	(20.8)	42	(79.2)	53	(26.6)	0.04
Three drugs or more	2	(10)	18	(90)	20	(10.1)	
Total	**50**	**(25.1)**	**149**	**(74.9)**	**199**	**(100)**	

control. This look inconsistent with the hypothesis that women have lower BP measurements than men in early adult life, but their BP increases more steeply with age to reach or exceed those of men beyond middle age.[9]

It is not uncommon to observe the association between HTN and diabetes mellitus,[28,32-35] as the 2 diseases may have common underlying mechanisms.[36] What is new here is the association between these factors and poor BP control. This may reflect the attitude of patients toward these risk factors and their response to them. Moreover, genetic predisposition factors are difficult to be excluded in this respect.

Physicians should record and take care of other cardiovascular risk factors, including smoking, high blood cholesterol, diabetes, men over 60 years old, postmenopausal women and family history of cardiovascular diseases.[13,37,38] The current study elucidates the association between BP control and the recording of renal function test and ECG.

The association between BP control and levels of management is self-evident. Patients on diet alone are usually diagnosed newly and can control their BP easily. Multi-medications were prescribed for chronic hypertensive cases proved to be difficult to control otherwise. Furthermore, poor compliance was a responsible factor for uncontrolled BP in many cases.

Although this study has many limitations, it reflects the deficiencies in BP control and physicians practice. Physicians must be aware of the effectiveness of better BP control and sufficient recording. Introducing a checklist (flow sheet) as a reminder for the physician or electronic medical records may help the improvement of care for hypertensive patients. Frequent auditing is recommended to ensure the required development.

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