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Study of Administrative, Pharmaceutical, and Clinical Aspects of Hypertension Patient Prescriptions at Advent Hospital, Medan.

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Abstract

Hypertension is a common chronic disease requiring precise pharmacological management to prevent complications. Inappropriate prescriptions may lead to treatment failure or adverse events. This study aimed to evaluate the completeness of prescriptions for hypertensive outpatients at Advent Hospital Medan based on administrative, pharmaceutical, and clinical aspects. This descriptive retrospective study analyzed 303 prescriptions collected from January to March 2024. Evaluation criteria included patient and prescriber identity, dosage form, drug strength, usage instructions, indication accuracy, dosage accuracy, and potential drug interactions. Results showed administrative completeness was high, with 100% inclusion of most identity elements, but 0% for weight and height. Pharmaceutical completeness was suboptimal, with only 25.08% including dosage form. Clinically, all prescriptions were appropriate in terms of indication, dose, and timing, and showed no duplication. However, 88.11% of prescriptions contained potential drug interactions, with 68 major interactions identified. The most frequent were Amlodipine–Simvastatin and Spironolactone–Candesartan combinations. These findings indicate that while clinical accuracy was excellent, pharmaceutical documentation and interaction screening need improvement. Collaboration between prescribers and pharmacists is essential to enhance medication safety.

Keywords: hypertension, prescription completeness, drug interaction, clinical evaluation, pharmaceutical documentation.

Abstrak

Hipertensi merupakan penyakit kronis yang umum terjadi dan memerlukan pengelolaan farmakologis yang tepat untuk mencegah komplikasi. Resep yang tidak lengkap atau tidak tepat dapat menyebabkan kegagalan terapi atau efek samping yang merugikan. Penelitian ini bertujuan mengevaluasi kelengkapan resep pasien rawat jalan hipertensi di Rumah Sakit Advent Medan berdasarkan aspek administratif, farmasetik, dan klinis. Penelitian ini bersifat deskriptif retrospektif terhadap 303 lembar resep periode Januari–Maret 2024. Evaluasi dilakukan terhadap identitas pasien dan dokter, bentuk sediaan, kekuatan dosis, aturan pakai, kesesuaian indikasi, dosis, waktu pemberian, serta interaksi obat. Hasil menunjukkan kelengkapan administratif tergolong tinggi (100% untuk sebagian besar identitas), namun berat dan tinggi badan tidak tercantum (0%). Kelengkapan farmasetik rendah, hanya 25,08% resep mencantumkan bentuk sediaan. Dari aspek klinis, seluruh resep dinilai tepat dari segi indikasi, dosis, waktu pemberian, dan tidak terdapat duplikasi obat. Namun, 88,11% resep mengandung potensi interaksi obat, dengan 68 di antaranya tergolong interaksi mayor, terutama kombinasi Amlodipin–Simvastatin dan Spironolakton–Candesartan. Hasil ini menunjukkan perlunya peningkatan dokumentasi farmasetik dan skrining interaksi obat secara berkala. Kolaborasi antara dokter dan apoteker sangat penting untuk meningkatkan keamanan terapi..

Kata kunci: *hipertensi, kelengkapan resep, interaksi obat, evaluasi klinis, dokumentasi farmasetik*

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INTRODUCTION

Hypertension is a major global health concern and a leading risk factor for cardiovascular diseases such as stroke, heart failure, and myocardial infarction[1]. According to the World Health Organization (2023), hypertension—defined as a persistent blood pressure of ≥140/90 mmHg—contributes significantly to global morbidity and mortality. In Indonesia, the prevalence of hypertension has shown a marked increase. The 2018 Basic Health Research (Riskesdas) reported a prevalence rate of 34.11% among individuals aged 18 years and above, up from 25.8% in 2013. These figures highlight hypertension as a critical public health issue requiring comprehensive management[2].

The complications associated with hypertension extend beyond cardiovascular

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damage, as long-term treatment often involves complex pharmacotherapy[2]. Consequently, the quality and appropriateness of antihypertensive therapy are essential in ensuring treatment effectiveness and patient safety. The use of multiple drugs—whether as monotherapy or in combination—increases the risk of medication errors during prescription, administration, or monitoring phases[3].

Medication errors are defined as preventable events that may cause or lead to inappropriate medication use or patient harm. These errors can result from incomplete prescription information, inappropriate drug selection, incorrect dosage, missing dosage forms, or drug-drug interactions found that prescription errors commonly included the absence of birth date (80.12%), dosage form (38.85%), and drug concentration (27.71%)[4].

