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Research Article

### BLOOD PRESSURE CONTROL BY ANTIHYPERTENSIVE DRUG UTILIZATION IN A PAKISTANI HYPERTENSIVE POPULATION

Dr. Nisar khan<sup>1</sup>, Dr. Muhammad Imran ullah<sup>2</sup>, Dr. Salman Khan<sup>2</sup>, Ata-Ur-Rehman<sup>3</sup>, Altaf Ali Mangi<sup>\*4</sup>, Eshwa Dar<sup>5</sup>

<sup>1</sup>Associate professor Mufti Mehmood Memorial (MMMTH) Dera Ismail khan, <sup>2</sup>AP medicine DHQ Teaching Hospital DI-Khan, <sup>3</sup>Department of Biological Sciences Gomal University Dera Ismail Khan KPK Pakistan. <sup>4</sup>Faculty Of Pharmacy, Gomal University Dera Ismail Khan KPK Pakistan.

<sup>5</sup>Department of Pharmacy, the university of Lahore Punjab.

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#### Abstract:

**Background:** Hypertension is a silent killer as it is without symptoms and stays undiagnosed, and if diagnosed, it is not monitored. Hypertension is on the rise, affecting more than 20 percent of adults. Estimates of prevalence are needed to design hypertension, cardiovascular diseases, and stroke control measures. This research evaluated the pattern of in-patient control of medicine utilization and hypertension ..

**Methods:** In the Department of Medicine of Ayub Teaching Hospital Abbottabad, a cross-sectional, retrospective community-based survey was performed among adolescents on drug use in hospitalized patients with hypertension. Patients' blood pressure (BPs) was registered in the hospital along with their personal details, history of previous diagnosis, therapy, and pre-discharge nutritional and lifestyle modification. Analyses of chi-square and cross-tabulation were used to associate assess between categorical variables ( $P < 0.05$ ).

**Results:** Of 169 patients with mild and serious hypertension, 29 (17.9 percent) and 64 (40.1 percent) were admitted. One hundred and fifty-five (95.8%) patients had antihypertensive medicines, of which 34 (23.1%) had monotherapy, 64 (40.3%) had two combinations of antihypertension, 61 (40.8%) had three or more combinations of antihypertension.  $\alpha$  channel blocker (CCBs) 116 (72.6%), (ACEIs) 102 (63.9%), diuretics 100 (62.3%), central agent 26 (16.9%), angiotensin receptor blockers (ARBs) 10 (7.3%), and  $\beta$ -blockers (BB) 10 (7.1%) were in the order of antihypertensive drug use. Control of blood pressure was accomplished in 51.2 percent of the population of patients. Co-morbidity ( $p=0.025$ ) were factors that negatively influenced blood pressure control. The change in nutritional lifestyle ( $p=0.010$ ) was a factor that strongly influenced anti hypertension..

**Conclusions:** The information acquired statistically evaluated and outcome showed that general blood pressure control rate for the documents of the 164 patients reported was 51.2%. The use of antihypertensive medicines was in line with therapy rules, but in 51.2% of patients blood pressure was attained.

**Keywords:** Hypertension/drug therapy; Aged; Prevalence; Awareness; Risk factors;

#### Corresponding author:

**Dr. Altaf Ali Mangi,**

Ph-D Scholar Department of Pharmaceutical Chemistry faculty of  
Pharmacy Gomal University Dera ismail Khan, Pakistan.

Contact Number+923313421263, Email: [pharmacistsindh41@gmail.com](mailto:pharmacistsindh41@gmail.com)

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## INTRODUCTION:

In latest research, compared to earlier reports from comparable settings, cardiovascular diseases particularly hypertension improved by 150 percent. The most common concern of hospitalization was hypertension and hypertension-related illnesses, and stroke the primary factor for demise (20 percent) [1]. High BP is world's main factor for early demise influencing 1 in 3rd adolescents around the world, with a calculated 1.56 billion individuals suffer from Blood pressure [2] in 2025. Nigeria is also the nation with hypertension 3's highest ratio especially of black people. Blood pressure and associated troubles are yet significant factor for adult morbidity in African country[4,5] despite the presence of broad spectrum of blood pressure lowering agents. In addition, surveys in a Nigerian population have shown that above 50 percent of patients cured with hypotensive have range above 140/90 mm Hg (very High BP) [6,7]. Hypertension complications are all reduced by reducing BP in several types of medicines, including (ACEIs), (ARBs), beta-blockers (BBs), (CCBs), and diuretics of thiazidetype. It is not possible to control more than 2/3rd of patients with monotherapy and will involve combine therapy chosen from distinct drugs list [8-11]. For instance, 60% of those BP was monitored to < 140/90 mmHg got 2 & above agents in the Antihypertensive and Lipid Lowering Treatment to Prevent Heart Attack Trial (ALLHAT), & just 30% in total monitored on single medication [12]. The blood pressure patients may require frequently 2 or more than 2 antihypertensive agents ..

