EVALUATION OF CONTROL OF HYPERTENSION IN A RURAL GENERAL HOSPITAL IN THE KINGDOM OF SAUDI ARABIA

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ABSTRACT

Hypertension is one of the most important preventable causes of premature morbidity and mortality. Usually hypertension is asymptomatic for many years but the increase in the blood pressure over the normal value, for a longtime, is the major risk factor for cardiovascular disease. This paper is a part from the study: Evaluation of the Management of Hypertension in a Rural General Hospital in the Kingdom of Saudi Arabia. In this study, the Saudi guideline for management of hypertension was followed to manage 382 hypertensive patients coming to the internal medicine department in Adam general hospital, the kingdom of Saudi Arabia, from February 2013 to December 2015. The blood pressure was measured using a mercury sphygmomanometer for all patients. The treatment target level of blood pressure was < 140/85 mm Hg and in diabetic patients < 130/80 mm Hg for controlled patients. In the uncontrolled patients, the blood pressure was ≥ 140/85 mm Hg and ≥130/80 mm Hg in diabetic patients. The results of the statistical analysis showed that only 18% of the patients reached the target of the controlled blood pressure determined by the Saudi hypertension management society. The present study has revealed the low percentage of achievement of the target blood pressure.

KEYWORDS: Hypertension, Evaluation, Saudi hypertension management guideline, Adam general hospital, Control, Blood pressure.

1. INTRODUCTION

Hypertension is defined as a condition in which the blood pressure is elevated to an extent where benefit is obtained from blood pressure lowering.[1] The Saudi Hypertension Management Society (SHMS) defines hypertension as persistent elevation of systolic blood pressure ≥ 140 mm Hg and/or diastolic blood pressure ≥ 90 mm Hg in adults not on antihypertensive medications.[2] This threshold is used to diagnose hypertension in the age from 18 years and old, who do not have diabetes or chronic kidney disease. In age 80, 150 mm Hg is acceptable for systolic blood pressure.[3]

Between cardiovascular diseases, hypertension is the most common. It is estimated that 25% of the population have systolic blood pressure more than 140 mmHg and/or diastolic blood pressure more than 90 mm Hg.[4] In addition, to the patients with cardiovascular risk and diabetics who have blood pressure more than 130/80 mm Hg. At a blood pressure of 125/75 mm Hg, patients with diabetic nephropathy are considered hypertensive.[1]

World Health Organization (WHO) estimates the highest prevalence of hypertension in the African countries with 46% of both men and women. While the lowest prevalence 35% is in the American countries.[5] Hypertension is less in premenopausal women than in men at the same age but after that hypertension occurs in the same percentage. At age 60, 60-80% of both men and women will develop hypertension.[6]

According to the pathological causes, hypertension is divided into two types. 5-10% of hypertensive patients develop hypertension due to other diseases. This hypertension is called secondary hypertension and needs treatment of the underlying disease.[1] The remaining 90-95% of hypertensive patients develop hypertension because no specific etiology is known. These patients have essential or primary hypertension.[7]

The most important risk factors for hypertension include:
- Genetic factors.
- Race, hypertension occurs more in the black race.
- Gender, before 55 years, men are in more risk of hypertension than women are. After menopause, women are at the same risk with men.

- Metabolic syndromes including obesity, dyslipidemia and diabetes.

- Presence of end organ damage at the time of the diagnosis.

- Family history of cardiovascular disease.[1,7]

The risk can be exacerbated with age, smoking, sedentary lifestyle, high salt intake, alcohol and obesity.[1]

In general, hypertension may occur due to:

• **Cardiac dysfunctions**, hyperkinetic blood circulation due to increase in the sympathetic activity and/or increase of the heart sensitivity to the neurohumoral regulators increase the cardiac output. This pattern of hypertension occurs more in younger hypertensive patients and makes β blockers more effective in the treatment of these patients.

• **Vascular dysfunctions**: disrupt of the equilibrium between the vasodilator and vasoconstrictor factors damages the endothelium of the blood vessels. The thickening of the vessels due to chronic vasoconstriction action increases the peripheral resistance. This kind of hypertension seems to occur more in the older hypertensive patients. Thiazide diuretics are effective in this type.

