

Prescribing Pattern and Pharmacoeconomic Evaluation of Antihypertensive Drugs at a Tertiary Care Hospital

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ABSTRACT

Aim and Background: The aim of this study is to evaluate anti-hypertensive drug prescription pattern and cost analysis in tertiary care hospital. Hypertension is one of the major chronic diseases resulting in high mortality and morbidity these days. Clinical pharmacists can play a role in pharmaceutical cost management by providing an outlook to the physicians for prescribing cost-effective choices of drugs when it is clinically appropriate. Despite broad dissemination of the JNC guidelines, prescribing practices have long remained discrepant with recommendations. **Methodology:** An observational and cross-sectional prospective. Was conducted in General Medicine department in tertiary care hospital for a period of 6 months. The study group consists of 200 patients, both males, and females diagnosed with hypertension and co-morbid conditions. **Results and Discussions:** Out of 200 patients, 99 males and 101 females were identified to have prescribed with antihypertensive drugs during the study period. In combination drug therapy, total 59 medications were prescribed. Telmisartan+HCL Thiazide 18 (30.5%), Losartan+Hydrochlorothiazide 12 (20.33%) and Telmisartan+Amlodipine 7 (11.86%) were the most frequently prescribed combinations drugs. Combinational therapy contributes the highest annual cost of (3248.5 ± 401.5 INR) followed by monotherapy drugs from various classes (1956.4 ± 222.65 INR). 5204.9 INR was accounted for the total

antihypertensive drugs prescribed. **Conclusion:** The economic studies state that 70.5% of patients had received monotherapy. The study reveals that majority of patients were treated with diuretics. They can also encourage prescribers to make cost-effective choices of drugs when clinically appropriate.

Key words: Hypertension, prescription pattern, cost, anti- hypertensive drugs

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CONTEXT

Aims

The Aim of This Study Is To Evaluate Anti-hypertensive Drug Prescription Pattern And Cost Analysis In Tertiary Care Hospital.

INTRODUCTION

Hypertension is one of the major chronic diseases resulting in high mortality and morbidity these days. Poor control of this highly prevalent disease can lead to the development of ischemic heart disease, stroke, and chronic renal failure.^[1] Several factors like socioeconomic status, social habits sedentary lifestyle, food and poor self-health maintenance can lead to the development of hypertension.^[2] Epidemiological studies demonstrate that prevalence of hypertension is increasing rapidly among urban and rural populations in India.^[3-6] Selection of an evidence-based therapy with safety and low cost has important economic implications. Clinical pharmacists can play a role in pharmaceutical cost management by providing an outlook to the physicians for prescribing cost-effective choices of drugs when it is clinically appropriate. Thus, by reducing the economic burden we can enhance the quality of patient care.

The Joint National Committee (JNC) 7 guidelines recommend the appropriate antihypertensive therapy based on the best available evidence. The guidelines recommend to Initiate thiazide, ACEI, ARB, or CCB, alone or in combination. However, most recent published data showed an increased use of the more expensive Calcium Channel Blockers (CCBs) and Angiotensin Converting Enzyme Inhibitors (ACEIs) despite the lack of evidence to support that they are superior to diuretics and beta blockers in reducing morbidity and mortality of cardiovascular diseases. Despite broad dissemination of the JNC guidelines, prescribing practices have long remained discrepant with recommendations. The cost of medications has always

been a barrier ineffective treatment. The prescribing pattern among doctors and patient adherence to the treatment are being influenced by the increasing prevalence of hypertension and rising expenses of its treatment.^[2,7-9]

Objectives

The 6-month cross-sectional study was designed to assess the prescription pattern and cost of anti-hypertensives therapy in a tertiary care hospital.

Cost of the drug was obtained from the current index of medical specialties (CIMS)/ 1mg.com

To study the prescribing pattern of anti-hypertensive drugs through a data entry format.

SETTINGS AND DESIGN

Study design

Observational and cross-sectional prospective.

Study period

Six months (July-Dec 2017).

METHODS AND MATERIALS

Study population

The study group consists of 200 patients, both males, and females diagnosed with hypertension and co-morbid conditions.

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Table 1: Distribution of patients according to gender

| S.no | Age | Male | Female | No. of Patients | Percentage |
|------|-------|------|--------|-----------------|------------|
| 1 | 21-30 | 0 | 1 | 1 | 0.5 |
| 2 | 31-40 | 11 | 8 | 19 | 4 |
| 3 | 41-50 | 24 | 10 | 34 | 5 |
| 4 | 51-60 | 32 | 28 | 60 | 14 |
| 5 | 61-70 | 18 | 33 | 51 | 16.5 |
| 6 | 71-80 | 11 | 19 | 30 | 9.5 |
| 7 | 81-90 | 3 | 2 | 5 | 1 |

Out of 200 patients, 99 males and 101 females were identified to have prescribed with antihypertensive drugs during the study period