## MATERIALS AND METHODS:

It is a cross-sectional retrospective research of hypertensive individuals at Ayub Teaching Hospital Abbottabad's Department of Medicine, a government-owned (secondary) health care facility in Hazara, KPK Pakistan. Abbottabad is located in North West Pakistan's rainforest belt. The research involved the evaluation & usage of current information (spanning 5 months) prior to this approval acquired from the Management Board of the Ministry of Health and Hospitals. Medical outpatient case notes were given by the hospital's Records Department.

### Inclusion criteria are viz:

- Hypertensive outpatient case reports cured during July 2016 and Nov 2016
- Hypertensive male and female outpatients between the ages of 22 and 89.
- Case notes including at least two (2) blood pressure measurements with or without prescribed drug records (since few individuals are just put on lifestyle changes).

### Sampling method:

One hundred and sixty-nine patients' case notes of patients with hypertension admitted within July 2016 and May 2019 were retrieved for the study using systematic stratified sampling method. Information collected from patients' case notes were entered into three sectioned questionnaire. The first section contained the sociodemographic information about patients, such as; age, sex, marital status, race, religion, weight, height, etc. The second section contained the clinical information about patients like; co-morbid conditions, family history of hypertension, laboratory biochemical results, length of hospitalization, daily blood pressure readings by physician from period admitted till when discharged. The third section contained information on drugs usage, such as drugs used before and while on admission. Patients discharged against.

### Medical advice, patients with incomplete medical records and patients that died while on admission were excluded from this study:

Combined medicines have been adequately recorded as combinations of 2 drugs, 3 drugs, etc.

### Blood pressure categorization:

As per guidelines of the (WHO / ISH) <sup>13</sup>, the average of three successive blood pressure (BP) readings before discharge was taken as BP on release. Controlled blood pressure on discharge < 140/90 mm Hg was taken as average BP.

### Permission for the study Approval:

To carry out the study was obtained from the management of the Hospital and Head, Department of medicine, Ayub Teaching Hospital Abbottabad.

### Data analysis:

Statistical analysis was carried out using the Social Sciences Statistical Package (SPSS) version 19.0 software (SPSS Inc., Chicago, USA) and the 8.0 graph pad prism. Descriptive analyzes have been used for parameter incidence. Analyzes of chi-square and cross-tabulation were used to associate asses between categorical variables ( $P < 0.05$ ).

## RESULTS:

Of 169 patients involved in the research, 90 (56.7%) were male, while 76 (47.9%) were female. Majority of the patients were in their middle age 80 (50.1%) and mean age of the patients was  $57.9 \pm 16.6$  shown in figure 1. Forty-five patients (30.8%) patient were taking alcohol, smoking tobacco or both. Ninety nine patients (61.7%) were obese. One hundred and seven patients (66.4%) completed tertiary education, and majority of the

patients, 148 (92.4%) were from rural area. Further information on sociodemographic characteristics of

the patients can be shown in Table 1.

**Table 1. Hypertensive characteristics of patients treated at the Medical Department of Ayub Teaching Hospital Abbottabad**

|   | All patients (n=169) | Diabetics (21) |
|---|----------------------|----------------|
| Gender: Male n                          | 90 (56.7%)           | 1 (4.7)        |
| Female                                  | 76 (47.9%)           | 1(2.3)         |
| Age (years)                             | 57.9±16.6            | 54.95 ± 10.4   |
| middle age                              | 80 (50.1%)           | 2(3.6)         |
| Systolic blood pressure initial (mmHg)  | 171 ± 26             | 165 ± 26       |
| Diastolic blood pressure initial (mmHg) | 99 ± 16              | 97 ± 17        |
| Mean systolic blood pressure (mmHg)     | 153 ± 24             | 152 ± 23       |
| Mean diastolic blood pressure (mmHg)    | 90 ± 14              | 87 ± 13        |
| Aspirin n (%)                           | 174 (62.3)           | 14 (66.7)      |
| Alcohol and smoking                     | 30 (18.5)            | 0.1(1.1)       |
| Obese                                   | 99 (61.7%)           | 3(1.5)         |
| Tertiary Education                      | 107 (66.4%)          | 1(5.2)         |
| Rural                                   | 148 (92.4%)          | 1(3.6)         |

Among these patients, diabetes mellitus was the most commonly diagnosed co-morbid condition. Information on presence of co-morbid conditions among patients can be seen in Figure 2.

