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A study on prescribing pattern of antihypertensive drugs in medicine department in a tertiary care teaching hospital

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Abstract

Aim and Objective: To study on prescription patterns of antihypertensive drugs in medicine department of Rajah Muthiah medical college hospital.

Methods: It was a Prospective observational study done in tertiary care teaching hospital in Chidambaram, Tamil Nadu. The patient data were collected by using well designed patient data collection form where prescription were recorded and analyzed.

Result: A total of 92 prescriptions were analyzed during five month study period where 53.2% and 46.7% were male and female respectively. Out of 92 patients maximum number of patients with Hypertension came under 50-60 years of age group 41.3%. The average number of drugs per one prescription was 1.87 which is lower than WHO (<2) standard. (10%), (52.1%) and (36.9%) of patients received monotherapy, dual therapy, and triple drug therapy respectively. For the hypertensive, 10, 48 and 34 patients received monotherapy, dual therapy out of that ACEI + Diuretics(Enalapril +Furosemide),triple therapy out of these ACEI + Beta Blockers +Diuretics (Enalapril + Metoprolol + Furosemide) respectively. Out of 15 patients (>60 years) without Co-morbidities (DM, CVA) has achieved the JNC-8 goal less than 150/90 mm.

Conclusion: Our study shows that the most commonly prescribed pattern in different combinations of drugs was Dual therapy. We found that generic drugs are low and encouraging prescribers for the former which may have more benefits in the cost effectiveness. We suggest to educate the patients how to go on a diet, curbing salt intake and physical fitness because medications alone cannot control blood pressure.

Keywords: Antihypertensive, drug prescribing pattern, ACEI, CCB, diuretic

Introduction

Hypertension or high blood pressure is a state in which the blood vessels have relentlessly raised arterial blood pressure. It could lead to heart attacks, stroke, kidney failure, blindness, rupture of blood vessels and cognitive impairment (WHO, 2016) [1]. Worldwide, high blood pressure is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths (WHO, 2010) [2]. The number of adults with hypertension is prognosticated to be raised to 1.56 billion adults by 2025 (Kearney *et al.*, (2005) [3]; Tabrizi *et al.* (2016) [4].

According to the Joint National Committee 7 (JNC7), normal blood pressure is a systolic BP < 120 mmHg and diastolic BP < 80 mmHg. Hypertension is determined as systolic BP level of ≥ 140 mmHg and/or diastolic BP level ≥ 90 mmHg. The grey area falling between 120–139 mmHg systolic BP and 80–89 mmHg diastolic BP is defined as “prehypertension” (Table 1) (Kumar *et al.*, (2016) [5]; Chobanian *et al.*, (2003) [6].

A blood pressure reading, given in millimeters of mercury (mm Hg), has two numbers. The first number measures the pressure in your arteries when your heart beats (systolic pressure). The second number measures the pressure in your arteries between beats (diastolic pressure)

Table 1: Classification of hypertension

| No | Classification | Systolic (mm hg) | And | Diastolic (mm hg) |
|----|--------------------------------|------------------|-----|-------------------|
| 1 | Normal | < 120 | And | < 80 |
| 2 | Prehypertension | 120 - 139 | And | 80 – 89 |
| 3 | Stage 1 or Mild hypertension | 140 - 159 | And | 90 – 99 |
| 5 | Isolated systolic hypertension | > 160 | And | > 100 |

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Symptoms of Hypertension

The majority of people with hypertension have no signs or symptoms, even if blood pressure readings get to severely high levels. A few people with high blood pressure may have headaches, shortness of breath, chest pain, irregular heartbeat and Fatigue or confusion. But these signs and symptoms aren't precise and regularly don't happen until hypertension has attained a severe or life-threatening stage.

Causes of Hypertension

Primary hypertension has no obvious cause and is thought to be linked to genetics, poor diet, lack of exercise and obesity.

Secondary hypertension can be caused by conditions that affect kidneys, thyroid problems, Diabetic mellitus and Adrenal gland tumor.

