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ORIGINAL ARTICLE

Screening of polypharmacy prescriptions in hypertensive patients at Royal Prima Hospital

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ABSTRACT

Hypertension occurs when a person's blood pressure exceeds the normal limits. This results in increased morbidity and mortality. The method in this study is descriptive, with the use of retrospective research, where the study was conducted by reviewing information or retrieving data that had existed before. Data were collected through polypharmacy prescriptions for patients with high blood pressure at the Royal Prima Medan Hospital between September and November 2023, with 650 prescriptions collected. From the results of this study, the prescriptions that met the inclusion criteria were 100% in accordance with the symptoms, drug doses, mechanisms, procedures, and duration of drug use. A total of 26 prescriptions contained five drugs with 63.41% interaction out of a total of 41 prescriptions. A total of 34 prescriptions contained 6 drugs, with 65.11% of the total 49 prescriptions. A total of 19 prescriptions contained seven drugs, with 82.61% of the total 23 prescriptions. A total of 13 prescriptions containing 8 drugs with a percentage of interactions of 86.67% of the total 15 prescriptions. Most interactions occurred in six prescriptions containing nine drugs, with 100% interaction from a total of six drugs. Most interactions also occurred in four prescriptions containing 10 drugs, with 100% interaction from a total of four drugs.

Keywords: hypertension, polypharmacy, drug interactions

Introduction

Hypertension, characterized by elevated blood pressure, is a prevalent health condition associated with increased morbidity and mortality. While diastolic pressure reflects the blood returning to the heart, systolic pressure indicates the force exerted by the heart as it pumps blood. Approximately 90% of hypertension cases are classified as primary, and the remaining 10% are attributed to secondary causes. Primary hypertension typically manifests between the ages of 30 and 50.[1] According to data from the Indonesian Ministry of Health, the prevalence of hypertension in Indonesia surged to 38.7% in 2019, largely because of its degenerative nature and potential for severe complications. This elevated risk often results in polypharmacy. Consequently, drug prescriptions for hypertensive patients have become the focal point of research.[2]

Elevated blood pressure can trigger comorbidities, exacerbate chronic conditions, and necessitate long-term treatment. This often results in polypharmacy, defined by the World Health Organization (WHO) as the concurrent use of five or more medications. The term "polypharmacy" originates from the Greek words

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"poly" (meaning many) and "pharmakon" (meaning drug). Similarly, studies conducted in Europe and Australia have defined polypharmacy as the simultaneous use of multiple medications.[3]

Patients with hypertension frequently receive polypharmacy prescriptions, which can lead to drug interactions and adverse clinical outcomes.[4] A pressing global healthcare concern is the increasing number of patients taking five or more medications. Although numerous studies have investigated strategies to mitigate polypharmacy, the clinical management of this issue remains complex. Identifying and preventing polypharmacy can significantly improve the outcomes and quality of life in elderly patients.[5]

A study involving 208 elderly patients revealed that 5% were taking medications unrelated to their diagnosis. Additionally, this study found that a substantial proportion of patients were taking incorrect medications or medications with inappropriate therapeutic effects. To optimize treatment outcomes, it is essential to prescribe the right medication at the right dose and for the right condition.[6] Based on the aforementioned findings, this study aimed to describe polypharmacy prescription patterns in hypertensive patients at Royal Prima Hospital.

Method

This study used a descriptive cross-sectional design and a retrospective approach. Data were collected through a retrospective review of prescriptions dispensed between September and November 2023 at Royal Prima Hospital, Medan. Data were collected in December 2023. The study population consisted of all prescriptions for hypertensive patients received by Royal Prima Hospital during the specified period. A sample of prescriptions meeting the inclusion criteria was selected. Inclusion criteria required original prescriptions containing at least five medications that were dispensed by Royal Prima Hospital between September and November 2023.

Data were entered into Microsoft Excel 2021 for analysis. The clinical aspects evaluated included indication appropriateness, dosage, administration instructions, duration of use, duplication, and drug interactions. Potential drug interactions were identified using the American Society of Health-System Pharmacists (ASHP) website (www.drugs.com). The results were tabulated based on the interaction severity (minor, moderate, and major). Data analysis involved calculating the percentage of prescriptions that met the clinical criteria outlined in Indonesian Ministerial Regulation No. 72 of 2016.

Results

Table 1 presents the results of a study examining a number of drug prescriptions, focusing on clinical aspects, such as appropriateness of indication, dosage, administration instructions, and potential drug interactions. Most prescriptions contained to 5-7 different medications. As the number of medications in a prescription increases, the complexity of medication management required by the patient increases. All prescriptions evaluated demonstrated perfect indication accuracy, meaning that the prescribed medications were appropriate for the patient's medical condition. This is a strong indicator that physicians prescribe medications accurately.

