RISK FACTORS OF UNCONTROLLED HYPERTENSION AMONG PEOPLE IN SULAIMANI CITY ACCORDING TO THE HYPERTENSION GUIDELINE OF AHA/ACC 2017

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ABSTRACT

Background

Hypertension is the major risk factor for cardiovascular disease (CVD) morbidity and mortality globally, which accounts for nearly half of the CVD events. A striking change has happened in the diagnosis of hypertension and its management after the introduction of the 2017 hypertension guideline by the American College of Cardiology and American Heart Association (ACC/AHA).

Objectives

To detect risk factors of uncontrolled hypertension according to ACC/AHA 2017 Guideline.

Patients and Methods

A cross-sectional study conducted at Ali Kamal outpatient clinic, a total of 282 uncontrolled hypertensive patients were collected and evaluated for risk factors of uncontrolled hypertension, including gender, age, body mass index & other variables.

Results

A total of 282 patients were included in this study.The mean ± SD age was 55.4 ± 12.5 (ranged from 30 to 84) years and around 68.4 % (n= 193) were females. A high percentage of 77.3% were living in rented houses. Their mean BMI was 28.4 ± 4 kg/m^2 (ranged from 19.5 to 51.9). Minority of participants.13.5% (n=38), had normal body mass index, 49.6% (n=140) were on triple antihypertensive therapy. The duration of hypertension was less than 10 years in 45 % (n=127).48% (n=136) of the patients were taking the medications from mixed sources (governmental and private sector). The mean DBP of the patients was 87.7±8.4 mm Hg, while the mean SBP was 147±15.4 mmHg and 96.5% (n=272) of the patients were adherent to the medications.

Conclusion

Hypertension is a major risk factor for CAD; every patient with uncontrolled hypertension must be evaluated for any associated comorbidity, and strongly advised against smoking and obesity especially with advanced age.

Keywords: *Uncontrolled hypertension; Risk factors; Non-adherence.*

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INTRODUCTION

Cardiovascular disease (CVD) is the main cause of deaths all over the world, accounting for 17.3 million deaths annually which are expected to rise to >23.6 million by 2030 [1]. A striking change has happened in the diagnosis of hypertension and its management after the introduction of the 2017 blood pressure guideline by American College of Cardiology and American Heart Association (ACC/AHA), a BP level of 130/80 mm Hg or greater is defined as hypertension while BP target was determined to be less than 130/80 mm Hg [2] .These changes from the ACC/AHA can significantly be associated with alteration in the epidemiology of hypertension, its management, and health care policy. [3, 4].

Uncontrolled hypertension is one of the common health problems among hypertensive patients worldwide, approximately half of hypertensive patients (36 million) have uncontrolled hypertension in the USA, and Its prevalence estimated at 54% [5] .Poorly controlled blood pressure result in cardiovascular-related morbidity and mortality, that is responsible for the occurrence of CVA (accounting for 51% of all CVA deaths worldwide), Chronic kidney disease (CKD), congestive heart failure, aortic aneurysm and ischemic heart disease (45% of all deaths) [6].

Significant reductions in the prevalence of target organ damage can be obtained through controlling hypertension [7]. Problems from uncontrolled hypertension can be managed through a wide range of interference including solving noncompliance to medication, physical activity, and exercise together with weight loss and controlling any comorbid condition if available like Diabetes Mellitus (DM), CKD. Moreover, the accessibility of health institutions equipped with trained physicians and nurses has a great impact on blood pressure control [8].

The study aims to detect the risk factors of uncontrolled hypertension.

PATIENTS AND METHODS

The cross-sectional study design was conducted from the 1st February 2018 to the 1st February 2019 at Ali Kamal outpatient clinic, which is the main consultation center in Sulaimani city.

A total of 282 uncontrolled hypertensive patients were enrolled non-randomly. After obtaining their informed consent, their home blood pressure records reviewed and re-checked at the outpatient clinic with an evaluation of their risk factors and their medications.

