*Original Article*

# Prescription Patterns of Antihypertensive Drugs and Adherence to Joint National Committee (Jnc-8) Guidelines in a Tertiary Care Hospital

**Poly Rani Debnath[1], Adhir Kumar Das[2], Prodip Kumar Karmakar[3], Nargis Sultana[4]**

***ABSTRACT:***

***Background:***

*Hypertension continues to be an important public health concern because of its associated morbidity, mortality and economic impact on the society. The standard treatment guidelines and drug utilization studies at regular intervals help physicians to prescribe drugs rationally. The adherence of physicians to guidelines is a key issue in the success of therapy and avoidance of serious health complications.* ***Objectives:*** *The purpose of the study was to assess the antihypertensive drug use patterns and adherence to Joint national committee (JNC- 8) hypertension treatment recommendations among newly diagnosed hypertensive patients attending Medicine OPD of Sher- E- Bangla Medical College Hospital, Barishal.* ***Methodology:*** *This cross-sectional study was conducted for a period of one year (July 2016 to June 2017) in the Department of Pharmacology and Therapeutics, Sher-E-Bangla Medical College in collaboration with Medicine OPD of Sher-E-Bangla Medical College Hospital, Barisal. A prescription based survey was conducted among the patients with established hypertension those were registered in the Medicine out patient department of SBMCH, Barishal during the study period. Data were collected from patient's prescription as well as patients' interviews. An informed consent was taken from patients participating in the study.* ***Results:*** *A total of 250 prescriptions were collected and analysed during study period. The results of this study suggests that study subjects with the age group of 40 to 60 years are most commonly suffering from hypertension. Mean systolic BP of the study subjects was 157.52 ± 7.23 mm of Hg and mean diastolic BP of the study subjects was 96.96 ± 4.90 mm of Hg. Most of the study subjects had no Co-morbidities. Only few study subjects had DM, IHD, Respiratory problem and Arthritis. DM was the most prevalent co-morbid condition. In this study 38.7% study subjects was treated with Beta blockers (BBs), followed by 33.6% treated with Angiotensin-II receptor blockers (ARBs) and 19.7% with Calcium channel blockers (CCBs). On the other hand in case of combination therapy, TZ+ARB was taken by 47.8% study subjects, followed by 32.7% with CCB+BB and 19.5% with ARB+CCB respectively. The drug adherence in different stages of*

1. Assistant Professor, Dept. of Pharmacology & Therapeutics, Sher-E-Bangla Medical College, Barishal.
2. Professor, Dept. of Pharmacology & Therapeutics, Dhaka Medical College, Dhaka.
3. Assistant Professor, Dept. of Surgery, Sher-E-Bangla Medical College, Barishal.
4. Assistant Professor (CC), Dept. of Anatomy, Bangladesh Medical College, Dhaka.

*hypertension was recorded. No adherence in stage I and II were 23(57.5%) cases and 104(49.5%) cases respectively. Adherence was found in 17(42.5%) cases and 106(50.5%) cases in stage I and II respectively. It has been found that significant adherence in stage II HTN and non-adherence in stage I HTN.* ***Conclusion:*** *Adherence of antihypertensive drugs in the stage II hypertension is comparatively better though it is poor in stage I hypertension.*
***Key words****: Hypertension, Antihypertensive drugs, Prescription pattern, Adherence, Joint national committee-8.*

*(The Planet 2020; 4(1): 52-60)*

**INTRODUCTION:**

Hypertension has been identified as the leading global risk factor for mortality and considered as the third contributing factor of disease burden worldwide that makes it a major public health challenge[(1)]. Elevated blood pressure accounts for two-thirds and one-half of all cases of stroke and ischaemic heart disease respectively. Prevalence of chronic kidney disease is about 22% among the undiagnosed hypertensive patients and 17% of pre hypertensive patients in the USA[(2)]. The exponential increase in the patients with hypertension puts an enormous burden on both the healthcare authorities and healthcare providers. Eighty percent (80%) of this burden occurred in low socio economic and middle-income countries[(3)]

Effective antihypertensive pharmacotherapy markedly reduces the risk of strokes, cardiac failure, renal insufficiency, IHD and MI due to hypertension[(4)]. Since the need to improve the control of hypertension is well acknowledged, several guidelines on its classification and management have been developed worldwide, and these serve as reference standards for clinical practitioners. Some of the bodies which have developed guidelines are American Society of Hypertension/ International Society of hypertension (ASH/ISH), Joint National Committee (JNC) on Detection, Evaluation, and Treatment of High Blood Pressure, European Society of Hypertension (ESH)/European Society of Cardiology ESC, National Institute for Health and Care Excellence (NICE) and Japanese Society of Hypertension. The JNC 8 guidelines published in 2014 are the most recent guidelines for the management of hypertension in different clinical settings [(5)].