Pharmaceutical services in hospitals are a critical component of healthcare systems, not only for ensuring drug availability but also for enhancing therapeutic outcomes through clinical pharmacy services. In accordance with Ministry of Health Regulation No. 72 of 2016, hospital pharmacists are required to evaluate prescriptions based on administrative, pharmaceutical, and clinical criteria. Administrative evaluation involves checking patient and prescriber identification, prescription date, and prescribing unit. Pharmaceutical assessment includes evaluation of dosage form, strength, quantity, and instructions for use. Clinical assessment focuses on the appropriateness of indication, dosage, timing, duplication, and potential drug interactions[4–6].

Previous studies have revealed substantial deficiencies in prescription quality. In Indonesia reported that 88% of outpatient prescriptions failed to meet administrative standards, and 52% were lacking in pharmaceutical completeness. Another study by Hadiningtias found that 47% of prescriptions exhibited potential drug interactions, ranging from minor to major in severity[7].

Given the high prevalence of hypertension, the risk of complications due to inappropriate medication use, and the critical role of pharmacists in ensuring rational drug use, it is essential to evaluate the completeness and accuracy of prescriptions[8]. RS Advent Medan, as a major healthcare institution, provides a suitable setting for such an evaluation. Therefore, this study aims to assess the completeness of prescriptions for hypertensive patients at RS Advent Medan from administrative, pharmaceutical, and clinical perspectives[9].

METHODOLOGY

Type of Research

This study is a non-experimental study using a descriptive research method. Data collection was carried out retrospectively. Where data was obtained from prescriptions for the period January-March 2024

Location and Time of Research

This research is located at Advent Hospital in December 2024.

Research Methodology

The research procedure began with obtaining approval from the Clinical Pharmacy Study Program and submitting a

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formal research request to Advent Hospital Medan. Following approval, prescriptions for hypertensive patients from January to March 2024 were collected retrospectively from the outpatient unit. Each prescription was then assessed comprehensively through three evaluative aspects: administrative, pharmaceutical, and clinical. The administrative review focused on verifying the completeness of key patient and prescriber information, including patient name, age, gender, weight, height, prescribing doctor's name and signature, prescription date, and the unit of origin.

The pharmaceutical assessment evaluated whether each prescription included the appropriate dosage form, drug strength, total quantity of medication, and clear usage instructions. Meanwhile, the clinical assessment involved analyzing the accuracy of drug indications, dosing appropriateness, timing of administration, as well as identifying any potential therapeutic duplications or drug interactions using references such as Drug.com and Medscape. All collected data were then compiled, processed, and analyzed quantitatively using Microsoft Excel 2021, and presented in the form of tables and percentages through univariate analysis[8].

Table 1. Administrative Completeness Criteria

No	Variable	Definition	Assessment Method	Category
1	Patient's Name	Name of the patient receiving the medication	Reviewed from prescription	Present / Absent
2	Age	Age of the patient	Reviewed from prescription	Present / Absent
3	Gender	Gender of the patient	Reviewed from prescription	Present / Absent
4	Body Weight	The patient's body mass in kilograms	Reviewed from prescription	Present / Absent
5	Height	The patient's height from head to toe in standing position (cm)	Reviewed from prescription	Present / Absent
6	Doctor's Name	Name of the prescribing physician	Reviewed from prescription	Present / Absent
7	Doctor's Signature	Signature or initials of the prescribing doctor as legal validation	Reviewed from prescription	Present / Absent
8	Prescription Date	Date the prescription was issued	Reviewed from prescription	Present / Absent
9	Unit of Origin	Hospital unit or department where the prescription originated	Reviewed from prescription	Present / Absent

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Table 2. Pharmaceutical Completeness Criteria

No	Variable	Definition	Assessment Method	Category
1	Dosage Form	Physical form of the drug (e.g., tablet, capsule, syrup, injection)	Reviewed from prescription	Present / Absent
2	Drug Strength	Amount of active ingredient contained in the dosage form	Reviewed from prescription	Present / Absent
3	Quantity	Total number of medication units to be dispensed	Reviewed from prescription	Present / Absent
4	Usage Instructions	Specific directions on how the medication should be used (signa)	Reviewed from prescription	Present / Absent

