

## Determination Medical Parameter and the Most Effective Antihypertensive Therapy in Patients Admitted To Intensive Care Unit in Hawler Hospitals

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### Abstract

Hypertension is one of the major modifiable risk factors for coronary heart disease, stroke, peripheral vascular disease and renal failure. The aim of treating hypertension is to maximize therapeutic efficacy without untoward side effects. The study population was carried out in emergency department of Razgary and Jumhury hospitals in Hawler. Hypertension was highly prevalent among aged persons between 61-70 years 33(27.5%) while the lowest percentage were recorded in the age group 30-40 years 8(6.6%). Female population showed higher percentage 53.3% than male 46.6%. Duration of hypertension more than five years 80 (66.6%) which was higher than those less than two years 8 (6.6%). Family history of hypertension appeared as strong risk factor of hypertension that recoded 76(63.3%). According to educational level found the hypertension was higher in Illiterate-primary education 55 (45.8%) than Intermediate –secondary school education 38(31.6%) and lowest among highest educational level 27(22.5%). Body mass index (BMI) had effect on percentage of hypertension among overweight patients 62 (51.6%) followed by obesity 39 (32.5%) and lowest in patients with normal weight 19(15.8%).

Co-morbidity was observed in 70(58.3%) among which diabetes mellitus was 28(23.3%) followed by cardiovascular disease 19(15.8%) and hypercholesterolemia was 11(9.1%). Types of drug used to treat hypertension show diuretics and angiotensin converting enzyme inhibitor were the most drug used 26(21.6%) and 25(20.8%) respectively followed by combined drug and calcium channel blocker were 19(15.8%), 18(15%) respectively then angiotensin receptor blocker 17(14.1%) and beta-blocker used in 15(12.5%).

**Key words** Hypertension, Prevalence and occurrence, blood pressure .

### تقدير المعايير الطبية والعلاجات الأكثر فعالية لارتفاع ضغط الدم في المرضى الوافدين إلى وحدة العناية المركزة في مستشفيات هولير

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### الخلاصة

ارتفاع ضغط الدم هو واحد من عوامل الاختطار الرئيسية لأمراض القلب التاجية ، أمراض الأوعية الدموية والفشل الكلوي. والهدف من علاج ارتفاع ضغط الدم هو زيادة الكفاءة العلاجية دون آثار جانبية غير مرغوب فيه. وقد أجريت دراسة السكان في قسم الطوارئ في المستشفى الجمهوري وركاري في اربيل . لوحظ أن ارتفاع ضغط الدم منتشر بشكل كبير بين الأشخاص الذين تتراوح أعمارهم ما بين 61-70 سنة وسجلت 33 (27,5 %) في حين كانت أدنى نسبة سجلت في مجموعة الاعمار 20-40 سنة حيث كانت 8 (6.6 %) و أظهرت الإناث نسبة عالية 53.3 % مقارنة بالذكور 46.6 %. سجلت مدة ارتفاع ضغط الدم لأكثر من خمس سنوات 80 (66.6 %) وهي أعلى مقارنة بارتفاع الضغط لأقل من سنتين كانت 8 (6.6 %) . التاريخ عائلي لارتفاع ضغط الدم ظهر كعامل خطر قوي لارتفاع ضغط الدم الذي سجل

