Trends in Beta-Blocker Prescribing in a Public Hospital in Al Saih

Nehad J. Ahmed¹*

¹Department of Clinical Pharmacy, College of Pharmacy, Prince Sattam Bin Abdulaziz University, Al Kharj, Saudi Arabia.

Author’s contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

ABSTRACT

Aim: This study aimed to describe the trends in beta-blocker prescribing in the outpatient setting of a public hospital in Al Saih.

Methodology: This is a retrospective study that includes patient electronic records revision of outpatients Between 1st July and 31st December 2018.

Results: The most commonly prescribed beta-blocker was bisoprolol (79.10%) followed by metoprolol (7.34%) More than half of the patients were less than 60 years old (52.54%). About 55.93% of the patients receiving beta-blockers were male. About 39.55% of the prescribed drugs were prescribed by cardiology department (39.55%) followed by internal medicine department (36.72%).

Conclusion: It can be concluded that beta-blockers were prescribed commonly. More studies are needed to find the prescribing patterns of beta-blockers for treating different indications and to prepare stratified guidelines to treat cardiovascular patients based on their characteristics.

Keywords: Beta-blocker; outpatient; prescribing; trends.

1. INTRODUCTION

Blood pressure increases the risk of cardiovascular disease events independent of other risk factors, and higher Blood pressures lead to greater risk of myocardial infarction, heart failure, stroke, and kidney disease [1]. Cardiovascular disease is currently the leading
cause of death; for example, it accounts for 17% of overall national health expenditures in the United States [2]. Blood pressure lowering treatments considerably decrease the risk of cardiovascular disease and death in several patient populations. A reduction of 10 mm Hg in systolic blood pressure has been shown to reduce the risk of major cardiovascular events and all-cause mortality [3,4].

Beta-blockers bind to the beta-adrenoreceptors selectively producing a reversible and competitive antagonism of the effects of beta-adrenergic stimulation on numerous organs. These drugs are used in the treatment of different indications such as heart failure, angina and hypertension [5]. Beta-blockers can lead to several adverse effects and should be given with cautions in several situations such as in patients with diabetes, renal and hepatic disease and in patients with thyroid disorders. They are also contraindicated in numerous situations such as in severe bronchial asthma or bronchospasms, hypotension and in sinus bradycardia. In addition to that, there are several potential drug-drug interactions that may occur with beta-blockers [5].

It is important to monitor patterns of cardiovascular drugs including beta-blockers to help in assessing the appropriateness of its prescribing and to give an idea about the factors that can affect its prescribing and to decrease its negative effects. Therefore, this study aimed to describe the trends in beta-blocker prescribing in the outpatient setting of a public hospital in Al Saih.

2. METHODOLOGY

This is a retrospective study that aims to describe the trends in beta-blocker prescribing in King Khalid Hospital in Al Saih.

The study includes patient electronic records revision of outpatients Between 1st July and 31st December 2018. Inclusion criteria included outpatient prescriptions during the study period that included beta blockers; so the prescriptions of patients who didn’t receive beta blockers, prescriptions before July 2018 and prescriptions after 2018 were excluded from the study.

The data includes the most commonly prescribed beta-blockers, age of patients, gender of patients, dosage forms and the prescribing departments.

3. RESULTS AND DISCUSSION

Between 1st July and 31st December 2018, 177 beta-blockers drugs were prescribed in the outpatient setting in the public hospital. The most commonly prescribed beta-blocker was bisoprolol (79.10%) followed by metoprolol (7.34%) and timolol (5.08%). The most commonly prescribed beta-blockers are presented in Table 1.

Table 1. The most commonly prescribed beta-blockers

| Medication     | Number | Percentage |
|----------------|--------|------------|
| Bisoprolol     | 140    | 79.10      |
| Metoprolol     | 13     | 7.34       |
| Timolol        | 9      | 5.08       |
| Propranolol    | 7      | 3.95       |
| Atenolol       | 5      | 2.82       |
| Carvedilol     | 3      | 1.69       |

More than half of the patients were less than 60 years old (52.54%). Age of the patients receiving beta-blockers is shown in Table 2.

