Hypertension Control and Associated Factors in Patients Attending Primary Health Care Centers in Jeddah, Saudi Arabia


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Abstract

Background: Although, hypertension complications are one of the most preventable diseases with the use of antihypertensive drugs, but many local studies are still showing higher prevalence of uncontrolled hypertension. Many factors influencing the hypertension control. These factors are variable in each country and even city within the same country.

Objectives: To access the level of hypertension control and identify factors associated with uncontrolled hypertension among patients attending the primary health care centers, Jeddah.

Subjects and methods: A cross sectional study was carried out in primary health care center in Jeddah, Saudi Arabia. Data were collected from 227 patients over a period of three months (June-August, 2016). Data sheet based on the inclusion criteria (age>18 years, one year follow up with at least four visits, on antihypertensive medication) was used to extract specific demographic characteristics from the patient’s file, as well as blood pressure, height, weight, BMI (body mass index), if they have associated co-morbidities (diabetes mellitus, chronic kidney disease, cardiovascular disease, smoker). Pregnant women were excluded. In addition, all biochemical measurements were collected from the patients’ files including: BP readings from the last visit and the other information regarding the possible associated chronic diseases like cardiovascular diseases, chronic kidney diseases and diabetes mellitus.

Results: The study included 227 hypertensive patients. Their age ranged between 21 and 84 years with a mean±SD of 58.7±9.3 years. Almost two-thirds were females (67%). Among eligible 209 patients, hypertension was uncontrolled in 70 patients (33.5%). Factors significantly associated with uncontrolled hypertension were lack of regular follow-up, p=0.019, longer duration of hypertension (>10 years), p=0.032 and having heart disease, p=0.005.

Conclusion: A considerable proportion of hypertensive patients in Jeddah were uncontrolled. Factors associated with uncontrolled hypertension were modifiable preventable factors. Educating and encouraging hypertension patients for regular follow-up were the key factor in its control.

Keywords: Hypertension, uncontrolled, associated factors, anti-hypertensives

Introduction

Hypertension is one of the most common conditions seen very frequently in the primary health care centers, and it’s contributed with many co-morbidities like stroke, ischemic heart diseases, renal diseases and 7.5 million deaths globally if not treated properly and according to WHO the uncontrolled hypertension rose from 600 million in 1980 to nearly 1 billion in 2008.(1)

Although, hypertension is one of the most preventable diseases with the use of antihypertensive drugs, (2) but many local studies are still showing higher prevalence of uncontrolled HTN. As many researches have been done in Saudi Arabia especially in Abha(3) and Khobar(4) the percentage of controlled patients were 63%, 37% respectively and in Riyadh(5) the percentage was 37% among the males while in females it was 24%. While in a research done back in 2011, the overall prevalence of controlled patients in Saudi Arabia was only 37%, (6) This was lower than Bahrain 66.3%(7) and 39% in Oman.(8) Also in United Arab Emirates the uncontrolled percentage showed only 19%. (9) However, internationally it was still lower than UK (49%), New Zealand
Many factors affected on the controlling of the HTN among these patients thus the percentages are variable in each country and city. However, a study in Oman showed that patients with cardiovascular diseases were more compliant to the treatment and achieved the optimum controlled BP target rather than the patients with Diabetes and chronic kidney diseases who showed poor control. Also the JNC-7 recommended two or more antihypertensive medications to achieve the goal BP readings, but the same study in Oman showed better BP control among the patients who used monotherapy than multi-therapy.

Anyhow, many studies questioned the effectiveness and capability of the primary health care centers in many regions of Saudi Arabia to achieve the recommended national standard goals regarding the HTN, which constantly found low in many areas. Also the studies emphasized at the quality of the health care given by the doctors during the follow ups which predicted to be a cause interfering with the control as well.

The present study was carried out to access the control of hypertension in patients attending the primary health care centers (PHCC) as well as to investigate the associated factors that contributed to patient’s uncontrolled status in Saudi Arabia.

Subjects and methods

A cross sectional study was carried out in primary health care center in Jeddah, Saudi Arabia. Data were collected from 227 patients over a period of three months (June-August, 2016). Data sheet based on the inclusion criteria (age>18 years, all nationalities, one year follow up with at least four visits, on antihypertensive medication) was used to extract specific demographic characteristics from the patient’s file, as well as blood pressure, height, weight, BMI (body mass index), if they have associated co-morbidities (diabetes mellitus, chronic kidney disease, cardiovascular disease, smoker). Pregnant women were excluded. In addition, all biochemical measurements were collected from the patients' files including: BP readings from the last visit and the other information regarding the possible associated chronic diseases like cardiovascular diseases, chronic kidney diseases and diabetes mellitus. Also, inquire about if they are smokers or not was done.