Table 3. Clinical Completeness Criteria

No	Variable	Definition	Assessment Method	Category
1	Indication Accuracy	Appropriateness of the prescribed drug for the patient's diagnosed condition	Based on medical record and references	Appropriate / Inappropriate
2	Dose Accuracy	Correct therapeutic dose prescribed according to guidelines	Based on references (e.g., JNC VIII)	Appropriate / Inappropriate
3	Timing Accuracy	Correct timing of administration to optimize drug effect	Based on usage guidelines	Appropriate / Inappropriate
4	Duplication	Presence of more than one drug with the same active ingredient or therapeutic effect	Reviewed from prescription	Present / Absent
5	Drug Interaction	Potential interaction between two or more drugs that could alter therapeutic outcomes	Based on Drug.com / Medscape	Present / Absent

Data Analysis

The data obtained were then analyzed using Microsoft Office Excel 2021. Data analysis was carried out using univariate analysis, namely the data analysis technique is carried out by analyzing a variable independently and associated with other variables. The measurement results are displayed in the form of numbers and percentages and presented in tabular form.

RESULT AND DISCUSSION

Patient Sociodemographic Characteristics

This study involved 303 outpatient hypertensive patients at Advent Hospital Medan during the period of January to March 2024. Sociodemographic characteristics were analyzed based on gender and age, as presented below:

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Table 4. Patient Distribution by Gender

No	Gender	Frequency
1	Male	80
2	Female	223
Total		**303**

Table 5. Patient Distribution by Gender

No	Age Group	Frequency
1	< 40 years	7
2	≥ 40 years	296
Total		**303**

Table 6. Prescribing profile based on the number of antihypertensives used

No	Number of antihypertensives used	Number of cases	%
1	1	135	44.88
2	2	118	38.62
3	3	42	13.86
4	4	8	2.64

The data show that hypertension was more prevalent among female patients (73.60%) compared to males (26.40%). This aligns with the findings of Nurhayati et al. (2023) and Sholekhah et al. (2025), who reported a higher incidence of hypertension in postmenopausal women, possibly due to decreased estrogen levels which normally protect cardiovascular function.

The vast majority of patients (97.69%) were aged 40 years or older. This finding supports research by Fadhilah et al (2021) which observed that aging is significantly associated with increased hypertension incidence [10]. Age-related vascular changes, such as arterial stiffness and reduced elasticity, contribute to elevated blood pressure in older adults. These demographic characteristics emphasize the importance of age and gender as key risk factors in the management of hypertension, particularly in older women[11].

The distribution data indicate that most hypertensive patients were prescribed either monotherapy (135 cases, 44.55%) or two-drug combinations (118 cases, 38.94%), accounting for over 83% of prescriptions. This prescribing pattern aligns with hypertension management guidelines, which recommend initiating treatment with monotherapy for Stage 1 hypertension and two-drug combinations for Stage 2 or poorly controlled cases [12].

Among single-agent therapies, Amlodipine was the most frequently prescribed drug (76 cases), followed by Candesartan (26) and Valsartan (17). This supports previous findings by Fadhilah et al. (2021), who reported that Amlodipine dominated monotherapy usage due to its efficacy and safety as a calcium channel blocker (CCB).

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Table 7. Distribution of Antihypertensive Drug Use

No	Number of Antihypertensive Agents	Drug Combinations	Frequency
1	1	Amlodipine	76
		Candesartan	26
		Bisoprolol	4
		Furosemide	1
		Nifedipine	2
		Ramipril	9
		Valsartan	17
	Total (monotherapy)		**135**
2	2	Amlodipine + Bisoprolol	5
		Amlodipine + Candesartan	27
		Amlodipine + Ramipril	15
		Amlodipine + Valsartan	34
		Bisoprolol + Candesartan	13
		Bisoprolol + Nifedipine	1
		Bisoprolol + Valsartan	7
		Candesartan + Diltiazem	1
		Candesartan + Nifedipine	3
		Candesartan + Spironolactone	3
		Nifedipine + Valsartan	9
	Total (two-drug combinations)		**118**
3	3	Various three-drug combinations*	**42**
4	4	Various four-drug combinations**	**8**
		Grand Total	**303**

** Including combinations like Amlodipine + Bisoprolol + Candesartan, Bisoprolol + Candesartan + Diltiazem, etc.*

*** Including combinations like Amlodipine + Bisoprolol + Candesartan + Furosemide.*

In terms of combinations, the most common two-drug regimen was Amlodipine + Valsartan (34 cases), followed by Amlodipine + Candesartan (27 cases) and Amlodipine + Ramipril (15 cases). These combinations suggest a preference for combining a CCB with an angiotensin receptor blocker (ARB) or an ACE inhibitor, which is consistent with evidence-based recommendations for synergistic blood pressure control and reduced adverse effects [13].