Exclusion criteria included age < 30 years, known cases of secondary hypertension and pregnancy, cases of controlled hypertension, duration of hypertension less than 6 months.

The blood pressure was checked after 10 minutes of rest in a sitting position in both sides and rechecked after 30 minutes, the blood pressure on the high side was considered the final reading. The sphygmomanometer was MDF Desk Mercury Sphygmomanometer.

The Body Mass Index (BMI) of every patient was measured by using the following equation: BMI=Weight/ (Height) ^{2} (Kg/M^2) [9],

The following information was obtained from every patient, duration of hypertensions in years, numbers of hypertensive drugs, source of medications and adherence to drugs, also each patient was asked about the history of D.M, Ischemic heart disease (IHD), stroke, hyperlipidemia, current smoking, and CKD.

To assess the socioeconomic condition they were asked about whether they were living in their own house or rented house.

Data were coded and entered into Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics (frequencies, percentages, mean values, and standard deviations) were calculated for demographic and health features. Moreover, a P-value 0f (≤ 0.05) was considered as statistically significant, and a P-value of (< 0.001) as statistically very highly significant. Also, Pearson Chi-square was used to find out a significant association between independent and dependent variable pairs, and Pearson R correlation was used to calculate the direction between the two variables.

RESULTS

A total of two hundred eighty-two (282) patients were included in the final analysis. There were no missed cases.

The mean ± SD age of the participants was 55.4 ± 12.5 (ranged from 30 to 84) years and around 68.4 %(n=193) were females while 31.6% (n=89) were males. A high percentage of them were living in rented houses 77.3 % (n=218) while, 22.7 %(n=64) of them were living in their own houses, Table 1.

Factors associated with uncontrolled hypertension: Behavioral and biological features.

The mean BMI was 28.4 ± 4 kg/m2 (ranged from 19.5 to 51.9). The minority of participants 13.5% (n=38) had normal body mass index, regarding medications 49.6% (n=140) were on triple antihypertensive therapy. 45% (n=127) of the patients were in their first decade since the diagnosis of hypertension. 48.2% (n=136) of the patients were taking medications from mixed sources (governmental and private sector), the majority of the 96 % (n=272) has claimed good adherence to their medications. The mean SBP of the patients was 147±15.4 (ranged from 120 to 220) mm Hg. The mean DBP of the patients was 87.7±8.4 (ranged from 70 to 120) mmHg.

Among 282 patients, 114 patients (40.4%) had isolated systolic hypertension, Table 2.

For comorbidities inpatient with uncontrolled hypertension, 61.3% (n=173) of the patient were known to have Hyperlipidemia, followed by type 2 Diabetes mellitus 50% (n=141). Ischemic heart disease was found in 107 patients (37.9%) while, stroke and CKD were found in 2.8% and 18.4% respectively. 30.5% of the patients were current smokers as shown in Table 3.

Multiple correlations were assessed with no statistically significant value apart from smoking status which had a statistically significant association with diastolic blood pressure.

Table 1. Frequency distribution of socio-demographic characteristics of uncontrolled hypertensive patients.

Demographic data		Frequency (%)
Age (year)	30 - 39	35 (12.4)
	40 - 49	55 (19.5)
	50 - 59	69 (24.5)
	60 - 69	78 (27.7)
	70 - 79	29 (10.3)
	80 - 84	9 (3.2)
	Unknown	7 (2.5)
House	Own house	64 (22.7)
	Rented house	218 (77.3)
Gender (Male: Female ratio = 0.46)	Male	89 (31.6)
	Female	193 (68.4)

Table 2. Behavioral and biological features of patients with uncontrolled hypertension.