Table 2: Frequency of distribution of drugs according to Age groups

| Age groups | ACEI | | ARB | | CCB | | BB | | DU | | NSBB | | A1B | |
|------------|------|------|-----|------|-----|------|----|------|----|------|------|------|-----|------|
| | n | % | n | % | n | % | n | % | n | % | n | % | n | % |
| 21-30 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.32 | 0 | 0 | 2 | 0.65 | 2 | 0.65 |
| 31-40 | 1 | 0.32 | 6 | 1.95 | 3 | 0.97 | 12 | 3.9 | 2 | 0.65 | 0 | 0 | 0 | 0 |
| 41-50 | 1 | 0.32 | 17 | 5.95 | 13 | 4.23 | 19 | 6.19 | 14 | 4.66 | 0 | 0 | 0 | 0 |
| 51-60 | 5 | 1.62 | 28 | 9.12 | 21 | 6.84 | 16 | 5.62 | 30 | 9.78 | 2 | 0.65 | 2 | 0.65 |
| 61-70 | 2 | 0.65 | 18 | 5.86 | 7 | 2.28 | 17 | 5.95 | 16 | 5.62 | 2 | 0.65 | 2 | 0.65 |
| 71-80 | 0 | 0 | 16 | 5.21 | 14 | 4.56 | 11 | 3.57 | 11 | 3.57 | 0 | 0 | 0 | 0 |
| 81-90 | 0 | 0 | 1 | 0.32 | 1 | 0.32 | 0 | 0 | 3 | 0.97 | 0 | 0 | 0 | 0 |

Table 3: Cost of various brands monotherapy

| S.no | Generic | Brand | Total | Percentage | Cost/Day In INR |
|------|-----------------|---|-------|------------|---------------------------|
| 1. | Amlodipine | T.Amlong, T.Stamlo, T.Amlong, T.Amlo. | 20 | 9.80 | 2.65 ± 0.00 |
| 2. | Cilidipine | T.Cilidin, T.Cinod, T.Ciladuo. | 27 | 13.23 | 4.68 ± 0.60 |
| 3. | Diltiazem | T.Dilzem, T.Angizem. | 3 | 1.47 | 2.49 ± 0.07 |
| 4. | Furosemide | T.Lasix (6), Inj.Lasix(5) | 11 | 5.39 | 0.5 ± 0.00 4.44 ± 0.00 |
| 5. | Torsemide | T.Dytor(21), Inj.Dytor.(9) | 30 | 14.70 | 7.63 ± 0.00 15 ± 0.00 |
| 6. | Metolazone | T.Metoz | 1 | 0.49 | 10.66 ± 0.00 |
| 7. | Telmisartan | T.Telvas, T.Telma, T.Telsartan, T.Telmikind, T.Telista. | 21 | 10.29 | 5.61 ± 0.71 |
| 8. | Enalapril | T.Enam | 1 | 0.49 | 3.25 ± 0.00 |
| 9. | Losartan | T.Losar, T.Repace | 7 | 3.43 | 5.71 ± 0.25 |
| 10. | Metoprolol | T.Prolomet XI, T.Met XI, T.Starpress XI, T.Supermet XI. | 38 | 18.62 | 3.67 ± 0.42 |
| 11. | Ramipril | T.Cardace, T.Ramistar. | 5 | 2.45 | 5.03 ± 0.02 |
| 12. | Atenolol | T.Aten. | 16 | 7.84 | 1.81 ± 0.00 |
| 13. | Spiroinolactone | T.Aldactone | 5 | 2.45 | 1.93 ± 0.00 |
| 14. | Olmesartan | T.Olmezest | 6 | 2.94 | 9 ± 0.00 |
| 15. | Propranolol | Inderal, Inderal La | 3 | 1.47 | 2.45 ± 0.32 |
| 16. | Clonidin | T.Arkamine | 2 | 0.98 | 1.51 ± 0.00 |
| 17. | Nebivolol | T.Nebistar | 2 | 0.98 | 6.3 ± 0.00 |
| 18. | Carvidolol | T.Carviflo | 6 | 2.94 | 7.5 ± 0.00 |
| 19. | Prazocin | T. Minipress XI, T. Prazocip XI. | 2 | 0.98 | 8.11 ± 3.29 |

In monotherapy, total 204 drugs were prescribed. Among those Metoprolol-38 (18.62%) Torsemide 30 (14.70%) and Cilnidipine 27 (13.23%) were the most frequently prescribed drugs. In monotherapy, Metolazone shows the highest mean cost per day of INR (10.66 ± 0.00) and Furosemide shows the lowest mean cost per day of INR (0.5 ± 0.00).