Three- and four-drug combinations were less frequently used (42 and 8 cases, respectively), likely reflecting more complex clinical cases requiring intensified therapy. The most frequent three-drug combination was Bisoprolol + Candesartan + Diltiazem (6 cases), while the most common four-drug regimen was Bisoprolol + Nifedipine + Spironolactone + Valsartan (4 cases). Overall, the prescribing trends observed reflect adherence to rational antihypertensive therapy principles, including stepwise intensification and drug class synergy[3].

Administrative Completeness Analysis

Based on the analysis of 303 outpatient prescriptions for hypertensive

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patients at Advent Hospital Medan, the administrative completeness was generally high. All prescriptions (100%) contained the patient's name, age, gender, prescribing doctor's name and signature, prescription date, and the unit or department where the prescription originated. However, none of the prescriptions included the patient's body weight or height, resulting in 0% completeness for these two aspects[14]. Administrative completeness analysis can be seen at Table 8.

Table 8. Administrative Completeness Analysis

No	Administrative Aspect	Present (n = 303)	% Present	Not Present (n = 303)	% Not Present
1	Patient's Name	303	100%	0	0%
2	Age	303	100%	0	0%
3	Gender	303	100%	0	0%
4	Body Weight	0	0%	303	100%
5	Height	0	0%	303	100%
6	Doctor's Name	303	100%	0	0%
7	Doctor's Signature	303	100%	0	0%
8	Prescription Date	303	100%	0	0%
9	Unit of Origin	303	100%	0	0%

The inclusion of the patient's name, age, and gender is essential to ensure the correct identification of the patient and to avoid medication mix-ups, particularly in hospital settings. Gender information can influence drug dosing or selection in certain clinical contexts, while age is often used to calculate appropriate pediatric or geriatric doses[2].

Body weight and height are important parameters, especially in cases where drug dosing depends on body surface area or body mass index (BMI). The absence of this information can pose risks in therapies requiring weight-based dosing (e.g., aminoglycosides, chemotherapy), although it may be less critical in standard hypertension treatments. Nevertheless, its absence reflects an area for improvement in prescription completeness.

Doctor's name and signature were consistently present, which ensures legal and professional accountability. The presence of the prescription date helps in identifying the currency and validity of the therapy plan, while the unit of origin aids in tracking patient treatment pathways and facilitating coordinated care.

In conclusion, while the majority of administrative components were fulfilled according to standards, the systematic omission of patient anthropometric data (weight and height) suggests a documentation gap that should be addressed to support safer and more individualized pharmacotherapy, especially in patients with comorbidities or special populations.

Pharmaceutical Completeness Analysis

Pharmaceutical completeness analysis can be seen at Table 9.

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Table 9. Pharmaceutical Completeness Analysis

No	Pharmaceutical Aspect	Present (n = 303)	% Present	Not Present (n = 303)	% Not Present
1	Dosage Form	80	25.08%	223	73.59%
2	Drug Strength	303	100%	0	0%
3	Quantity	298	98.34%	5	1.65%
4	Usage Instructions (Signa)	303	100%	0	0%

The pharmaceutical assessment of 303 prescriptions revealed that only 26.08% of prescriptions were fully complete in all pharmaceutical aspects. The most common deficiency was the omission of dosage form (present in only 25.08% of prescriptions). In contrast, drug strength and usage instructions were consistently included in all prescriptions (100%), while quantity was absent in only 1.65% of cases.

The lack of dosage form details is concerning, as it may lead to medication errors, particularly for drugs available in multiple forms. While most prescribers accurately specified the strength and directions for use, greater attention is needed to ensure all pharmaceutical components are clearly documented to optimize patient safety and dispensing accuracy[15,16].

Clinical Completeness Analysis

Clinical completeness analysis can be seen at Table 10.