Variables		Frequency (%)
Number of anti-hypertensive drugs	One drug	61 (21.6)
	Two drugs	81 (28.7)
	Three drugs	140 (49.6)
Supply of drugs	Government	38 (13.5)
	private	108 (38.3)
	Both	136 (48.2)
Compliance of patient for drugs	Yes	272 (96.5)
	No	10 (3.5)
systolic blood pressure groups Mean ±SD = 147±15.4 (ranged from 120 to 220)	Normal	7 (2.5)
	High	275 (97.5)
Isolated systolic hypertension		114 (40.4)
Diastolic blood pressure groups Mean ±SD = 87.7±8.4 (ranged from 70 to 120)	Normal	117 (41.5)
	High	165 (58.5)
BMI groups: Mean ± SD = 28.4 ± 4 (ranged from 19.5 to 51.9)	Normal (18.5 - 24.99)	38 (13.5)
Height (meter): Mean ± SD = 1.7 ± 0.1 (ranged from 1.4 to 1.8) Weight (kilogram): Mean ± SD = 76.7 ± 11.4 (ranged from 51 to 150)	Overweight (25 - 29.99)	160 (56.7)
	Obese (30 - 40)	72 (25.5)
	Morbid obesity (> 40)	3 (1.1)
	Unknown	9 (3.2)
Duration of hypertension groups (year) Mean ±SD = 3.8±4.9 (ranged from 0.08 to 30)	<1	111 (39.4)
	1 - 9	127 (45)
	10 - 19	29 (10.3)
	20 - 30	8 (2.8)
	Unknown	7 (2.5)

Table 3. Comorbidities in patients with uncontrolled hypertension.

Comorbidities	Numbers and (%)
Hyperlipidemia	173 (61.3)
Diabetes mellitus	141 (50)
Ischemic heart disease	107 (37.9)
Smoking status	86 (30.5)
Chronic kidney disease	52 (18.4)
Stroke	8 (2.8)

Table 4. Correlations between blood pressure and independent variables.

Variable pairs		P-value (Pearson R Correlation)
Age groups (year)	+ systolic blood pressure groups (mmHg)	0.19 (-0.026)
	+diastolic blood pressure groups (mmHg)	
BMI group (kg/M²))	+ systolic blood pressure groups (mmHg	0.91 (-0.026)
	+ diastolic blood pressure groups (mmHg)	0.46 (0.11)
Duration of hypertension groups (year)	+ systolic blood pressure groups (mmHg)	0.2 (0.115)
	+ diastolic blood pressure groups (mmHg)	0.11 (0.134)
Gender	+ systolic blood pressure groups (mmHg)	0.86 (0.01)
	+ diastolic blood pressure groups (mmHg)	0.5 (0.04)
Diabetes mellitus	+ systolic blood pressure groups (mmHg)	0.7 (0.023)
	+ diastolic blood pressure groups (mmHg)	0.28 (0.065)
Ischemic heart disease	+ systolic blood pressure groups (mmHg)	0.61 (0.031)
	+ diastolic blood pressure groups (mmHg)	0.55 (0.036)
Stroke	+ systolic blood pressure groups (mmHg)	0.65 (0.027)
	+ diastolic blood pressure groups (mmHg)	0.09 (0.101)
Hyperlipidemia	+ systolic blood pressure groups (mmHg)	0.07 (0.107)
	+diastolic blood pressure groups(mmHg)	0.24 (0.071)
Smoking status	+ systolic blood pressure groups (mmHg)	0.91 (0.007)
	+ diastolic blood pressure groups (mmHg)	0.02 (0.136)
Renal function	+ systolic blood pressure groups (mmHg)	0.77 (-0.017)
	+ diastolic blood pressure groups (mmHg)	0.27 (-0.066)
Number of anti-hypertensive drugs	+ systolic blood pressure groups (mmHg)	0.68 (0.048)
	+ diastolic blood pressure groups (mmHg)	0.23 (-0.064)
Supply of drugs	+ systolic blood pressure groups (mmHg)	0.49 (0.008)
	+ diastolic blood pressure groups (mmHg)	0.13 (-0.114)
Compliance of patient for drugs	+ systolic blood pressure groups (mmHg)	0.61 (-0.031)
	+ diastolic blood pressure groups (mmHg)	0.45 (0.045)

DISCUSSION

While the knowledge on the risks of hypertension and its management has been increased with the appearance of new and effective medications, the prevalence of hypertension is the same in the population with better control of hypertension [10].