The Joint National Committee (JNC 8) for the prevention, detection, evaluation and treatment of hypertension report recommends initiating treatment in the non-black community with a thiazide-diuretic, angiotensin converting enzyme inhibitor (ACEI), angiotensin receptor blocker (ARB) and calcium channel blocker(CCBs) alone or in combination. For black community initiating treatment with thiazide-diuretic or calcium channel blocker alone or in combination . It also recommends use of an angiotensin converting enzyme inhibitor (ACEI) or an angiotensin receptor blocker (ARB) alone or in combination with another drug class as initiation therapy in patients with Chronic

Kidney Disease (CKD) irrespective of age or race[6].Start one drug, titrate to maximum dose, and then add a second drug. Start one drug, then add a second drug before achieving maximum dose of first. Begin 2 drugs at same time, as separate pills or combination pill. Initial combination therapy is recommended if BP is greater than 20/10 mm Hg above goal [7].

Bangladesh is passing through a phase of epidemiological transition from communicable diseases to non-communicable disease and currently has a double burden of disease[8]. Though globally cardiologists play the major role for treating hypertension even at initial stage but the scenario of Bangladesh is slightly different in this aspect[9]. Owing to unfavourable socio-economic condition, most of the people in Bangladesh especially the poor or marginalized people do not consult cardiologist for the initial treatment of hypertension or uncomplicated hypertension. Rather they consult it with village doctors, drug sellers and registered physicians. Moreover, they are using public health facilities like outdoor services of different tertiary care hospitals. But it is essential to get the proper management of hypertension in due time as this phenomenon usually comes with co-morbid diseases like diabetes mellitus, heart disease, renal disease and other vascular, endocrine and metabolic disorders. The standard treatment guidelines and drug utilization studies at regular intervals will help physicians prescribe drugs rationally and prevent subsequent morbidity and mortality.

Despite of presence of such guidelines, the adherence of physicians in Bangladesh to them remains a question. Therefore, the current study has been carried out with an objective to assess the antihypertensive drug use patterns and adherence to Joint national committee (JNC– 8) among newly diagnosed patients attending OPD of Sher-E- Bangla Medical college Hospital, Barisal.

## MATERIALS AND METHODS:

This was an observational cross-sectional type of study conducted for a period of one year (July 2016 to June 2017) in the Department of Pharmacology and Therapeutics, Sher-E-Bangla Medical College in collaboration with Medicine OPD of Sher-E-Bangla Medical College Hospital, Barisal. Newly diagnosed patient belonging stage- I and stage- II hypertension (According to JNC-VII) without prior antihypertensive treatment were included in this study. 250 hypertensive patients fulfilling inclusion criteria (Hypertensive patients of both sexes in age group of 18 to 65 years who gave consent to participate in the study and newly diagnosed hypertensive patients treated with antihypertensive drug, both mono and combination therapy) were included in this study. Hypertensive patients of age <18 years and >65 years, Patient with secondary, resistant and severe hypertension and Hypertension in pregnancy were excluded from this study. Every consecutive patients attending the OPD were included purposively. Sample size was determined by standard statistical formula. BP were measured after taking rest of 5 minute by

sphygmomanometer in sitting and recumbent positions. Every encounter was observed, monitored and recorded in a data sheet. Results were analyzed by descriptive statistics.

**RESULTS:**

**Table I: Age distribution of the study subject**

| Age (years) | N (%) | Mean±SD | Min-max |
|---|---|---|---|
| 24-30 | 16 (6.4) | 47.96 ± 9.92 | 24-65 |
| 31-40 | 54 (21.6) | | |
| 41-50 | 83 (33.2) | | |
| 51-60 | 77 (30.8) | | |
| >60 | 20 (8.0) | | |
| Total | 250 (100.0) | | |

**Figure 1: Pie chart showing antihypertensive drug use (monotherapy)**

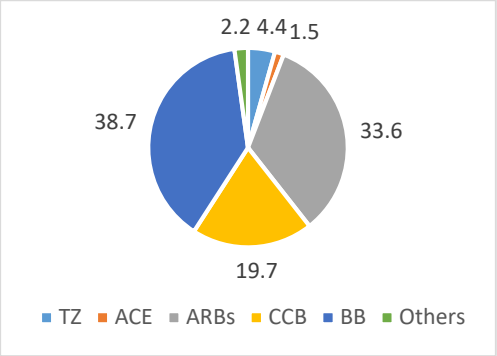


Figure 1 shows that BB used 38.7%, ARB used 33.6% and CCB used 19.7% of study subjects.