Table 10. Clinical completeness analysis

No	Clinical Aspect	Appropriate (n = 303)	% Appropriate	Inappropriate / Present	% Inappropriate / Present
1	Indication Accuracy	303	100%	0	0%
2	Dose Accuracy	303	100%	0	0%
3	Timing Accuracy	303	100%	0	0%
4	Duplication	303	100% (None)	0	0%
5	Drug Interactions	36	11.88%	267 (Present)	88.11%

The clinical analysis of 303 prescriptions for hypertensive outpatients at Advent Hospital Medan showed a high level of completeness and appropriateness in most assessed aspects. All prescriptions demonstrated 100% accuracy in terms of drug indication, dosage, timing of administration, and absence of therapeutic duplication. This indicates that prescribers consistently followed evidence-based clinical guidelines, ensuring that the selected antihypertensive agents matched the patient's condition, the doses were in line with therapeutic standards, and the medications were administered at the appropriate times to optimize therapeutic outcomes. The absence of duplication further suggests a rational prescribing practice, minimizing the risk of overdose or unnecessary drug burden on the patient.

These findings align with the results of Razoki et al. (2023), who reported full compliance with clinical prescribing standards—particularly in terms of

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indication and dosage accuracy—among diabetic patients undergoing polypharmacy at the same institution. Similarly, the avoidance of drug duplication mirrors the results from Huynh and Rajendran (2021), who emphasized the importance of prescription screening in preventing unnecessary therapeutic overlap that may lead to adverse drug reactions or increased treatment costs.

However, a notable concern emerged from the analysis: 88.11% of prescriptions (267 out of 303) contained one or more potential drug interactions. While some interactions may be clinically manageable or minor, their high prevalence indicates a significant challenge in hypertensive pharmacotherapy, especially among patients receiving combination regimens. The most frequent major interaction identified was between Amlodipine and Simvastatin, a well-documented combination that increases the risk of myopathy due to CYP3A4-mediated metabolic inhibition [17]. Similar findings were observed in the study by Sharma et al. (2024), who reported the same interaction as one of the most common in antihypertensive prescriptions[18]. Moreover, deOlievera also highlighted the increasing risk of drug interactions among hospitalized hypertensive patients, particularly when multiple drug classes are involved[19].

Despite the high prevalence of potential drug interactions, it is important to note that not all interactions lead to clinical harm. Many prescriptions involved combinations with known interaction profiles but are still considered acceptable when monitored appropriately—such as combinations of calcium channel blockers with [20]or ARBs. This reinforces the importance of continuous pharmacist-led screening and clinician awareness to mitigate interaction risks through dosage adjustments, therapy monitoring, or drug substitution when necessary.

In summary, the prescriptions analyzed in this study exhibited excellent clinical completeness regarding drug indication, dosage, timing, and therapeutic rationale. However, the substantial number of potential interactions underscores the need for strengthened collaboration between prescribers and pharmacists to ensure safer pharmacotherapy, particularly in patients with complex medication regimens.

Distribution of Number of Drug Interactions per Prescription

Distribution of number of drug interactions per prescription can be seen at Table 11. Based on the analysis of 303 prescriptions, only 37 prescriptions (12.2%) were free from drug interactions, while the remaining 266 prescriptions (87.8%) contained one or more potential drug interactions. The most common occurrence was a single interaction per prescription, found in 85 cases (28.1%). This was followed by prescriptions with two interactions (15.2%), three interactions (17.5%), and four or five interactions (each 8.9%). Prescriptions with higher numbers of interactions were less frequent, including six (3.6%), seven (2.6%), and up to twelve interactions in a single prescription (0.3%).

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Table 11. Distribution of Number of Drug Interactions per Prescription

No	Number of Interactions per Prescription	Number of Cases	Percentage (%)
1	0 Interactions	37	12.2%
2	1 Interaction	85	28.1%
3	2 Interactions	46	15.2%
4	3 Interactions	53	17.5%
5	4 Interactions	27	8.9%
6	5 Interactions	27	8.9%
7	6 Interactions	11	3.6%
8	7 Interactions	8	2.6%
9	8 Interactions	2	0.7%
10	9 Interactions	1	0.3%
11	10 Interactions	3	1.0%
12	11 Interactions	2	0.7%
13	12 Interactions	1	0.3%
	Total	**303**	**100%**

This data suggests that the majority of patients received multidrug regimens with a high potential for interactions, which is not uncommon in the treatment of hypertension, particularly when comorbidities are present. The presence of prescriptions with more than five interactions, although rare, signals a need for close monitoring and evaluation. Overall, the findings emphasize the importance of routine drug interaction screening as part of clinical pharmacy services to minimize adverse events and ensure patient safety in complex pharmacotherapy.