In this study hypertensive patients visiting outpatient clinics for follow up of their blood pressure were assessed for risk factors of uncontrolled hypertension.

Age was a strong factor of uncontrolled hypertension that has been found in this study with a mean age of 55.4 ± 12.5 years and more than 40 % of them were older than 60 years, this is supported by many pieces of literature as age was a strong factor associated with high systolic blood pressure and isolated systolic hypertension in the majority of individuals with uncontrolled hypertension in patients who are older than 60 years [11, 12], Additionally, Hyman and Pavlik [13] indicated advanced age as the most important correlate of uncontrolled hypertension in 32% of their cases.

We found that 68% of patients with uncontrolled hypertension were females. This could be because the female patient in most of the societies is more aware and more careful concerning their health as supported by NHANES III (National Health and Nutrition Examination Survey. Up to date literature on the correlation of hypertension control and gender is inconsistent. Female gender was found to be a significant predictor of blood pressure control [14, 15] while other studies have shown either better control in men [16, 17], or no difference [18].

The minority of our patients had an ideal body weight of 13.5%. Many pieces of literature found a correlation between obesity and uncontrolled hypertension [19, 20]. Obese patients are less likely to reach the recommended targets than normal-weight individuals. Furthermore, a meta-analysis showed that a loss of 3% to 9% of body weight decreased both systolic and diastolic blood pressure by 3 mmHg[21].

The effects of comorbidity on hypertension control have not been studied extensively; we could not find a statistically significant correlation of Co-morbidity and uncontrolled hypertension. Our study included a large number of diabetic patients 50% (n=141) and patients with hyperlipidemia 61.3% (n=173). Although it is recommended for the diabetic patient to have well-controlled blood pressure as they both are major cardiovascular risk factors, Diabetes was not associated with good control as deemed by the guidelines [22].

We have found a significant association between smoking status and diastolic blood pressure (p-value = 0.02).

Adherence is a key indicator in obtaining blood pressure control [20, 23] Reasons for poor adherence may be inadequate patient knowledge, misperception about hypertension, and antihypertensive drugs together with medication availability and cost [24].

While 96.5% (n=272) of the patient in this study were adherent to medications yet they had uncontrolled blood pressure which could be due to their high BMI, salty foot, sedentary lifestyle & quality of the medications.

Despite that for most of the patients' combination therapy is required to have optimum blood pressure control as the drugs work synergistically and has better control than monotherapy [25], we found that 49.6%(n=140) of them were taking three types of antihypertensive medications, while 28.7% (n=81) of the patients were taking two kinds of antihypertensive medications and only 21.6% of them where taking single drug and majority of them claimed that they have complied with their medications. But being on multiple drugs makes the patients less likely to adhere to their medications, furthermore, patients with a single drug that can be taken once daily are more adherent to their medication and less likely to have uncontrolled blood pressure [26]. Physicians could have a part in this problem as they may not adhere to the guideline [27] or they are unaware or have a deficiency in knowledge [28], disagree with the guideline [29], or reluctant to proceed with upgrading therapy (clinical inertia) [30].

In conclusion, hypertension is a major risk factor for CAD, morbidity, and mortality.patients with uncontrolled hypertension must be carefully evaluated for associated comorbidities and risk factors and strongly advised against smoking and obesity especially with advanced age. At the same time, physicians should be encouraged to follow the new 2017 AHA/ ACC hypertension guideline in their practice for better control of hypertension.

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