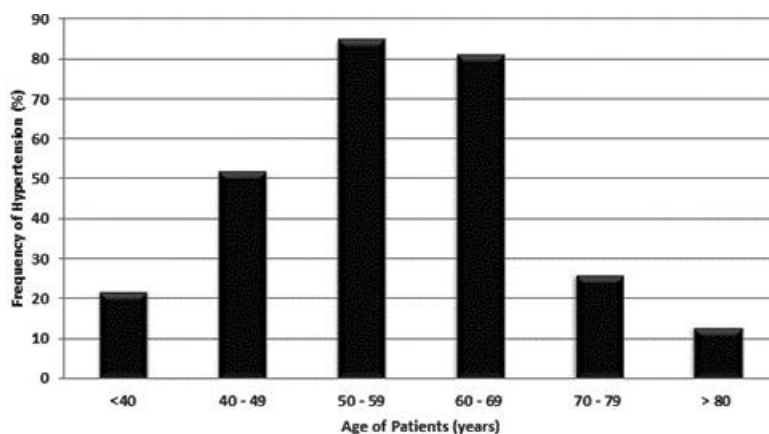


Figure 1: Age distribution in Ayub Teaching Hospital for hypertensive patients between July 2016 and May 2019

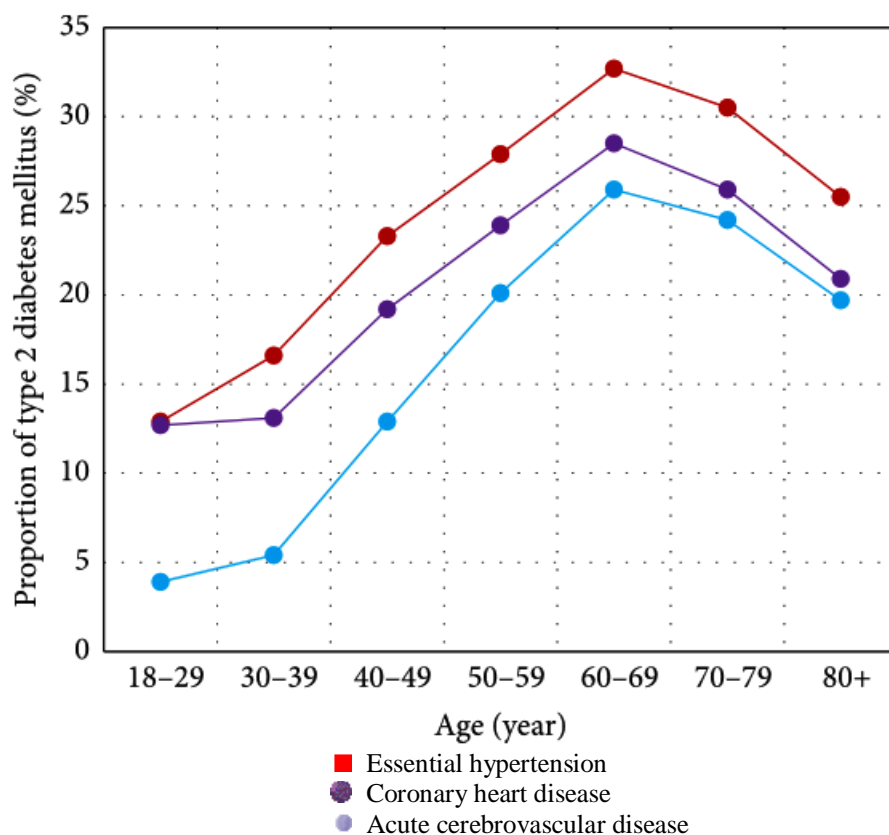


Figure 2: Patients with type 2 diabetes mellitus in hospitalized patients with essential hypertension, heart disease or acute cerebrovascular disease in different age groups. On admission, 29 (17.9%) patients were admitted with grade II hypertension while 64 (40.1%) patients were admitted with grade III hypertension. Majority of the patients were on pharmacotherapy, 153 (95.8%) while 10 (6.7%) patients were not on any antihypertensive medication. Of those on pharmacotherapy, 34 (23.1%) patients

were on monotherapy, 64 (40.3%) patients were on two antihypertensive combinations and 61 (40.8%) were on 3 or plus blood pressure lowering agents. The prevalence of antihypertensive usage in descending order are as follow: calcium channel blockers (CCBs) > angiotensin converting enzymes inhibitors > diuretics > centrally acting methyl dopa >  $\beta$ -blockers and angiotensin receptors blockers as shown in Table 2.