Body Mass Index (BMI) was classified according to WHO criteria into underweight <18.5 kg/m², normal BMI if 18.5-24.99 kg/ m², overweight when BMI 25-29.9 kg/ m² and obese when BMI ≥30 kg/ m².

According to JNC-8, hypertension was defined when the patient is taking anti-hypertensive drugs and the systolic blood pressure (SBP) >140 mmHg and diastolic blood pressure (DBP) > 90 mmHg and the patient is considered as controlled hypertensive when the SBP <140 mmHg and DBP <90 mmHg in diabetic patients or in non-diabetics with chronic kidney disease patients. Also, when the SBP <150 mmHg and DBP <90 mmHg in patients >60 years old or when the SBP <140 mmHg and DBP <90 mmHg in patients <60 years old.

According to the American Diabetes Association, diabetes mellitus was characterized by recurrent or persistent high blood sugar, and is diagnosed by demonstrating any one of the following: fasting plasma glucose level FPG >126 mg/dL (7.0 mmol/L), plasma glucose ≥ 200 mg/dl (11.1 mmol/l) two hours after a 75 g oral glucose load as in an oral glucose tolerance test or glycated hemoglobin (HbA1C) ≥ 6.5%. The patient also was diagnosed as diabetic if he’s receiving hypoglycemic medications. According to WHO guidelines, current smoker was defined as: a person who smokes cigarettes daily or occasionally, past-smoker: a person who was formerly a daily or occasional smoker, but currently does not smoke at all and nonsmoker: a person who has never smoked before or has smoked very little in the past.

Dyslipidemia was defined according to the NCEP ATP III criteria 2003, if one or more of the followings were found: total serum cholesterol of > 200 mg/dl, serum LDL of > 130 mg/dl. (In diabetic patient LDL> 1 00 mg/dl ), serum triglyceride of > 150 mg/dl and serum HDL < 40 mg/dl in men, and <50 mg/dl in women. The patients were also diagnosed to have dyslipidemia if were on medication for any of the above conditions.

Coronary heart disease was considered when there is a history of CHD like: coronary artery bypass, stent, angina or myocardial infarction or, if the patient was on current treatment of CHD in the medical records, cerebrovascular disease was considered if there was a history of stroke or transient ischemic attack mentioned in the medical records, retinopathy was considered if it was documented by the ophthalmologist or the treating physician in the medical records whereas peripheral distal symmetrical neuropathy was considered if there was a positive history of numbness, tingling or pain in the toes, feet legs, hands, arms, and fingers and mentioned in the medical records.
The authors collected the data, each sensitive information was handled with integrity. The data were accessible and reached by the authors only, each participant was linked to their data through their medical file, with only accessible member were allowed to reach the patients files.

The statistical program SPSS version 22 was used for data analysis. Chi-square was used to determine risk factor that has been defined according to the definition of study variable.

**Results**

The study included 227 hypertensive patients. Their age ranged between 21 and 84 years with a mean of 57.8 ad standard deviation of 9.3 years. Table 1 summarizes their baseline characteristics. Almost two-thirds of them (67%) were females. More than half of them (53.5%) were illiterate whereas 11.3% were university graduated. More than two thirds of them (67.9%) were house wives or not working and 20.8% were employed. Prevalence of current smoking was 27.7%.

Regarding reported antihypertensives, ACE inhibitors, calcium antagonists, and diuretics (Thiazide like/loop diuretics) were the most frequently uses as they were used by 41.9%, 38.38% and 34.3% of patients, respectively. Table 2

As obvious from figure 1, uncontrolled diabetes was observed among 33.5% of patients.

There was significant association between co-morbid heart diseases and level of hypertension control as 57.1% of patient with co-morbid heart diseases compared to 30.2% of those without heart diseases had uncontrolled hypertension. Regarding co-morbid DM, 36.5% of patient with co-morbid heart DM compared to 30.2% of those without DM had uncontrolled hypertension. However, this was not statistically significant, p>0.05. Duration of hypertension was significantly associated with its control as all those with a duration of more than 10 years were uncontrolled compared to 40% of those with a duration of 5 years or less, p=0.032. Patients who had regular follow up for hypertension were more likely to be controlled as opposed to those without who didn’t follow-up their blood pressure (70% versus 48.4%), p=0.019. Similarly patients with heart diseases were more likely to be uncontrolled compared to those without heart diseases (57.1% versus 30.2%), p=0.005. Other factors were not significantly associated with uncontrolled hypertension, particularly types and number of antihypertensive medications. Table 3

**Discussion**

Consistent with other studies carried out in developing countries,[18-22] as well as developed countries,[23] a significant proportion of hypertensive patients attended primary health care centers in Jeddah (33.5%) did not reach the level of blood pressure control recommended by international standards. However, the rate of uncontrolled hypertension reported in the current study is higher than others.[24,25]

The control of hypertension can be influenced by several factors described in other studies.[18, 26, 27] These factors can be categorized into patient-related factors and factors related to physicians’ practices.