• **Renal dysfunction**, reduction in the sodium excretion by the kidney leads to increase in the blood volume and cardiac output. The volume of circulation can increase due to renal parenchymal disease, due to glomerular injury with reduction of functional nephron mass and/or excessive secretion of renin. Renovascular disease e.g., renal artery stenosis can result in decreased renal blood flow leading to increased renin secretion from the juxtaglomerular cells. Finally, both cardiac output and vascular resistant are elevated.[4,8]

Elevated blood pressure damages the blood vessels in the brain, heart, kidney and eye. Each 20/10 mm Hg increase above 115/75 mm Hg will double the risk of cardiovascular disease.[7] The diagnosis of hypertension is based on repeated measurements on different visits and situations.[7] When the blood pressure cannot be measured in the upper arms, legs and wrist can be used.[9] The wrist measurements are used for the obese and breast cancer patients.[10] The blood pressure can be measured by three ways: Office-based blood pressure measurements, Ambulatory blood pressure monitoring or Home blood pressure monitoring.[2]

For management of hypertensive patients, they are classified into five categories according to their blood pressure. These categories are:

• **People with blood pressure < 120/80 mm Hg**: - In normal range- need to check their blood pressure every 5 years.

• **People with blood pressure range (120-139/80-89) mm Hg**: -prehypertension – these people are not for treatment with antihypertensive drugs, only for lifestyle changing and checking blood pressure annually.

• **People with blood pressure 140/90 mm Hg**: - hypertensive- after repeated measurements over several months, if the blood pressure remains in the same range the treatment should be started.

• **People with blood pressure range > 140-159/90-99 mm Hg**: -stage 1 -repeat measurements over several weeks if remains in the same range and there is organ damage, treatment should be started.

• **People with blood pressure range >160/100 mm Hg**: -stage 2- blood pressure is measured several times at the same visit and are treated immediately if remains > 220/120 mm Hg, or there is organ damage.[1,2]

Old people elevation in the blood pressure presents as isolated systolic hypertension, in the age over 50 years the diastolic blood pressure will be at around 80 mmHg. The treatment of hypertension starts when the blood pressure is equal to or more than 160/80 mm Hg.[1]

Saudi hypertension management society recommends reducing the blood pressure in patients with diabetes or renal disease below 130–140/80–90 mm Hg and less than 140/90 mm Hg in others to reduce the mortality and morbidity of hypertension.[2]

After establishing hypertension, the patients need evaluation to determine the following:
• Secondary causes of hypertension that need treatment sometimes by surgery.
• Presence of the other cardiovascular diseases.
• Signs of the organ damage.
• The risk factors for each patient.[2]

The first step in the evaluation according to the SHMS, is asking about the history of patients. The main information include: all drugs used by the patients, lifestyle, family history of the cardiovascular diseases, the duration of the hypertension, the compliance of the treatment, and the presence of the symptoms of organ damage. The second step is physical examination including: weight, height, body mass index and waist circumference, signs of end organ damage, cardiovascular disease and secondary causes of disease.[2]

The third step is laboratory tests including: electrolytes, serum creatinine, fasting glucose, urinalysis and lipid profile (total, high-density lipoprotein, cholesterol and triglycerides) and Electrocardiogram. Other tests are needed for some patients: Thyroid-Stimulating Hormone, thyroxine, chest X-ray, abdominal sonograph, urine analysis for albuminuria and echocardiography, as more investigation about left ventricular hypertrophy.[2]

Treatment of high blood pressure reduces the risk by up to 15% for myocardial infraction, 40% for stroke and 30% for cardiovascular mortality.[11]

The management of hypertension in each country is guided by unique guidelines. They have the same general features with some special points for each region. The goal of the Saudi guideline is to achieve the maximum reduction in the total risk of cardiovascular and renal morbidity and mortality. This requires treatment of the high blood pressure and identifying and treating other cardiovascular diseases risk factors such as smoking, dyslipidemia, or diabetes mellitus.[2]