**Table 2: In the Department of Medicine, Ayub Teaching Hospital Abbottabad, patterns of use of antihypertensive drugs among hypertensive patients**

|                              |            |
|------------------------------|------------|
| <140/90                      | 34 (23.1%) |
| 140-159/90-99                | 43 (25.5)  |
| 160-179/100-109              | 29 (17.9%) |
| ~180/110                     | 64 (40.3%) |
| <b>BP on discharge**</b>     |            |
| <140/90                      | 81 (50.10) |
| ~140/90                      | 83 (51.2)  |
| <b>Antihypertensive used</b> |            |
| ACEIs (C09AA)                | 100 (61.7) |
| ARBs (C09CA)                 | 8 (4.9)    |
| BB (C07)                     | 8 (4.9)    |
| CAA (C02)                    | 14 (14.8)  |

|                       |            |
|-----------------------|------------|
| CCBs (C08)            | 114 (70.4) |
| D (C03)               | 98 (60.5)  |
| <b>Co-medications</b> |            |
| Aspirin               | 23 (15.0)  |
| Heparin               | 50 (31.8)  |
| Insulin Therapy       | 44 (27.1)  |
| Coartem               | 9 (6.5)    |
| Metronidazole         | 69 (43.6)  |
| Augmentin             | 42 (26.9)  |
| Ceftriaxole           | 39 (23.10) |

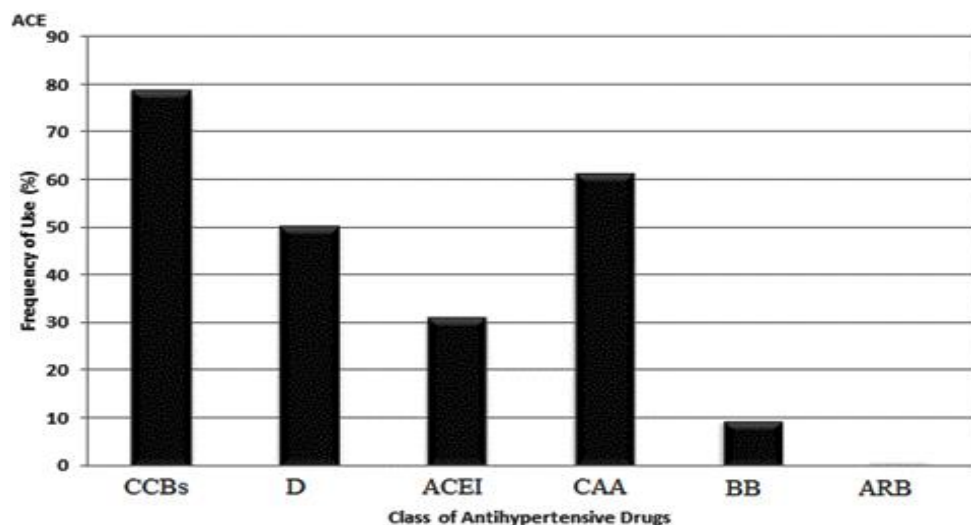


Figure 3. Blood pressure on of patients admission was based on Hypertension classification by WHO/ISH guideline<sup>14</sup>. ACEIs-Angiotensin converting enzymes inhibitors; ARBs-angiotensin receptor blockers; CAAcentrally acting agent ( $\alpha$ -methyldopa); CCBs-calcium channel blockers; D-diuretics.

Antibacterial were the most commonly used comedication. Of these, metronidazole, augmentin and ceftriaxole were mostly used among these patients. Antimalarial was used by 9 (4.5%) of the patients. Other commonly used drugs were insulin

and heparin. Aspirin was found to be used by 23 (15%) patients (Table 2). Substantial blood pressure control (BP < 140/90 mm Hg) was achieved in 81 (50.8%) patients.

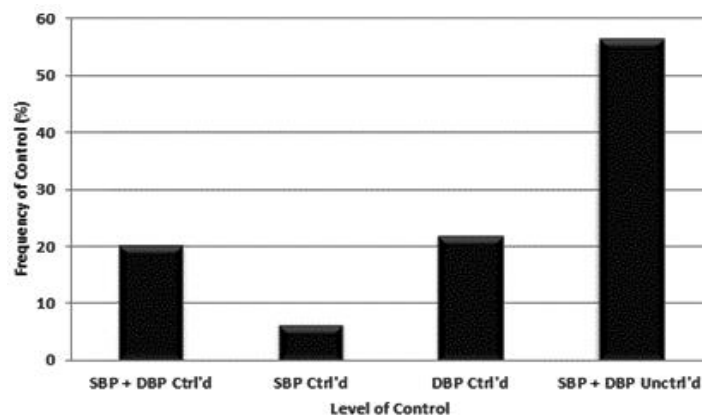


Figure 4. Blood pressure of patients on discharge was marginalized into normotensive (controlled) (<140/90) and hypertensive (uncontrolled) ( $\geq$  140/90)