Numerous studies revealed that men were more presented with uncontrolled hypertension compared to females.[18, 19, 26-28] They attributed the findings to the fact that females are naturally protected by oestrogen hormone.[29] Furthermore, male subjects are less likely to seek medical care.[30] In the present study, gender was not significantly associated with uncontrolled hypertension.

Orduña ezza, et al[18] observed that young and middle-aged hypertensive patients were more likely to be uncontrolled. This appeared to be a result of not visiting their physician or higher frequency of not following treatment regularly. In the current study, patient’s age was not associated with controlled hypertension.

Some studies demonstrated an association between type 2 diabetes mellitus and control of hypertension.[30-33] However, in the present study, diabetes was not significantly associated with controlled hypertension.

In accordance with others,[30, 34] education was not proven as a risk factor for uncontrolled hypertension.

Association between heart diseases and uncontrolled hypertension was proven in the present study. The same has been reported in another recent study carried out in Zimbabwe by Mpande, et al.[22]

Lack of follow up, which could significantly associated with proper adherence to antihypertensive medications and life style modification instructions, was significantly associated with uncontrolled hypertension in the present survey. This finding consists with others.[22, 30]

In accordance with other studies,[18, 19, 22] longer duration of hypertension was associated with uncontrolled hypertension in the present study.

In the present study, uncontrolled hypertension was not found significantly among smokers. In several other studies,[35, 36] smoking has been recognized as a risk factor for uncontrolled hypertension.

Overweight and obesity were very common among our study cohorts. This finding
could be considered as evidence that overweight and obesity are among significant risk factors of hypertension in our population. It has been documented that obesity can interfere with the efficacy of hypertension drugs, and thus lead to uncontrolled hypertension.\(^{(37, 38)}\) In the present study, body mass index was not proven to be associated with uncontrolled hypertension.

Type of medication used in controlling hypertension was not proven to be associated with controlled hypertension in the current study. The same has been reported in other studies.\(^{(18, 22)}\)

In conclusion, uncontrolled hypertension is common among Saudi population, mostly due to preventable factors. Thus, effort should be provided to increase awareness of diabetic patients regarding the importance of controlling blood pressure and adverse consequences of its uncontrolled.

Among limitations of the present study, inclusion of patients from one sector in one city in Saudi Arabia (primary health care centers in Jeddah) could affect the generalizability of results. Its cross-sectional design, permits association not causality. However, the study could have public health significance in investigating this important topic.

References
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19. Babiker FA, Elkhalfia LA, Moukhyer ME. Awareness of hypertension and factors associated with uncontrolled hypertension in
Sudanese adults CVJ Africa 2013
July;24(6):208-212


### Table 1: Baseline characteristics of the participants

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<th>Number</th>
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<tr>
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<td>51-60</td>
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<td>&gt;60</td>
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<tr>
<td>Intermediate</td>
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<tr>
<td>Secondary</td>
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<td>University</td>
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<td><strong>Occupation (n=159)</strong></td>
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<td>Retired</td>
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<td>Ex-smoker</td>
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### Table 2: Frequency distribution of antihypertensive, Jeddah

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<tr>
<th>Antihypertensive Class</th>
<th>Frequency</th>
<th>Percentage</th>
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<tr>
<td>Diuretics (Thiazide like/loop diuretics)</td>
<td>78</td>
<td>34.3</td>
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<tr>
<td>B-blockers</td>
<td>38</td>
<td>16.7</td>
</tr>
<tr>
<td>ACE inhibitors</td>
<td>95</td>
<td>41.9</td>
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<tr>
<td>Calcium antagonists</td>
<td>88</td>
<td>38.8</td>
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<tr>
<td>ARB</td>
<td>64</td>
<td>28.2</td>
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<tr>
<td>Others (alpha blockers/spirinolacton)</td>
<td>18</td>
<td>7.9</td>
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### Table 3: Factors associated with uncontrolled hypertension, Jeddah, Saudi Arabia.