In the Saudi hypertension management guideline, the treatment of hypertension starts with restricting the diet if the hypertension is not in severe levels, increasing the exercise, decreasing salt, alcohol, smoking and observing the patient over months.[2] The first line drug includes angiotensin converting enzyme inhibitors (ACE-I) or angiotensin receptor blockers (ARBs), calcium channel blockers (CCB) or thiazide diuretics (THZ-D). The choice of any of these classes depends on the patient's age, presence of target organ damage, tolerability, other diseases, potential interactions with other drugs, implications for adherence and cost.[2]

In general, the drug of choice in the young, less than 55 years, white patients is ACE-I or ARB and in the old, more than 55 and black patients is CCB or THZ-D. When considering adding a second drug, it is recommended to consider ACE-I or ARB plus CCB or ACE-I or ARB + low-dose THZ-D.[2]

Patients are educated about their disease, benefits and side effects of the treatment and given appointment to come back to check out their disease. Patients need appointment to the clinic every month until the hypertension and the treatment established. Then every three to six month.[2]

Beside the antihypertensive agents, SHMS recommends the use of statins and aspirin. Lipid lowering therapy, usually with statin, reduces the incidence of stroke and coronary heart disease. The use of low-dose aspirin is recommended in hypertensive patients whose blood pressure has been controlled, who are at high risk of cardiovascular disease and who are not particularly at risk of bleeding from the gastrointestinal tract or from other sites.[2]

Hypertension is increasing in prevalence in KSA and affecting more than one fourth of the adult Saudi population. In a major national study on Coronary Artery Disease in Saudis Study (CADISS), a community-based study, subjects in the age group of 30-70 years were examined during a 5-year period between 1995 and 2000 in Saudi Arabia. The prevalence of hypertension was 26.1%. For males, the prevalence of hypertension was 28.6% and 23.9% for women. In the urban population hypertension prevalence was 27.9% and in rural population was 22.4% (p<0.001). The prevalence of coronary artery disease among hypertensive patients was 8.2% and 4.5% among normotensive subjects (p<0.001.).[12]

The study of Hypertension control in a community health center at Riyadh, Saudi Arabia tried to find out the degree of control of blood pressure among the hypertensive patients according to the British Hypertension Society Guidelines published in 1999, the target was less than 140 mm Hg for systolic and less than 85 mm Hg for diastolic blood pressure. The study showed that control of hypertension fell short of the recommended goals.[13]

2. MATERIALS AND METHODS

This was a prospective cross-sectional hospital-based study. An interview-guided direct questionnaire was used. The study included 382 hypertensive patients followed in the internal medicine clinic in Adam general hospital, KSA, form February 2013 to December 2015.

2.1 HYPERTENSION DIAGNOSTIC CRITERIA

Patients were diagnosed and evaluated according to the Saudi hypertension management guidelines, published in 2011, by the Saudi hypertension management society. A hypertensive patient was defined as a subject with a systolic blood pressure SBP ≥ 140 mm

Hg and/or a diastolic blood pressure DBP ≥ 90 mm Hg without using antihypertensive agents or who used antihypertensive medication to treat high blood pressure.

2.2 BLOOD PRESSURE MEASUREMENT

The blood pressure BP was measured according to the Saudi hypertension management guideline by mercury sphygmomanometer. Patients were physically rested 3 to 5 minutes before measuring BP. With the back supported, BP was measured in sitting position and in both arms. Upper arm was not covered by clothing and elbow was supported at heart level. The cuff bladder was encircling 80% of the arm and the cuff width 40% of the arm circumference. Standard cuff bladder size was 12 cm in width and 24 cm in length and 15 cm in width and 30 cm in length, if the upper arm circumference is 33 to 41 cm. If the upper arm circumference was >42 cm, a cuff bladder width of 18 cm and length of 36 cm was used. A distance of 2.5 cm (2 fingers) was maintained between the lower end of the cuff and the antecubital fossa. The cuff bladder was centered over the brachial artery and was wrapped around the upper arm, firmly in contact with the arm, but not too tight (smooth) and not too loose (snug), allowing 2 fingers to be put under the cuff comfortably.