**DISCUSSION:**

The current research evaluated the mode of medicine utilization & expressed the therapeutic outcome of drug use in terms of blood pressure control in hospitalized patients having high blood pressure. In general, the result of this study revealed that more than half of the hospitalized patients having hypertension had suboptimal blood pressure control despite been on combination therapy. In a very latest research in which (116) successive hypertensive topics aged  $50.9 \pm 8.6$  years were assessed, a rather encouraging blood pressure control is reflected. Eighty-two (70.7%) of topics were thoroughly monitored on therapy, 2 on lifestyle changes; whereas fifteen (12.9%) of the topics were not monitored at all. In this research, the level of blood pressure control is nice. Fully regulated topics, despite co-payment, were nearly twice as many as in the past research from the same region. This indicates that health education and patient counseling will help enhance adherence to antihypertensive drugs along with the accessibility of free drug. This in turn favorably affects the control of blood pressure [15]. Patients had a majority in their middle age. There were more male than female patients. Literature search shows that there was no consistency in gender distribution of patients with hypertension in Pakistan. Some studies reported higher percentage of males while some reported higher percentage of female patients with hypertension [16, 17, 18, and 19]. It has been reported that women visit hospital often, they have better treatment adherence and better utilization of health care services than men [20] Male preponderance among in-hospital patients with hypertension in this study may be because male patients do not visit clinic often until when they develop complication of hypertension, which may require hospital admission. Diabetes mellitus, stroke, hypertensive heart diseases and renal failure were frequently co-diagnosed diseases. In conformity with several studies in Nigeria, diabetes mellitus has been the most prevalent ailment reported among hypertensive patients [21, 22]. The co-occurrence of these co-morbidities in hospitalized patients with hypertension will affect the choice of standard pharmacotherapy and achievement of substantial blood pressure control in these patients in line with international treatment guidelines [23].

Angiotensin converting enzyme inhibitors (ACEIs) were the most commonly used drug as monotherapy. This is an indication that physician often use ACEIs as standard pharmacotherapy in many patients. Evidenced based guidelines buttressed the potentials of ACEIs, and CCBs among blacks and in compelling indication like diabetes mellitus, chronic

kidney diseases and target organ damages [24] Higher frequency of ACEIs among patients on monotherapy may be cost related, or due to prevalence of diabetes among the patients. The use of combination of ACE inhibitors and diuretics or calcium channel blocker have been shown to be beneficial in black hypertensive patients because combining any drug of these classes have produce significant reduction in blood pressure and mitigate of end-organ damage [25] Calcium channel blockers (CCBs), diuretics or ACEIs were more frequent in patients on two and three antihypertensive combinations. Several guidelines recommend the use of calcium channel blockers with diuretics in blacks and or with angiotensin converting enzyme inhibitors in the patients with compelling indication like diabetes and chronic kidney diseases [26, 27] For comparable research in Pakistan, the corresponding findings (combination therapy, monotherapy, and control of BP) are as follows: 73 percent, 27 percent, and 33 percent, 28; 64.4 percent, 34.7 percent, and 25.4 percent, [29] a control of BP as elevated as 70.7 percent, while a research in Italy recorded a control of blood pressure of 33.5 percent, [28] Review of other research indicates that there was an increase in u. It is as per the JNC 7 rules (7th Report of the Joint National Committee on High Blood Pressure Prevention, Diagnosis, assessment and management) which tells that tiny doses of distinct classes of antihypertensive medicines are very useful than a elevated dose of one. [30]

Also remarkable is that in a secondary healthcare setting there is no previous research of this kind. Moreover, the outcome of current research reflects a authentic, latest (and perhaps more reliable) analysis of the subject matter and, as such, it is expected that it will not only merit research paper but will also serve as source of knowledge for the new researches to be made .

**CONCLUSION:**

This study shows that in this portion of the globe the level of blood pressure control is still rather low and is obviously worse off than before, suggesting a decrease in hypertension control. Consequently, enhanced adherence to global rules for the management of hypertension, with regard to each treatment strategy as essential, never as adjunctive as well as a patient-oriented approach that gradually corrects erroneous cultural stereotypes of drug use, dietary habits and weight gain, will result in an enhanced level of control of blood pressure in the face.

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