Table 2. Age of the patients receiving beta-blockers

| Age          | Number | Percentage |
|--------------|--------|------------|
| Less than 20 | 2      | 1.13       |
| 20-39        | 14     | 7.91       |
| 40-59        | 77     | 43.50      |
| More than 59 | 84     | 47.46      |

About 55.93% of the patients receiving beta-blockers were male. Table 3 shows gender of patients receiving beta-blockers.

Table 3. Gender of patients receiving beta-blockers

| Gender | Number | Percentage |
|--------|--------|------------|
| Female | 78     | 44.07      |
| Male   | 99     | 55.93      |

Table 4 shows the dosage forms of the prescribed beta-blockers. Most of the prescribed beta-blockers were prescribed as a tablets (94.92%).

Table 5 shows the departments that prescribed beta-blockers. About 39.55% of the prescribed drugs were prescribed by cardiology department (39.55%) followed by internal medicine department (36.72%).
Table 4. Dosage forms of beta-blockers

| Dosage form       | Number | Percentage |
|-------------------|--------|------------|
| Tablet            | 168    | 94.92      |
| Bottle - Eye Drops| 9      | 5.08       |

Beta-blockers were prescribed commonly. Ma et al [6] stated that β-blocker prescribing during outpatient visits for uncomplicated hypertension was high and increased modestly from 24% in 1993 to 33% in 2004 in the United States [6]. Wu et al [7] reported that among children and adolescents in Beijing, China the trends of prescribing beta-blockers increased from 2010 to 2014 and that beta-blockers and angiotensin-converting enzyme inhibitors were more likely to be prescribed in outpatient visits [7]. Ahmed et al [8] reported that about 18.66% of the antihypertensive classes that were used in the outpatient setting were beta-blockers [8].

In contrast to that, Shah et al [9] stated that beta-blocker use in the United Kingdom has risen but remains inequitable and low but their study focused on heart failure patients [9]. Ahmed et al [8] found that the most commonly prescribed antihypertensive class was calcium channel blockers followed by diuretics, angiotensin-converting enzyme inhibitors and beta-blockers [8]. Almalki et al [10] found that among hypertensive patients with diabetes, the most frequently used was calcium channel blockers, followed by angiotensin-converting enzyme inhibitors [10].

The present study also found that more than half of the patients receiving beta-blockers were less than 60 years old and that more than half of the patients receiving beta-blockers were male. Liu and Wang stated that beta-blockers, angiotensin-converting enzyme inhibitors and Angiotensin II receptor blockers were the most prescribed among younger hypertension patients [11]. Additionally, Pittrow et al [12] reported that beta-blockers were more frequently prescribed for hypertension patients less than 60 years of age [12]. Ahmed et al [8] found that female patients are more frequently treated with diuretics and less frequently with angiotensin-converting enzyme inhibitors and angiotensin receptors blockers than male patients [13].

All of the prescribed beta-blockers were prescribed as a tablets except timolol which was prescribed as an eye drop and this is rational because the study was conducted in the outpatient setting. Most of the beta-blockers were prescribed by cardiology department followed by internal medicine department and this is rational because most of the patients in these departments have hypertension, angina or other cardiovascular diseases.

The most commonly prescribed beta-blocker in the present study was bisoprolol followed by metoprolol. Shah and Stafford reported that among hypertension patients, metoprolol was the most common beta-blocker, followed by atenolol, nebivolol, and carvedilol [14]. Di Nicolantonio et al [15] stated that non-vasodilating β1-selective beta-blockers such as atenolol and metoprolol are still the most frequently prescribed beta-blockers in the United States of America [15].

The main limitation in the present study was that the diagnosis of patients was not written in the outpatients' records.

Table 5. Prescribing departments

| Prescribing Department | Number | Percentage |
|------------------------|--------|------------|
| Cardiology             | 70     | 39.55      |
| Internal Medicine      | 65     | 36.72      |
| Emergency              | 19     | 10.73      |
| Ophthalmology          | 9      | 5.08       |
| Nephrology             | 8      | 4.52       |
| Neurology              | 2      | 1.13       |
| Gastroentrology        | 2      | 1.13       |
| Psychiatry             | 1      | 0.56       |
| Cardiac Surgery        | 1      | 0.56       |
4. CONCLUSION

It can be concluded that beta-blockers were prescribed commonly for patients in the outpatient setting. In the future, more studies are needed to find the prescribing patterns of beta-blockers for treating different indications and to prepare stratified guidelines and policies to treat cardiovascular patients based on their characteristics.