**ACEI- Angiotensin-converting Enzyme Inhibitor, ARB- Angiotensin Receptor Blocker, CCB- Calcium Channel Blocker, BB- Beta Blocker, TZ- Thiazide Diuretics.**

**Figure 2: Pie chart showing antihypertensive drug use (Combination therapy)**

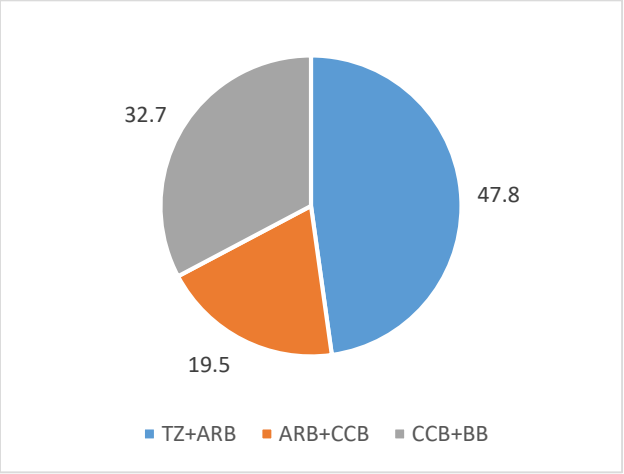


Figure 2 shows that 47.8% of study subjects used TZ+ARB combinations, 32.7% used CCB+BB combination and 19.5% of study subjects used ARB+CCB combination.

**Table II: Drug adherence by different stages**

| Drug adherence | Stage 1 | Stage 2 | Total | p value |
|---|---|---|---|---|
| No adherence | 23 (57.5) | 104 (49.5) | 127 (50.8) | 0.360 |
| Adherence | 17 (42.5) | 106 (50.5) | 123 (49.2) | |
| **Total** | **40(100.0%)** | **210(100.0%)** | **250(100.0%)** | |

$\chi^2$ test was done to measure the level of significance

**Table III: Adherence by drugs used in different stages**

| HTN classified | Drugs used (%) | Adherence (%) | No adherence (%) | P |
|---|---|---|---|---|
| Stage I | BB (42.5) | 10.2 | 89.8 | <0.001 |
| | ARBs (22.5) | | | |
| | TZ+ARB (10.0) | | | |
| | CCB (7.5) | | | |
| | Others (7.5) | | | |
| | CCB+BB (5.0) | | | |
| | ARB+CCB (2.5) | | | |
| | TZ (2.5) | | | |
| Stage II | TZ+ARB (23.8) | 93.8 | 6.2 | <0.001 |
| | ARBs (17.6) | | | |
| | BB (17.1) | | | |
| | CCB+BB (16.7) | | | |
| | CCB (11.4) | | | |
| | ARB+CCB (10.0) | | | |
| | TZ (2.4) | | | |
| | ACEI (1.0) | | | |

$\chi^2$ test was done to measure the level of significance

**Adherence of stage-I means:** Use of single drug and use of mentioned 1st line drug in the guideline as well as use of combined drug in related comorbidities.

**Adherence of stage-II means:** Use of combined drug with or without related co-morbidities.

**DISCUSSION:**

This study analysed the prescribing pattern in hypertensive patients and its adherence with JNC-8 guidelines for the management of hypertension. The distribution of study subjects according to age was recorded. The results of this study suggests that study subjects with the age group of 40 to 60 years are most commonly suffering from hypertension. There were more than 60% females and around 40% male. Almost half of the study subjects had systolic BP 160 mm of Hg. Mean systolic BP of the study subjects was 157.52 ± 7.23 mm of Hg. More than half of the study subjects had diastolic BP 100 mm of Hg. Mean diastolic BP of the study subjects was 96.96 ± 4.90 mm of Hg. In this study BB were taken by 38.7% study subjects, ARBs by 33.6% and CCB by 19.7% study subjects. TZ+ARB was taken by 47.8% study subjects, CCB+BB was taken by 32.7% and ARB+CCB was taken by 19.5% study subjects. Guidelines are recommended Thiazide types diuretics as first-line therapy for treatment of hypertension. Utilization of thiazide diuretics in the present study was 4.4% as mono therapy which is lesser even though they are available at lower cost. But in combination therapy thiazide diuretics are being utilized in combination with ARB (47.8%) which is greater than other combinations and the pattern supports JNC-8 guidelines as diuretics play a very important role in adequate reduction of BP by reducing blood volume and vascular resistance. The present study agrees with the study done by Sindhu and Reddy, 2013[10]. They found diuretics used as monotherapy was 5.1% and as combination therapy with ARB was 63.4%. In contrast to this study Etuk et al., 2008[11] reported that diuretic was the most frequently prescribed drug either as a single agent (44.8%) or as combination therapy (88.8%). Beta blockers were the most frequently prescribed drug as single therapy in the present study. Studies done by Augustine et al., 2010[12] found the similar result. They observed that Beta blockers were the most frequently prescribed antihypertensive drug as monotherapy and it was 58%. In contrast to this study Gomathi et al., 2015[13] found ACEI (34%) and Joseph et al., 2014[14] found CCB (64%) as single most prescribed drug. It should be mentioned that Beta-blockers are no longer recommended as first line monotherapy in recent guidelines.