نسبة 67 (63.3%). وفقا لمستوى التعليم فكان ارتفاع الضغط أعلى نسبة انتشار بين المستوى التعليمي الابتدائي - الأمي 55 (45.8%) ثم المتوسطة والثانوي 38 (31.6%) وأقل نسبة بين ذوي التعليم العالي وكان 27 (22.5%). مؤشر كتلة الجسم له تأثير على نسبة ارتفاع ضغط الدم بين المرضى تظهر زيادة الوزن 62 (51.6%) تليها السمنة 39 (32.5%) وأقل نسبة في المرضى ذوي الوزن العادي كان 19 (15.8%). وكان مجموع المرضى المصابين بارتفاع ضغط الدم مع حدوث اضطراب طبية أخرى 70 (58.3%) وأكثر الأمراض المرافقة لارتفاع ضغط الدم داء السكري سجل أعلى نسبة عالية 28 (23.3%) ، يليه ارتفاع ضغط الدم مع امراض القلب والأوعية الدموية 19 (15.8%) ، مريض ارتفاع ضغط الدم مع زيادة مستوى الكوليسترول 11 (9.1%). انواع الادوية المستخدمة لعلاج ارتفاع الضغط فاظهر مدرات البول و دواء للأنجيوتنسين المانع الإنزيم من اكثر الادوية استخداما وكانت 26 (21.6%) و 25 (20.8%) على التوالي وتلها عقار المركب و حاصرات قنوات الكالسيوم 19 (15.8%) و 18 (15%) على التوالي وكما ان استخدم عقاقير طبية اخرى مثلا غالقات مستقبلات أنجيوتنسين 17 (14.1%) وحاصرات بيتا 15 (12.5%).

**الكلمات الدالة:** ارتفاع ضغط الدم، حدوث انتشار ، ضغط الدم .

## Introduction

Hypertension is one of common diseases especially in adult that effect up to 25% of adult population in developing countries. Hypertension involves alteration in baroreflex and chemoreflex pathways at either peripheral or central level it classified as either primary (essential hypertension) or secondary hypertension [1,2].

Essential hypertension is the most prevalent type affecting about 90-95% of hypertensive patients [3] although no direct cause has been identified, there are many factors such as sedentary lifestyle, smoking, stress, obesity and recent studies have implicated low birth weight a risk factor for adult essential hypertension and cluster in families which represent collection of genetically based disease or inherited biochemical abnormalities [4]. The remaining 5-10% of cases are secondary hypertension caused by other that conditions effect the kidney, arteries, heart and endocrine system. In the Eastern Mediterranean region hypertension affects more than 20% of people [4, 5, 6].

In most cases, hypertension results from a complex interaction of genetic, environmental & demographic factors, the twin studies document greater concordance of blood pressure in monozygotic twin and pathophysiological factors of hypertension involve activation of sympathetic nervous system and abnormalities of resistant vessels [5,6,7]. Epidemiologies of hypertension vary markedly in different regions, in the year 2000 it was estimated that nearly one billion people or 26% of the adult population have hypertension worldwide. Lifestyle modification are still recommended in conjunction with medication for treatment of hypertension such as dietary changes ,physical exercise and weight loss , several classes of medication collectively referred to antihypertensive drugs are currently available for treating hypertension and the aim of treatment should be to reduce blood pressure to < 140/ 90mmHg for most individuals, and lower for individual with diabetes or kidney disease[7,8,9].

Aldosterone –receptor antagonist (ARAS) have been shown to have effect on blood pressure reduction specially in difficult –to- treat or resistant hypertension and addition of spironolactone resulted in an impressive drop in systolic blood pressure (SBP) of up to 2.5 mmHg and 12mmHg in diastolic blood pressure (DBP) .The combination of both drugs and placebo in uncontrolled hypertension despite treatment with at least diuretics and calcium channel –blockers [9,10] .The most commonly combined drugs used to treatment hypertensive cases are as follows diuretic with potassium –sparing agent, adrenergic blocker with diuretics, angiotensin-converting enzyme inhibitors with diuretics ,angiotensin11 receptor blockers with diuretics and angiotensin-converting enzyme inhibitors with calcium-channel blockers [4]. Response to hypertensive drug increase with absence of diabetes, higher waist circumference, lower aortic pulse wave velocity and lower baseline high-density lipoprotein (HDL) and cholesterol [11,12] while deficit of exogenous calcium ,its low content in drinking water plays a key role in the pathogenesis of increased blood pressure[12]. Hypertension is common in persons with diabetes as in persons without diabetes and increase risk of acute myocardial infarction so treatment need- antihypertensive and treat of dyslipidemia and glucose control [13,14,15].