Risk factors of Hypertension

The high blood pressure has many risk factors, which are including: age, smoking, family history, obesity, drinking alcohol, stress and certain chronic condition.

The complications of Hypertension

The extreme pressure on artery walls caused by high blood pressure can damage your blood vessels, as well as organs in body. The higher blood pressure and the longer it goes uncontrolled, the greater the damage. Uncontrolled hypertension can guide to complications including: Heart attack or stroke, Heart failure, Thickened, narrowed or torn blood vessels in the eyes, Metabolic syndrome, Dementia.

Antihypertensive drugs

Antihypertensive drugs are given mostly to decrease the morbidity and mortality caused by hypertension and its complications. Many a time patient required more than one drugs for effective control of hypertension. Various classes of antihypertensive drugs like

- Angiotensin-converting enzyme inhibitors (ACEI).
- Angiotensin II receptor blockers (ARBs).
- Calcium channel blockers (CCB).
- Diuretics

There is an additional medications sometimes used to treat high blood pressure like

- Sympathetic inhibitors (Alpha adrenergic blockers, Alpha-beta adrenergic blockers, Beta adrenergic blockers)
- Renin inhibitors.
- Vasodilators.
- Central-acting agents or central sympatholytics.

Prescribing pattern helps to evaluate the pattern of local consumption/resistance to optimize the therapeutic effect of medicines. Therefore, the aim of our study was to study the prescribing pattern of antihypertensive in RMMCH TEACHING hospital.

Aim

To study on prescription patterns of antihypertensive drugs in the Medicine department of RMMCH.

Objectives

- To study on prescription patterns of antihypertensive drugs.
- To identify the drug related issues like drug-drug interaction and dosing error.

Materials and Methodology

A prospective observational study was carried out over five months (April 2019 to August 2019) in the Department of Medicine Rajah Muthiah Medical College Hospital Annamalai University (RMMCH), Chidambaram, Tamil Nadu; all hypertensive patients admitted to Medicine Department will be enrolled. Data was obtained from a total of 92 prescriptions which includes age and gender of the patients, the diagnosis, the drugs prescribed, route of administration and duration of treatment and the prescriptions were subjected to measuring the appropriateness of prescription. After collecting, the data were checked and analyzed with the help of Microsoft Excel (2011) and Microsoft Word (2011). The result was shown in bar, pie and column chart and calculated the percentage of the awareness and drugs prescribing pattern in the Medicine Department.

Result

Table 2: Gender wise distribution among the study

| S. No. | Type of Gender | Number of Prescription | Percentage |
|---------|----------------|------------------------|------------|
| 1 | Male | 49 | 53.2% |
| 2 | Female | 43 | 46.7% |
| Total = | | 92 | 100% |

From our demographic data, out of 92 patients most of them were male patients n=49 (53.2%) than female patients n=43 (46.7%).

Table 3: Age wise distribution among the study group

| S. No. | Age Group (in years) | Number of Patients | Percentage |
|--------|----------------------|--------------------|------------|
| 1 | 30-40 | 21 | 22.8% |
| 2 | 40-50 | 9 | 9.7% |
| 3 | 50-60 | 38 | 41.3% |
| 4 | >60 | 24 | 26% |
| Total | | 92 | 100% |

Table 3 represents the distribution of the patients according to their age where highest number of patients was in the age group of 50-60 years (41.3%), followed by < 60 years age group (26%), 30-40 years (22.8%) and 40-50 years (9.7%).

Table 4: Table showing different drug combinations received by patients

| S No | Type of Different Combination of Drug Received by Patients | Number of Prescriptions | Percentage |
|-------|--|-------------------------|--------------|
| 1 | Mono-therapy | 5 | 5.43% |
| 2 | Dual Therapy | 51 | 55.43% |
| 3 | Triple Therapy | 38 | 41.30% |
| Total | | = 92 | =99.98%~100% |

Table 4 represents the most commonly prescribed of different combinations of drugs. Among the total prescribed different combinations of drugs Dual therapy 55.43% (n=48) was prescribed commonly followed by Triple therapy 41.30% (n=37) and Monotherapy 5.43% (n=5).