CONSENT AND ETHICAL APPROVAL

This study was approved by the Institutional Review Board log number 2019-0153E. As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ACKNOWLEDGEMENT

“This Publication was supported by the Deanship of Scientific Research at Prince Sattam bin Abdulaziz University”.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Chobanian AV. National heart, lung and blood institute joint national committee on prevention, detection, evaluation and treatment of high blood pressure; national high blood pressure education program coordinating committee: the seventh report of the joint national committee on prevention, detection, evaluation and treatment of high blood pressure: The JNC 7 report. JAMA. 2003;289:2560-2572.

2. Heidenreich PA, Trogdon JG, Khavjou OA, Butler J, Dracup K, Ezekowitz MD, et al. Forecasting the future of cardiovascular disease in the United States: A policy statement from the American Heart Association. Circulation. 2011;123(8):933-44.

3. Ettehad D, Emdin CA, Kiran A, Anderson SG, Gallender T, Emberson J, et al. Blood pressure lowering for prevention of cardiovascular disease and death: A systematic review and meta-analysis. Lancet. 2016;387(10022):957-967.

4. Neal B, MacMahon S, Chapman N. Blood pressure lowering treatment trialists collaboration. Effects of ACE inhibitors, calcium antagonists and other blood-pressure-lowering drugs: Results of prospectively designed overviews of randomised trials. Blood pressure lowering treatment trialists’ collaboration. Lancet. 2000;356:1955–1964.

5. HSE. Beta-adrenoreceptor blocking drugs for the treatment of heart-failure, angina and hypertension; 2016. Accessed: 29 March 2012. Available:https://www.hse.ie/eng/services/publications/clinical-strategy-and-programmes/beta-blockers.pdf.

6. Ma J, Lee KV, Stafford RS. Changes in antihypertensive prescribing during US outpatient visits for uncomplicated hypertension between 1993 and 2004. Hypertension. 2006;48(5):846-852.

7. Wu Y, Cao Y, Song J, Tian Y, Wang M, Li M, et al. Antihypertensive drugs use over a 5-year period among children and adolescents in Beijing, China: An observational study. Medicine. 2019;98 (40):e17411.

8. Ahmed NJ, Menshawy MA, Almalki ZS. Age-related prescribing patterns of antihypertensive medications. J Pharm Res Int. 2020;32(30):80-85.

9. Shah SM, Carey IM, DeWilde S, Richards N, Cook DG. Trends and inequities in beta-blocker prescribing for heart failure. Br J Gen Pract. 2008;58(557):862–869.

10. Almalki ZS, Albassam AA, Alhejji NS, Alotaibi BS, Al-Qayyi LA, Ahmed NJ. Prevalence, risk factors and management of uncontrolled hypertension among patients with diabetes: A hospital-based cross-sectional study. Prim Care Diabetes. 2020;14(6):610-615.

11. Liu P, Wang J. Antihypertensive medication prescription patterns and time trends for newly - diagnosed uncomplicated hypertension patients in Taiwan. BMC Health Serv. Res. 2008;8:133.

12. Pittrow D, Kirch W, Bramlage P, Lehner H, Höfler M, Unger T, et al. Patterns of antihypertensive drug utilization in primary care. Eur J Clin Pharmacol. 2004;60 (2):135-42.

13. Ahmed NJ, Menshawy MA, Almalki ZS. Gender differences in prescribing antihypertensive drugs in a Public Hospital
14. Shah SJ, Stafford RS. Current trends of hypertension treatment in the United States. Am J Hypertens. 2017;30(10):1008-1014.

15. DiNicolantonio JJ, Fares H, Niazi AK, Chatterjee S, D'Ascenzo F, Cerrato E, et al. β-Blockers in hypertension, diabetes, heart failure and acute myocardial infarction: A review of the literature. Open Heart. 2015;2(1):e000230.