Present study results showed Diabetes mellitus (9.6%, males; 5.8%, females), IHD (9.6%, males; 2.6%, females), Respiratory problem (5.3 %, males; 2.6%, females), Arthritis and other problem (1.1%, males; 7.7%, females). From the present study it was concluded that DM is the most prevalent co-morbid condition. Study done by Kaur et al., 2012[15] has also found DM as the most prevalent condition. The distribution of the study subjects according to single drug used in different co-morbid condition was recorded. Among patients with DM, ARBs, CCB and BB were used in 4(57.1%), 2(28.6%) and 1(14.3%) cases respectively. Among patients with IHD, ACEI and BB were used by 1(25.0%) and 3(75.0%) cases respectively. The distribution of the study subjects according to combined drugs used in different co-morbid condition was recorded. Among

study population with DM combined drugs used were TZ+ARB, ARB+CCB and CCB+BB which were 5(45.5%), 2(18.2%) and 4(36.4%) cases respectively. Among patients with IHD combined drugs used were TZ+ARB, ARB+CCB and CCB+BB which were 2(22.2%), 3(33.3%) and 4(44.4%) cases respectively. The study has shown that ARB were the most important class of drugs both as single and combination therapy in patients with coexisting diabetes which is a rational approach as ARB cause lesser side effects in diabetic patients with hypertension. This study finding is similar to the study done by Das, 2015[16]. In contrast to this study, Alavudeen et al., 2015[17] have found CCB as mostly prescribed drug in diabetic patient. JNC-8 recommends ACEI/ARB, CCB and Diuretcs as preferred drugs in diabetic hypertensive patient. CCB+ BB combination was the 2nd most drug used in diabetic patient. In Hypertension with IHD patient BB was mostly use drug which is a rational approach.

The drug adherence in different stages of hypertension was recorded. No adherence in stage I and II were 23(57.5%) cases and 104(49.5%) cases respectively. Adherence was found in 17(42.5%) cases and 106(50.5%) cases in stage I and II respectively. The difference between these two groups were not significant (p=0.360). Again, the adherence by drugs used in different stages of HTN was recorded. In stage I HTN, the prescribed drugs were BB (42.5%), ARBs (22.5%), TZ with ARB (10.0%), CCBs (7.5%), others (7.5%), CCB with BB (5.0%), ARB with CCB (2.5%) and TZ (2.5%). In stage II HTN the prescribed drugs were TZ with ARB (23.8%), ARBs (17.6%), BB (17.1%), CCB with BB (16.7%), CCBs (11.4%), ARB with CCB (10.0%), TZ (2.4%) and ACEI (1.0%). The adherence of stage I was 10.2% and non-adherence was 89.8% which was highly significant (0.001). The adherence of stage II was 93.8% and non-adherence was 6.2% which was highly significant (0.001). It has been found that significant adherence in stage II HTN and non-adherence in stage I HTN. In a study Romday et al., 2016[7] have reported that adherence rate to JNC-8 in stage I HTN was 87.90% and in stage II HTN was 68.2% which is in contrast to present study. Study conducted by Raju et al., 2016[18] observed that 28% of prescriptions were rational and 56% of prescriptions were irrational. Regarding the perception of physicians towards JNC 8 guidelines it was found that majority were not following JNC 8 guidelines. Thus adherence to the anti-hypertensive drugs is essential to avoid the morbidity and mortality of the hypertensive patients.

**CONCLUSION:**

In the present study, adherence of antihypertensive drug used in stage II hypertension was good whereas adherence was poor in stage I hypertension.The use of TZ+ARB combination was justified in stage II hypertension whilist use of BB as monotherapy was enormously high in stage I hypertension which is inconsistent with the guidelines. Comparatively better adherence in the stage II hypertension may be due to attempt at achieving targeted BP control goal by using available combination

therapy. Inspite of the data and published guidelines, inconsistencies exist towards treatment approach. There should be provision for appraisal of antihypertensive guidelines at the undergraduate curriculum. Which will encourage the future doctors to adopt the instructions of the guideline in their clinical practice. There should also be provision for acting implementation the guidelines at the managerial level. Furthermore the findings of this study will help future researcher in conducting interventional study in this regard. The overall findings of the study show that there is need for further improvement in the prescription pattern of antihypertensives as well as strategies to improve patient adherence to drug treatment.

There were certain limitations such as smaller sample size, single centered hospital based study etc. So further studies are needed from time to time taking a large number of study population including patients attending hospital as well as private practicing chambers.

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