Table 4: Cost of various Brands combinational therapy

| S.no | Generic Name | Brand Name | Total | Percentage | Cost/Day In INR |
|------|----------------------------|--|-------|------------|-----------------|
| 1. | Amlodipine+Atenolol | T.Amlkind At, T.Amosafe At | 2 | 3.38 | 3.65 ± 1.54 |
| 2. | Furosemide+Spironolactone | T.Lasilactone | 2 | 3.38 | 3.66 ± 0.00 |
| 3. | Telmisartan+Hcl Thz | T.Telma H, Telpres H, T.Telvas H, T.Tellzy H, Telista H | 18 | 30.5 | 13.34 ± 0.49 |
| 4. | Telmisartan+Amlodipine | T.Venpress Am, T.Telmikind Am, T.Cresar Am. | 7 | 11.86 | 5.73 ± 0.83 |
| 5. | Telmisartan+Metoprolol | T.Tellzy Mt, T.Telmax | 5 | 8.47 | 14.06 ± 0.00 |
| 6. | Telmisartan+Chlorthalidone | T.Tellzy Ch | 5 | 8.47 | 12.2 ± 0.00 |
| 7. | Amlodipine+Hcl Thiazide | T.Amlong H, T.Stamlo D. | 2 | 3.38 | 5.66 ± 0.26 |
| 8. | Metoprolol+Ramipril | T.Prolomet R | 1 | 1.69 | 12.8 ± 0.00 |
| 9. | Metoprolol+Amlodipine | T.Amlong Mt | 2 | 3.38 | 6.93 ± 0.00 |
| 10. | Cilidipine+Metoprolol | T.Cilidin M | 1 | 1.69 | 7.99 ± 0.00 |
| 11. | Olmesartan+Amlodipine | T.Olmezest Am | 2 | 3.38 | 11.5 ± 0.00 |
| 12. | Losartan+Hcl Thiazide | T.Losar H, T.Cosart H | 12 | 20.33 | 9.325 ± 1.225 |

Drug acquisition costs were calculated, using the cost with respect to prescribed branded drugs and the most commonly prescribed dosage, for each drug on a daily and annual basis.^[10-12]

Data collection

Ward round participation

Daily regular ward rounds were carried out in the study site

Table 5: Distributions of patients according to therapy

| S.no | Type of Therapy | Total | Cost/Day in INR | Cost/Day in INR |
|--------------|-----------------------|-------|-----------------|-----------------|
| 1 | Monotherapy | 204 | 5.36± 0.61 | 1956.4 ± 222.65 |
| 2 | Combinational therapy | 59 | 8.90± 1.10 | 3248.5 ± 401.5 |
| Total | | | | 5204.9 |

during the study period. Prior to data collection, taken the consent of the patient/bystander Patient bystander was also well informed about the study, its objective etc.

Statistical analysis used

Data analyzed also included the results of patient's demographics [Age, Gender, etc.] And the cost per day and cost per year by using appropriate statistical stools.

RESULTS AND DISCUSSION

Angiotensin-converting enzyme inhibitors (ACEIs) contributed 2.75% of total cost (28.4 INR), Angiotensin receptor blockers (ARBs) contributed 20.52% of total cost (211.78INR), Beta blockers contributed 21.90% of total cost (226.02INR), Diuretics contributed 33.04% of total cost (340.96 INR), Alpha-adrenergic blockers (AABs) contributed 1.57% of total cost (16.2 INR), Centrally acting agents contributed only 0.29% of total cost (3.02 INR). Alpha-adrenergic blockers and centrally acting agents (CAA) were the least prescribed. Angiotensin-converting enzyme inhibitors (ACEIs) and Angiotensin receptor blockers (ARBs) were the most prescribed.^[13]

In combination drug therapy, total 59 medications were prescribed. Telmisartan+HCL Thiazide 18 (30.5%), Losartan+Hydrochlorothiazide 12 (20.33%) and Telmisartan+Amlodipine 7 (11.86%) were the most frequently prescribed combinations drugs. In combination drug therapy, Telmisartan+Metoprolol shows the highest mean cost per day of INR (14.06 ± 0.00) and Amlodipine+Atenolol combination shows the lowest mean cost per day of INR (3.65 ± 1.54).

There was a significant difference in mean cost per day between various drugs in monotherapy as well as combination therapy. Also determined the total costs of antihypertensive drugs prescribed as monotherapy and in combinations during the study period. Combinational therapy contributes the highest annual cost of (3248.5 ± 401.5 INR) followed by monotherapy drugs from various classes (1956.4 ± 222.65 INR). 5204.9 INR was accounted for the total antihypertensive drugs prescribed. The present study shows that most of the patients were stable with monotherapy followed by two drug combination therapies, none of the patient's required triple-drug therapies.^[14]

CONCLUSION

The economic studies state that 70.5% of patients had received

monotherapy. The study reveals that majority of patients were treated with diuretics. Among combination drug therapy, Telmisartan+HCL Thiazide combination was highly prescribed. Considering the pharmacoeconomics, diuretics are more economical. It is suggested that, while starting the drug therapy economic status of the patients should be kept in consideration. Strict lifestyle modifications should be recommended to all patients who are in the pre-hypertensive stage as the cardiovascular risk factors are highly seen in these individuals. Clinical pharmacists are in the position to make suggestions and interventions that can save cost by reducing economic burden and enhance the quality of patient care. They can also encourage prescribers to make cost-effective choices of drugs when clinically appropriate.^[15-16]

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