Table 5: Distribution of Patients Receiving Antihypertensive drugs without Co-morbidity

| S. No. | Therapeutic Management | Number of Prescription | Percentage |
|--------|--|------------------------|--------------|
| 1 | Mono-therapy | | |
| | Amlodipine | CCB | 1 25% |
| | Enalapril | ACEI | 3 75% |
| 2 | Double therapy | | |
| | ACEI + Diuretics (Enalapril + Furosemide) | | 24 47.05% |
| | CCB + Diuretics (Amlodipine + furosemide) | | 12 23.52% |
| | Diuretics + Beta Blockers (Furosemide + Metoprolol) | | 13 25.49% |
| | CCB + Beta Blockers (Amlodipine + Metoprolol) | | 2 3.92% |
| 3 | Triple Therapy | | |
| | ACEI + CCB + Diuretics (Enalapril + Amlodipine + Furosemide) | | 10 27.02% |
| | ACEI + Beta Blockers + CCB (Enalapril + Metoprolol + Amlodipine) | | 5 13.51% |
| | ACEI + Beta Blockers + Diuretics (Enalapril + Metoprolol + Furosemide) | | 22 59.45% |

Table 4: Displays the percentage of prescriptions with different drugs combinations prescribed.

This data shows the percentage of Amlodipine and Enalapril were given as Monotherapy for the hypertensive patients, 10 patients received Monotherapy, out of that Enalapril 75% (n=3) was the most frequently prescribed drug followed by Amlodipine 25% (n=1).

In case double therapy there are various combinations of antihypertensive drugs are given such as ACEI + Diuretics (Enalapril + Furosemide) 47.05% (n=24) were the most prescribed drug followed by Diuretics + Beta Blockers (Furosemide + Metoprolol) 27.02% (n=13), CCB + Diuretics (Amlodipine + furosemide) 25.49% (12) and CCB + Beta Blockers (Amlodipine + Metoprolol) 3.92% (n=2).

In combinations of drugs the triple therapy ACEI + Beta Blockers + Diuretics (Enalapril + Metoprolol + Furosemide) 59.45% (n=22) were the most frequently prescribed drugs followed by ACEI + CCB + Diuretics (Enalapril + Amlodipine + Furosemide) 27.02% (n= 10) and ACEI + Beta Blockers + CCB (Enalapril + Metoprolol + Amlodipine) 13.7% (n=5).

Table 5: Details of drug utilization prescribing indices

| No | Who Prescribing indices | Value | Reference value |
|----|---------------------------------------|-------|-----------------|
| 1 | Average number of drugs per encounter | 1.87 | <2 |

The average number of drugs per one prescription was 1.87 which is lower than WHO (<2) standard.

Table 6: Use of Anti-hypertensive Drugs in Hypertension Patients with Co-morbidities

| Co-morbidities Drugs | Number of Prescription | Percentage |
|---|------------------------|------------|
| Diabetic Mellitus | | |
| Losartan | ARB | 2 3.26% |
| Telmisartan | ARB | 1 1.08% |
| Metoprolol | Beta Blockers | 1 1.08% |
| Enalapril | ACEI | 1 1.08% |
| CVA Hemiplegia | | |
| Furosemide | Diuretics | 3 3.26% |
| Lorsartan | ARB | 2 2.17% |
| CCB + Beta Blockers Amlodipine + Atenolol | | 1 1.08% |

From Table 6 shows the percentage of prescription with anti-hypertensive Drugs in Hypertension Patients with co-morbidities like Diabetic Mellitus, cerebrovascular accident Hemiplegia.

- During the study period were found on the prescriptions there was other additional medications prescribed such as

H2 Antihistamine (Ranitidine), Multivitamins, Multiminerals, Antioxidants.