Major Drug Interactions Identified in Prescriptions

Major drug interactions identified in prescriptions refer to clinically significant interactions between two or more drugs that may result in serious adverse effects, reduced therapeutic efficacy, or life-threatening conditions. Major drug interactions can be seen at Table 12. The analysis of major drug interactions in this study identified a total of 68 cases involving combinations known to have high clinical significance and potential to cause serious adverse effects. The most frequently encountered interaction was between Amlodipine and Simvastatin (27 cases), a combination that may increase the risk of statin-induced myopathy due to CYP3A4 inhibition by amlodipine. This finding is consistent with the study by Tirta et al. (2023), which also reported Amlodipine–Simvastatin as the most common major interaction in hypertensive prescriptions. Other major interactions observed included Spironolactone with Candesartan (10 cases) and Spironolactone with Valsartan (9 cases), both of which may significantly raise the risk of hyperkalemia due to their potassium-sparing effects. These results align with the findings of Chalik et al. (2021), who emphasized the prevalence of RAAS-inhibitor combinations as contributors to elevated potassium levels in polytherapy regimens.

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Table 12. Major drug interactions

No	Drug Combination	Number of Cases
1	Allopurinol + Ramipril	3
2	Amlodipine + Simvastatin	27
3	Atorvastatin + Fenofibrate	2
4	Codeine + Alprazolam	2
5	Diltiazem + Bisoprolol	6
6	Diltiazem + Simvastatin	1
7	Omeprazole + Clopidogrel	3
8	Simvastatin + Fenofibrate	5
9	Spironolactone + Candesartan	10
10	Spironolactone + Valsartan	9
	Total	68

Additionally, interactions such as Diltiazem with Bisoprolol (6 cases) and Simvastatin with Fenofibrate (5 cases) were also identified. These combinations can lead to cardiac conduction abnormalities and increased risk of rhabdomyolysis, respectively. Similar interactions were reported in Hadiningtias' study, which found moderate to major interactions involving calcium channel blockers and statins in internal medicine prescriptions. Although less frequent, combinations such as Omeprazole with Clopidogrel, Atorvastatin with Fenofibrate, and Codeine with Alprazolam were also identified, indicating the need for broader monitoring beyond antihypertensive therapy alone[21].

Overall, the findings underscore the importance of regular drug interaction screening, particularly in patients on multidrug regimens. The high frequency of clinically significant interactions observed in this study is comparable to previous research and highlights the critical role of clinical pharmacists in ensuring safe pharmacotherapy through early detection and intervention.

CONCLUSION

The evaluation of antihypertensive prescriptions at Advent Hospital Medan showed good completeness in administrative and clinical aspects, but low pharmaceutical completeness due to missing dosage form information. All prescriptions were appropriate in terms of indication, dose, timing, and showed no duplication. However, most prescriptions (88.11%) had potential drug interactions, including 68 major interactions. These results highlight the importance of improving prescription documentation and regularly screening for drug interactions to ensure patient safety.