There are many risk factor increased incidence of hypertension include positive family history, older age, male gender ,obesity, less of exercise , high sodium potassium ratio and chronic stress factor[16] also epithelial sodium channel activation might be more common cause of hypertension ,as evidence by increase sodium conductance in peripheral lymphocytes has been noticed in 25%of patient with resistant hypertension [17,18].

### Objectives

The present study was carried out on hypertensive patient to study correlation of risk factors as age, gender, family history, hypertension onset and hypertension duration to determine the most effective treatment used in emergency cases and control them properly in addition to patients having other disease rather than hypertension in intensive care unit.

### Materials and Methods

The study was conducted in emergency department of Razgary and Jumhury hospital in Hawler from1st September2010 to 31th July2011, on 120 patients aged between 30 to 90and above years old and blood pressure was measured using mercury sphygmomanometer; patient were selected when they had hypertension (BP< 140>90mmHg) or >130>80mmHg.

Other clinical data was calculated by taking information about patient gender, height, age, family history and calculated BMI, duration of hypertension and the most effective antihypertension medication used in patients with complicated condition as diabetes mellitus and cardiovascular disease.

Hypertensive patients were diagnosed to have diabetes mellitus if they fasting blood glucose level was greater than or equal to 7mmol/L or had history of diabetes. Hypercholesterolemia was defined as cholesterol was greater than or equal to 6.2mmol/L. BMI mean body index was indicate normal, overweight and obesity were defined as body mass index (<25Kg/m<sup>2</sup>, >-25Kg/m<sup>2</sup> and >- 30Kg/m<sup>2</sup>) respectively.

### Results

Table (1) indicates frequency of hypertension among 120 patients their age rang from 30 to 90 years old and above .The highest percentage was among the age 61-70 and 71-80 and 80-90 years and above were recorded highly percentage 33((27.5%),27(22.5%) and 20(16.6%)respectively while the lowest percentage was recorded in 51-60,41-50 and 30-40 years old was 18(15%),14(11.6%) and 8(6.6%) respectively and hypertension according to gender shows female 64(53.3%).

**Table (1): Frequency distribution of hypertension according to age and gender.**

<b>Age</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
30- 40	5(8.9%)	3(4.6%)	8(6.6%)
41- 50	6(10.7%)	8(12.5%)	14(11.6%)
51- 60	8(14.2%)	10(15.6%)	18(15%)
61- 70	14(25%)	19(29.6%)	33((27.5%)
71- 80	15(26.7%)	12(18.7%)	27(22.5%)
80-90 and above	8(14.2%)	12(18.7%)	20(16.6%)
Total	56(46.6%)	64(53.3%)	120

Medical parameters to study hypertension showed high percentage of patients with duration of hypertension more than five years 80 (66.6%) followed by patients with hypertension from 3-5 years 32(26.6%), the lowest was among patients had hypertension less two years 8 (6.6%) table (2).

Family history of hypertension appears a strong factor that increase incidence of hypertension that recoded 76(63.3%) while percentage of patient without family history show44(3.6%) as in figure (2) .