Table 1. Clinical study of prescriptions

Number of medications	Number of prescriptions	Accuracy of indications	Drug dosage	Instructions, method, and duration of drug use	Duplication	Interactions
5	51	100%	100%	100%	0%	70,59%
6	59	100%	100%	100%	0%	74,58%
7	33	100%	100%	100%	0%	84,85%
8	15	100%	100%	100%	0%	86,67%
9	6	100%	100%	100%	0%	100%
10	4	100%	100%	100%	0%	100%

Similar to the indications, the dosage of medications in all prescriptions was deemed appropriate, suggesting that the doses administered were tailored to the patient's needs and minimized the risk of adverse effects. Instructions for medication use, including how and for how long to take medications, were also accurate in all prescriptions. This is crucial to ensure that patients use medications correctly and derive maximum benefit from treatment. No medication duplications were found in any of the prescriptions, indicating that no medication was prescribed more than once in the same prescription. This avoids medication waste and potential for unnecessary adverse effects. The percentage of drug interactions varied depending on the number of prescribed medications. The greater the number of medications, the higher the potential for

interactions. However, overall, the percentage of drug interactions was quite high, especially in prescriptions containing 5-7 medications. From the results of this study, it can be concluded that, in general, the prescriptions examined were of good quality in terms of the appropriateness of indication, dosage, and administration instructions.

Table 2. Drug combination

Drug combination	Severity Level
Amlodipin + Bisoprolol	Moderate
Amlodipin + Nitroglyserin	Moderate
Amlodipin + Aspirin	Moderate
Amlodipin + Atorvastatin	Moderate
Amlodipin + Ibuprofen	Moderate
Amlodipin + Captopril	Minor
Amlodipin + Methylprednisolon	Moderate
Amlodipin + Alprazolam	Moderate
Amlodipin + Dexamethason	Moderate
Atorvastatin + Clopidogrel	Moderate
Bisoprolol + Spironolacton	Moderate
Bisoprolol + Furosemid	Moderate
Bisoprolol + Aspirin	Minor
Candesartan + Spironolactone	Major

Table 2 presents the data on potential drug interactions among commonly prescribed medications, particularly in the management of cardiovascular diseases. Drug interactions occur when the effects of one drug are altered or influenced by those of another drug taken concurrently. These interactions can enhance drug efficacy, increase adverse effects, and reduce drug efficacy. Minor drug interactions have low potential to significantly alter the pharmacological or pharmacokinetic properties of the drugs involved. Moderate drug interactions can cause significant changes in the safety or efficacy profile of therapy, necessitating careful clinical evaluation and additional pharmacological interventions. Major drug interactions pose a high risk of life-threatening adverse effects and require urgent medical intervention.

Amlodipin, which is frequently used to treat hypertension, demonstrates moderate interaction potential with various medications, including bisoprolol, nitroglycerin, aspirin, atorvastatin, and ibuprofen. Bisoprolol, a beta-blocker commonly prescribed for hypertension and other cardiovascular conditions, also exhibits moderate interaction potential with drugs, such as spironolactone and furosemide. However, its interaction with aspirin was considered minor. Atorvastatin, used to lower cholesterol levels, has moderate interaction potential when combined with clopidogrel. Candesartan, an antihypertensive agent, exhibits major interaction potential when combined with spironolactone, indicating a significantly elevated risk of serious adverse events.

Discussion

Drug interactions according to the working procedure for the type of pharmacodynamic interaction, one of which is amlodipine and bisoprolol, if taken together, will inhibit the exchange of beta-blocker oxidative substances and have additional pharmacological effects related to decreased blood pressure and heart rate.[7] The side effects of using amlodipine with nitroglycerin simultaneously will cause collapse and usually occur when waking up from sitting or lying down, and lower blood pressure if taken together.

In this study, other drugs, namely, amlodipine and aspirin, were found to interact with each other. The use of NSAIDs will cause hypertension in patients whose treatment is carried out through antihypertensive drugs of the calcium channel blocker type.[3] The use of amlodipine increases the inhibition of HMG-CoA reductase after the administration of atorvastatin, and there is a pharmacokinetic interaction between these two drugs. The action of statins increases their toxicity to the musculoskeletal system, causing myopathy. If a drug interaction was found between amlodipine and atorvastatin, a lipid level review was carried out, and the lowest dose of statin was used. When used together, amlodipine and ibuprofen cause pharmacodynamic interactions, and several studies have shown that NSAID can minimize the occurrence of antihypertensive effects against several drugs that block calcium channels. If there is a drug interaction between amlodipine and ibuprofen, blood pressure should be monitored to keep it within the normal threshold.[8]

The combination of calcium channel blocker drugs (amlodipine) with angiotensin-converting enzyme inhibitors (captopril) effectively controls blood pressure because it uses two different but complementary working procedures in which calcium channel blockers (amlodipine) and angiotensin-converting enzyme inhibitors (captopril) tend to cause a decrease in blood pressure.[9] If methylprednisolone and amlodipine are

administered together, the effects of amlodipine are reduced. This occurs if methylprednisolone is administered for more than a week.[10]

Interactions in other prescriptions amlodipine and alprazolam have an additive effect on lowering blood pressure, the side effects that appear are headaches, dizziness, mild headaches, collapse, and changes in pulse or heart rate. These side effects will be observed at the beginning of therapy, after increasing the dose, or when therapy is resumed after stopping. The drug interaction of amlodipine and dexamethasone, if taken together, causes a decrease in the effect of antihypertensive drugs, namely through increased water and sodium storage, causing hypertension.[11]

Conclusion

The results of this study indicate that administering many types of drugs to hypertensive patients at Royal Prima Medan Hospital has the potential to increase the risk of unwanted side effects due to drug interactions. This finding highlights the importance of re-evaluating the practice of administering drugs to patients with hypertension to minimize these risks.

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