The bell orifice of the stethoscope was placed just above and medial to the antecubital fossa but below the edge of the cuff. The stethoscope bell orifice was not touching the cuff bladder or tubing. The mercury manometer was upright at examiner's eye level. Cuffs with complete and steady compression on the brachial artery was used. Rolling up the sleeve cuff on the arm results in a tourniquet effect.

The cuff bladder was inflated rapidly to 30 mm Hg above the level of the estimated SBP (too slow inflation can be uncomfortable for the patient), applying mild pressure on the stethoscope bell (firmly but gently, without excessive pressure). The cuff bladder pressure was deflated at the rate of 2 mm Hg/sec. The cuff bladder was deflated rapidly and completely at DBP to prevent venous congestion. The SBP was defined as the cuff pressure at which the Korotkoff sound can be heard with the stethoscope (Phase I) and the DBP as the cuff pressure at which the Korotkoff sound disappears over the brachial artery (Phase V).

2.3 BLOOD PRESSURE MEASUREMENT TARGET

The treatment target level of blood pressure was < 140/85 mm Hg and < 130/80 mmHg in diabetic patients for controlled patients. In the uncontrolled patients, the blood pressure was ≥ 140/85mmHg and ≥ 130/80 mmHg in diabetic patients.

2.4 STATISTICAL ANALYSIS

The data analysis included 300 patients who completed the questionnaire and follow to at least one-year. The data was collected and was analyzed by using Statistical Package for Social Science (SPSS) ver. 21.

3. RESULTS AND DISCUSSION

The study included 382 hypertensive patients came to Adam general hospital from February 2013 to December 2015. The data analyzed, included 300 patients who completed the questionnaire. The remaining patients were excluded from the analysis because they were not cooperative. The controlled patients were 53(17.7%) while the uncontrolled were 247(82.3%). The results are shown in table-1.

Table -1: Numbers and percentages of controlled and uncontrolled patients.

Hypertension	Frequency	Percent
Controlled	53	17.7%
Un controlled	247	82.3%
Total	300	100%

The mean systolic blood pressure in all patients was 149 mm Hg and 126 mm Hg and 154 mm Hg in controlled and uncontrolled patients respectively. For diastolic blood pressure, the mean was 83 mm Hg in all patient and 74 and 85 in controlled and uncontrolled patients respectively. Tables 2, 3 and 4 show the systolic and diastolic blood pressure in total, controlled and uncontrolled patients.

Table-2: Level of systolic and diastolic blood pressure in all patients.

Blood pressure mm Hg	N	Minimum	Maximum	Mean	Standard Deviation
Systolic blood pressure	300	100	219	149	19
Diastolic blood pressure	300	50	129	83	11

Table-3: Level of systolic and diastolic blood pressure in controlled patients.

Blood pressure mm Hg	N	Minimum	Maximum	Mean	Standard Deviation
Systolic blood pressure	53	100	143	126	9
Diastolic blood pressure	53	52	88	74	7

Table-4: Level of systolic and diastolic blood pressure in uncontrolled patients.

Blood pressure mm Hg	N	Minimum	Maximum	Mean	Standard Deviation
Systolic blood pressure	247	100	219	154	16
Diastolic blood pressure	247	50	129	85	11

The study included patients between 28-100 years old, 148(49.3%) males and 152(50.7%) females. Males were 25(8.30%) from the controlled patients and females were 28(9.30%). The Saudi patients were 293(97.7%) and 7 patients (2.3%) were non Saudi. Saudi patients were 51(17%) in the controlled patients and only 2 non-Saudi were controlled.

The management of hypertension in the hospital was running according to the Saudi guideline but still the control of the blood pressure to the target was weak. The result is supported by the national survey: Hypertension and Its Associated Risk Factors in the Kingdom of Saudi Arabia, 2013. The controlled patients were 16.6% among all their examined patients and 57.8%, 20.2% and 5.4% were undiagnosed, treated uncontrolled and untreated, respectively.[14]

4. CONCLUSION

Results of this study suggest that even in a country with free medical care and high resources the percentage of patients with uncontrolled blood pressure is high. The patients need more time spent for them to be educated about their disease and the importance of adherence to the treatment to achieve control of their blood pressure to avoid the complications.

5. ACKNOWLEDEGMENT

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