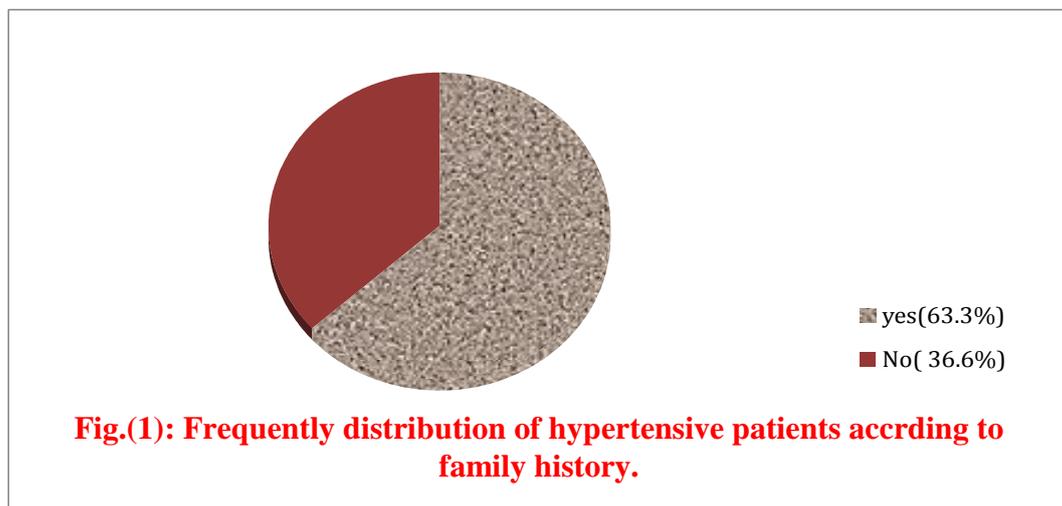
According to education level the hypertension appears higher in Illiterate-primary 55 (45.8%) followed by Intermediate –secondary which were 38(31.6%) and lower percentage in patient with higher education was 27(22.5%).

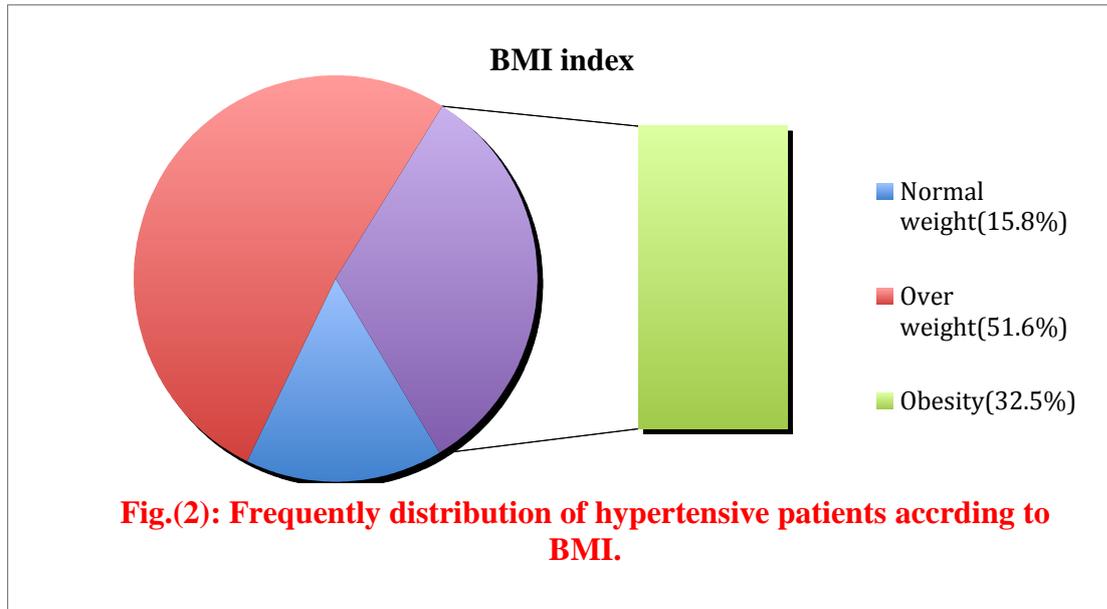
BMI index was other medical parameter that had effects on percentage of hypertension among patient and according to figure (3) it appear that overweight(>25 Kg/M) 62(51.6%) followed by obesity(>30 Kg/M) 39(32.5%) while the lowest was among patients with in normal weight(<25Kg/M) 19(15.8%).