- In this study were found information about generic and brand drugs. The most prescribed drugs were Brand name drugs while Generic name was ranked second prescribed drug.
- The Eighth Joint National Committee (JNC 8) released evidence-based recommendations on treatment thresholds, goals, and medications in the management of hypertension in adults. In the general population of adults 60 years and older, pharmacologic treatment should be initiated when the systolic pressure is 150 mm Hg or higher, or when the diastolic pressure is 90 mm Hg or higher. In our study, we documented that according to JNC-8 guidelines out of 15 patients (>60 years) without Co-morbidities (DM, CVA) has achieved the JNC-8 goal less than 150/90 mm hg.

Discussion

In the present study, even though the sample size was not very large, it gave prospective observational study of patients and the diseases for which they reported for treatment. The present study assessed the prescribing pattern of Antihypertensive drugs at a tertiary hospital in Rajah Muthiah Medical College Hospital (RMMCH). Our demographic data showed out of 92 patients most of them were male patients 53.2% than female patients 46.7% (Tab1). Age distribution was analyzed in this study. Out of 92 patients maximum number of patients with Hypertension came under 50-60 years of age group 41.3% (Tab 2).

In our study, we documented that, (Tab3) showed the Dual Therapy 52.1% were the commonest in different combinations of drugs.

In this study (Tab 4) we documented that, amlodipine, furosemide and enalapril were given as monotherapy for the hypertensive patients, 10 patients receiving monotherapy, out of that Enalapril is the maximum prescribed drug (75%). In case of dual therapy there are various combinations of antihypertensive drugs are given such as ACEI + Diuretics (Enalapril + Furosemide), CCB + Diuretics (Amlodipine + furosemide), Diuretics + Beta Blockers (Furosemide + Metoprolol), and CCB + Beta Blockers (Amlodipine + Metoprolol). Out of that ACEI + Diuretics (Enalapril + Furosemide) (47.05%) is the most prescribed dual therapy. In this study of triple therapy ACEI + CCB + Diuretics (Enalapril + Amlodipine + Furosemide), ACEI + Beta Blockers + CCB (Enalapril + Metoprolol + Amlodipine), ACEI + Beta Blockers + Diuretics (Enalapril + Metoprolol + Furosemide) are the various combinations of triple therapy, out of these ACEI + Beta Blockers + Diuretics (Enalapril +

Metoprolol + Furosemide) 59.45% is the maximum prescribed combination. The average of drugs per one prescription in this study was 1.87 which less than WHO standard (<2) it is advisable to keep restraint on poly-pharmacy as it leads to risk of drug interactions (Tab 5).

The study documented on Hypertension Patients with Co-morbidities (DM, CVA) in comparison to antihypertensive with co-morbidities which was similar to Arshad H. Mohd *et al.* (2012) [7].

In this study, we found information about generic and brand drugs. The most prescribed drugs were Brand name drugs while Generic name was ranked second prescribed drug. This study found that generic prescription is low and suggests that effort must be made to encourage prescribers for generic prescribing which may have a multitude of benefits including cost effectiveness. In our study, we documented that according to JNC-8 guidelines out of 15 patients (>60 years) without Co-morbidities (DM, CVA) has achieved the JNC-8 goal less than 150/90 mm hg which was similar to Ashok *et al.* (2018) [8]. We suggests to teach patients how to go on a diet, lose weight, physical fitness, curbing salt, oil and sugar intake because the medications is nothing without patient counseling on blood pressure amongst the patients.

Conclusion

Our study was mainly focused on the prescribing pattern of Antihypertensive drugs in Medicine department. It shows that the most commonly prescribed pattern in different combinations of drugs was Dual therapy. According to JNC-8 guidelines the tayer blood pressure was achieved. In this study, we found that generic drugs are low and suggest encouraging prescribers for generic drugs which may have more benefits in the cost effectiveness. Also, we suggest educating the patients about the blood pressure and how to take care of their life by using diet food, reducing weight, physical exercises daily, reducing salt, oil and sugar. It is very important to conduct a patient counseling in order to reduce the likelihood of blood pressure in patients.

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Conflicts of Interest

The authors have no conflict of interest to declare in this study

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