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REFERENCES

1. Burnier, M. & Egan, B. M. Adherence in Hypertension: A Review of Prevalence, Risk Factors, Impact, and Management. *Circ. Res.* **124**, 1124–1140 (2019).
2. Hamrahian, S. M. & Falkner, B. Hypertension in Chronic Kidney Disease. in *Hypertension: from basic research to clinical practice* (ed. Islam, Md. S.) vol. 956 307–325 (Springer International Publishing, Cham, 2016).
3. Karo, R. M. B., Razoki, R., Neswita, E. & Novriani, E. THE EFFECT OF DRUG COUNSELING ON HYPERTENSION PATIENT'S COMPLIANCE IN A HOSPITAL IN MEDAN CITY. *Jambura J. Health Sci. Res.* **4**, 755–765 (2022).
4. Reeves, L. *et al.* Pharmacist Interventions in the Management of Blood Pressure Control and Adherence to Antihypertensive Medications: A Systematic Review of Randomized Controlled Trials. *J. Pharm. Pract.* **34**, 480–492 (2021).
5. Park, N. H., Song, M. S., Shin, S. Y., Jeong, J. & Lee, H. Y. The effects of medication adherence and health literacy on health-related quality of life in older people with hypertension. *Int. J. Older People Nurs.* **13**, e12196 (2018).
6. Choudhry, N. K. *et al.* Medication Adherence and Blood Pressure Control: A Scientific Statement From the American Heart Association. *Hypertension* **79**, (2022).
7. Andriansyah, Y., Neswita, E. & Razoki, R. ADMINISTRATIVE, PHARMACEUTIC AND CLINICAL STUDY OF PRESCRIPTION ANTI-DIABETES DRUGS IN ONE OF MEDAN CITY PHARMACIES. *Jambura J. Health Sci. Res.* **4**, 740–747 (2022).
8. van Eikenhorst, L., Salema, N.-E. & Anderson, C. A systematic review in select countries of the role of the pharmacist in consultations and sales of non-prescription medicines in community pharmacy. *Res. Soc. Adm. Pharm.* **13**, 17–38 (2017).
9. Komalasari, V. Tanggung Jawab Apoteker Dalam Pelayanan Obat Dengan Resep Dokter. *J. Poros Huk. Padjadjaran* **1**, 226–245 (2020).
10. Fadhilah, G., Lestari, D., Rahayu, A. P., Syaputri, F. N. & Tugon, T. D. A. Evaluasi profil penggunaan obat antihipertensi pada pasien hipertensi rawat jalan di salah satu rumah sakit Kabupaten Bogor. *J. Sci. Technol. Entrep.* **3**, (2021).
11. Nurhayati, U. A., Ariyanto, A. & Syafriakhwan, F. Hubungan usia dan jenis kelamin terhadap kejadian hipertensi. in *Prosiding Seminar Nasional Penelitian dan Pengabdian Kepada Masyarakat LPPM Universitas' Aisyiyah Yogyakarta* vol. 1 363–369 (2023).
12. DiPiro, J. T. *et al.* Pharmacotherapy: a pathophysiologic approach. (2014).
13. Aztriana, A., Mumtihanah, A. & Kadir, M. A. Kesesuaian Pengkajian Resep Racikan Pediatri di RSUD Siwa. *Makassar Pharm. Sci. J. MPSJ* **1**, 19–30 (2023).
14. Puput, P. V. N., Novriani, E. & Simanjuntak, N. J. P. Antidiabetic Activity Test of Ethanol Extract of Bandotan Leaves (Ageratum conyzoides L.) in Alloxan-Induced White Rats. *NSMRJ Nusant. Sci. Med. Res. J.* **3**, 06–13 (2025).
15. Chow, K. T., Chan, L. W. & Heng, P. W. Characterization of spreadability of nonaqueous ethylcellulose gel matrices using dynamic contact angle. *J. Pharm. Sci.* **97**, 3467–3482 (2008).
16. Lubis, Z. K., Ongko, N. X., Soekardi, A. & Razoki, R. The impact of white turmeric rhizome extract on the histopathological characteristics of the pancreas in male wistar rats with diabetes. *Bul. Kedokt. Kesehat. Prima* **4**, 1–11 (2025).
17. Dorairaj, P. *et al.* PS-C10-9: EFFECTIVENESS OF AMLODIPINE ON 24-HOUR AMBULATORY BLOOD PRESSURE IN ADULT PATIENTS WITH MILD-MODERATE ESSENTIAL HYPERTENSION: A MULTICENTRE OBSERVATIONAL, REAL-WORLD STUDY. *J. Hypertens.* **41**, e213–e214 (2023).
18. Sharma, P. K., Ram, M., Jaiswal, R. T. & Mishra, M. Lifestyle Disorders and Ayurveda with special reference to Raktagata Vata (Hypertension). *J. Ayurveda Integr. Med. Sci.* **9**, 155–165 (2024).
19. de Oliveira, R. C. B., de Oliveira, R. C. B., e Silva, B. de S. N., Costa, S. C. & Chiang, W. M. Understanding of current clinical approaches to gestational hypertensive syndromes. *Exec. Ed.* 106.
20. Cutrell, S. *et al.* ACE-inhibitors in hypertension: a historical perspective and current insights. *Curr. Hypertens. Rep.* **25**, 243–250 (2023).
21. Famurewa, A. C., Asogwa, N. T. & Ezea, S. C. Antidiabetic drug sitagliptin blocks cyclophosphamide cerebral neurotoxicity by activating Nrf2 and suppressing redox cycle imbalance, inflammatory iNOS/NO/NF-κB response and caspase-3/Bax activation in rats. *Int. Immunopharmacol.* **116**, 109816 (2023).