**Table (2): Frequency distribution of clinical parameters of hypertensive patients**

<b>Parameter</b>	<b>Percentage</b>
Duration of hypertension	
<2years	8(6.6%)
3-5years	32(26.6%)
>5years	80 (66.6%)
Family history	
Yes	76(63.3%)
No	44(36.6%)
Education level	
Illiterate-primary	55(45.8%)
Intermediate –secondary	38(31.6%)
Higher education	27(22.5%)
BMI index	
Normal weight(<25Kg/M)	19(15.8%)
Overweight(>25 Kg/M)	62(51.6%)
Obesity(>30 Kg/M)	39(32.5%)

The main medical conditions that were related to hypertension were showed a percentage 70 (58.3%). Patients suffer from hypertension with diabetes mellitus 28(23.3%) followed by hypertensive patient with cardiovascular disease 19 (15.8%), then hypertensive patient with hypercholesterolemia 11(9.1%) and hypertension with concurrent medical symptoms diarrhea, cough and other disorders was 12(10%).





**Table (3) Medical disorders associated with hypertension**

Associated disease	Female	Male	Total
Diabetes mellitus	13(39.3%)	15(38.4%)	28(23.3%)
Cardiovascular disease	6(18.1%)	13(33.3%)	19(15.8%)
Hyperchlestremia	6(18.1%)	5(12.8%)	11(9.1%)
Others	8(24.2%)	6(15.3%)	12(10%)
Total	33(47.1%)	39(55.7%)	70(58.3%)

Determining drug type to treat hypertension showed that diuretics and angiotensin converting enzyme inhibitor(ACEI) were the most widely drug used 26(21.6%) and 25(20.8%) respectively, followed by combined drug, calcium channel blocker, angiotensin receptor blocker, and beta-blocker were 19(15.8%),18(15%) and 17(14.1%) and15(12.5%) respectively.

**Table (4) Medical treatment for hypertensive patients**

Drug	Male	Female	Total
Diuretics	10(17.8%)	16(25%)	26(21.6%)
Angiotensin-converting enzyme inhibitor	14(25%)	11(17.1%)	25(20.8%)
Combined	9(16%)	10(15.6%)	19(15.8%)
Angiotensin receptor blocker	8(14.2%)	9(14%)	17(14.1%)
Calcium channel blocker	6(10.7%)	12(18.7%)	18(15%)
Beta-blocker	9(16%)	6(9.3%)	15(12.5%)
Total	56(46.6%)	64(53.3%)	120

## Discussion

Out of total 120 patients the highest hypertension frequency occurred at age group 61-70 (27.5%), SBP increased with age due to reduce elasticity and increase stiffness of large conduit arteries [11,18] others[6,16] showed ageing was common as predictor of both SBP and DBP and the arteriosclerosis resulted from collagen deposition and smooth –muscle cell hypertrophy in addition to structural abnormalities, [5]founded that hypertension was highly prevalent among middle- aged and elderly persons. Hypertensive female showed higher percentage 64(53.3%) than male 56(46.6%) and this in agreement with [11,12,14] as female have more visits to clinics and more complaint than males while [9,16] showed hypertension was commoner in males.

Duration of hypertension appear highest in patients who had hypertension more than five years 80(66.6%) and lower frequency in patient with duration of hypertension less than two years 8(6.6%) which was in agreement with [11]. Hypertension showed highest frequency within family 76(63.3%) than between families 44(36.6%) other population studies showed greater similarity in blood pressure within family than between families and vasoconstrictor responsiveness to norepinephrine increased in normotensive offspring of hypertension parents compared with control without family history of hypertension, suggesting that the hypersensitivity may be genetic in origin[5].

The study showed that about 45.8%of the study population was either illiterate or with primary education and the lowest percentage of hypertension was in higher educational level 22.5% patients, this is expected as educated patients are more adherent to treatment and this in agreement with [11]. Hypertensive patients suffer from overweight and obesity recorded in a percentage of 51.6%, 32.5% respectively, [16] showed that obesity is a common risk factor in hypertensive patients.