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<th>Age (years) (n=178)</th>
<th>Controlled N=139</th>
<th>Uncontrolled N=70</th>
<th>p-value</th>
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<tbody>
<tr>
<td>≤50 (n=42)</td>
<td>28 (66.7)</td>
<td>14 (33.3)</td>
<td>0.761</td>
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<td>51-60 (n=67)</td>
<td>41 (61.2)</td>
<td>26 (38.8)</td>
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<tr>
<td>&gt;60 (n=69)</td>
<td>46 (66.7)</td>
<td>23 (33.3)</td>
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<tr>
<th>Gender (n=209)</th>
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<th></th>
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<tbody>
<tr>
<td>Male (n=69)</td>
<td>43 (62.3)</td>
<td>26 (37.7)</td>
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<td>Female (n=140)</td>
<td>96 (68.6)</td>
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<th>Educational level (n=147)</th>
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<th>p-value</th>
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<tr>
<td>Illiterate (n=79)</td>
<td>50 (63.3)</td>
<td>29 (36.7)</td>
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</tr>
<tr>
<td>Primary (n=19)</td>
<td>10 (52.6)</td>
<td>9 (47.4)</td>
<td></td>
</tr>
<tr>
<td>Intermediate (n=14)</td>
<td>10 (71.4)</td>
<td>4 (28.6)</td>
<td></td>
</tr>
<tr>
<td>Secondary (n=19)</td>
<td>15 (78.9)</td>
<td>4 (21.1)</td>
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</tr>
<tr>
<td>University (n=16)</td>
<td>11 (68.8)</td>
<td>5 (31.3)</td>
<td>0.499</td>
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<table>
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<th>Occupation (n=147)</th>
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<tr>
<td>Employed (n=31)</td>
<td>21 (67.7)</td>
<td>10 (32.3)</td>
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<tr>
<td>Retired (n=17)</td>
<td>9 (52.9)</td>
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<td>House wives/not working (n=99)</td>
<td>64 (64.6)</td>
<td>35 (35.4)</td>
<td>0.575</td>
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<table>
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<tr>
<th>Smoking status (n=167)</th>
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None-smoker (n=115) & 77 (67.0) & 38 (33.0) \\
Current smoker (n=47) & 27 (57.4) & 20 (42.6) \\
Ex-smoker (n=5) & 4 (80.0) & 1 (20.0) \\
\hline
**BMI (n=205)** & & \\
Underweight (n=43) & 29 (67.4) & 14 (32.6) \\
Normal (n=15) & 9 (60.0) & 6 (40.0) \\
Overweight (n=46) & 34 (73.9) & 12 (26.1) \\
Obese (n=101) & 65 (64.4) & 36 (35.6) \\
\hline
**Duration of hypertension(years) (n=39)** & & \\
≤5 (n=25) & 15 (60.0) & 10 (40.0) \\
6-10 (n=11) & 4 (36.4) & 7 (63.6) \\
>10 (n=3) & 0 (0.0) & 3 (100) \\
\hline
**Follow-up (n=201)** & & \\
Yes (n=170) & 119 (70.0) & 51 (30.0) \\
No (n=31) & 15 (48.4) & 16 (51.6) \\
\hline
**Co-morbid DM (n=209)** & & \\
Yes (n=159) & 101 (63.5) & 58 (36.5) \\
No (n=50) & 38 (76.0) & 12 (24.0) \\
\hline
**Heart diseases (n=200)** & & \\
Yes (n=28) & 12 (42.9) & 16 (57.1) \\
No (n=172) & 120 (69.8) & 52 (30.2) \\
\hline
**Number of antihypertensives (n=208)** & & \\
No (n=13) & 9 (69.2) & 4 (30.8) \\
One (n=85) & 59 (69.4) & 26 (30.6) \\
Two (n=74) & 51 (68.9) & 23 (31.1) \\
Three (n=26) & 14 (53.8) & 12 (46.2) \\
>Three (n=10) & 6 (60.0) & 4 (40.0) \\
\hline
**Type of antihypertensives** & & \\
Diuretics (n=96) & 73 (76.0) & 23 (24.0) \\
B-blockers (n=35) & 22 (62.9) & 13 (37.1) \\
ACE inhibitors (n=90) & 58 (64.4) & 32 (35.6) \\
Calcium antagonists (n=81) & 53 (65.4) & 28 (34.6) \\
ARB (n=61) & 39 (63.9) & 22 (36.1) \\
Others (alpha blockers/spirinolacton) (n=15) & 6 (40.0) & 9 (60.0) \\
\hline

**Figure 1:** Prevalence of controlled hypertension among hypertensives, Jeddah, Saudi Arabia