Hypertension associated with other medical disorders recorded 70(58.3%) which indicates that early detection and effective treatment to hypertension is crucial .The most common medical related disease was diabetes mellitus 23.3% which was in agreement with[5] who showed hypertension is approximately twice as common in diabetics as in persons without diabetes and since 35-75% of cardiovascular complication of diabetes are attributable to hypertension ,diabetic patient need aggressive antihypertensive treatment([19]. NIDDM and hypertension commonly co-exist and may be part of the insulin resistance or metabolic syndrome. This syndrome describes a group of clinical and biochemical features which are strongly associated with accelerated atherosclerosis, these features include obesity, mixed

dyslipidemia (high triglycerides and low HDL [high density lipoprotein] cholesterol levels) and hyperinsulinaemia, as well as hypertension.

The frequency of hypertensive patients with cardiovascular disease was 15.8%, [7,20] showed hypertension is considered as cardiovascular risk factor that increases the risk of development of atherosclerosis, through induction of oxidative stress on arterial wall. While [13,16] recorded cardiovascular disease as significant causes of morbidity and mortality in hypertension, then hypertensive patients with hypercholesterolemia was 9.1% [21] found approximately 40% of persons with essential hypertension also have hypercholesterolemia while [16] found hypercholesterolemia occurred in very small proportion of hypertensive patients, this study recorded hypertension with other medical symptoms diarrhea, cough and other disorder 12(10%) patients.

Antihypertensive drugs from several classes have been shown to reduce elevation of blood pressure and cardiovascular disease morbidity and mortality [19] this study showed drug type to treat hypertension as diuretics and angiotensin converting enzyme inhibitor were the most drug used 26(21.6%) and 25(20.8%) respectively followed by then combined drug uses 19(15.8%) the usefulness of combination drugs is to counterbalance these regulatory mechanisms and thus increase their antihypertensive effectiveness, the monotherapy for hypertension was successful in only 50% - 60% of the cases [4] the combination to low dose administration, control blood pressure and minimizes side effects.

Calcium channel blocker, angiotensin receptor blocker 18(15%) and 17(14.1%) respectively, [7] found that blocker and ACEI are widely used for the treatment of hypertension it is addition to blood pressure control, prevention of complication represents a great challenge in the management of hypertension. Adrenergic receptor blockers are effective agents for the treatment of hypertension and their use has been associated with reduced cardiovascular morbidity and mortality. [4] Beta blocker uses recorded 15 (12.5%) are effective and overall safe agents for hypertension not recommended under some unique clinical circumstances like diabetes mellitus, peripheral vascular disease and bronchial asthma [4,5].

## Conclusion

Hypertension is a risk factor for many diseases especially in elderly and female patients, other medical parameter is duration of hypertension showed higher percentage in patient with more than five years and increased the incidence within a family history. Hypertensive patients with Illiterate-primary education showed lower percentage than those with higher education level. Higher frequency of hypertension among overweight and obesity patients and there are several medical condition related to hypertension like diabetes mellitus, cardiovascular disease and hypercholesterolemia.

Diuretics and angiotensin converting enzyme inhibitor were the most drug used followed by then combined drug used for control blood pressure and minimize of side effects. Angiotensin receptor blocker, calcium channel blockers are widely used to control and prevention of complication represents a great challenge in the management of hypertension. Then Beta blockers are effective and safe agents for hypertension.

## Recommendation

Hypertension has an important impact on public health because the positive association between increase blood pressure and diabetes, cardiovascular disease and hypercholesterolemia, regular doses of antihypertension drugs are required to control blood pressure and treatment related disease, weight loss has been found to reduce elevation of blood pressure. Developing therapeutic mechanism with fewer side effects, resulting in more effective blood pressure reduction is possibly effective approaches to treating and even preventing hypertension in future.

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