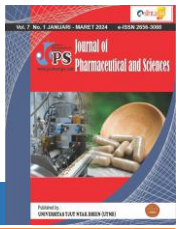
Journal of Pharmaceutical and Sciences
Electronic ISSN: 2656-3088 DOI: https://doi.org/10.36490/journal-jps.com
Homepage: https://journal-jps.com
ORIGINAL ARTICLE JPS. 2026, 9(2), 1628-1636



Rationality Evaluation of Antidiabetic Drug Use in Patients with Type 2 Diabetes Mellitus and Hypertension Complications in an Inpatient Ward of a Hospital in Cimahi City

Evaluasi Rasionalitas Penggunaan Obat Antidiabetes pada Pasien Diabetes Melitus Tipe 2 dengan Komplikasi Hipertensi di Instalasi Rawat Inap Salah Satu Rumah Sakit Kota Cimahi

Linda Purnamawati Suherman [a]*, Diana Novalina [a], Pudjiastuti Kartidjo [a], Fauziah Nurul Afifah [b]

[a] *Faculty of Farmasi, Universitas Jenderal Achmad Yani, West Java, Indonesia*
[b] *Hospital Pharmacy Installation Level II 03.05.01 Dustira, West Java, Indonesia*

* *Corresponding Authors: linda.purnamawati@lecture.unjani.ac.id*

Abstract

Type 2 diabetes mellitus (T2DM) with hypertension complications requires rational and standardized pharmacological management to prevent cardiovascular deterioration. This study aimed to evaluate the pattern and level of rationality of antidiabetic drug use in T2DM patients with hypertension complications in the inpatient ward of a hospital in Cimahi City for the period of January 2023 to December 2024. This study utilized a retrospective descriptive-analytical observational design involving 79 medical records that met the inclusion criteria. The assessment of rationality was measured using five parameters based on the Indonesian Ministry of Health guidelines: appropriate indication, drug selection, dosage, administration interval, and duration of therapy. The majority of patients were elderly females (62%). Prescribing patterns indicated that 50.6% of patients received a combination therapy of insulin and oral hypoglycemic drugs (OHDs), 31.7% received OHD monotherapy, and 12.6% received insulin monotherapy, with metformin and glimepiride being the most prescribed OHDs. The evaluation results of the rationality level reached 100% for the parameters of appropriate indication and duration of therapy, 96% for appropriate administration interval, 90% for appropriate dosage, and 70% for appropriate drug selection. The majority of inappropriateness stemmed from the selection of insulin regimens that had not been optimally individualized to the patients' clinical profiles. Overall, the antidiabetic management was classified as rational; however, a multidisciplinary approach and strong coordination between physicians and clinical pharmacists are crucial to optimize therapy individualization and adherence to standard guidelines.

Keywords: Type 2 diabetes mellitus, hypertension, insulin, oral hypoglycemic drugs, drug rationality.

Abstrak

Diabetes melitus tipe 2 (DMT2) dengan komplikasi hipertensi membutuhkan penatalaksanaan farmakologis yang rasional dan terstandarisasi guna mencegah perburukan kardiovaskular. Penelitian ini bertujuan mengevaluasi pola dan tingkat rasionalitas penggunaan obat antidiabetes pada pasien DMT2 dengan komplikasi hipertensi di instalasi rawat inap salah satu rumah sakit di Kota Cimahi periode Januari 2023–Desember 2024. Penelitian ini menggunakan desain observasional deskriptif-analitik retrospektif terhadap 79 data rekam medis yang memenuhi kriteria inklusi. Penilaian rasionalitas diukur menggunakan lima parameter berdasarkan pedoman Kemenkes RI yaitu tepat indikasi, pemilihan obat, dosis, interval waktu pemberian, dan lama terapi. Mayoritas pasien adalah lansia perempuan (62%). Pola peresepan menunjukkan 50,6% pasien menerima terapi kombinasi insulin dan obat hipoglikemik oral (OHO), 31,7% monoterapi OHO, dan 12,6% monoterapi insulin, dengan metformin dan glimepiride sebagai OHO terbanyak. Hasil evaluasi tingkat kerasionalan mencapai 100% pada parameter tepat indikasi dan lama pemberian, 96% pada tepat interval waktu, 90% pada tepat dosis, dan 70% pada tepat pemilihan obat. Ketidaktepatan mayoritas bersumber dari pemilihan regimen insulin yang belum diindividualisasi secara optimal terhadap profil klinis pasien. Secara keseluruhan, penatalaksanaan antidiabetes tergolong rasional, namun pendekatan multidisiplin dan koordinasi yang kuat antara dokter dan apoteker klinis sangat diperlukan untuk mengoptimalkan individualisasi terapi dan kepatuhan terhadap pedoman standar.

Kata Kunci: Diabetes melitus tipe 2, hipertensi, insulin, obat hipoglikemik oral, rasionalitas obat.

Article History:
Received: 02/04/2026,
Revised: 06/06/2026
Accepted: 07/06/2026,
Available Online: 07/06/2026.
QR access this Article

https://doi.org/10.36490/journal-jps.com.v9i2.1501

Introduction

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disease whose prevalence continues to surge globally and nationally, including in West Java Province [1]. According to the 2021 International Diabetes Federation (IDF) report, Indonesia ranks fifth among countries with the highest number of people with diabetes globally, reaching approximately 19 million individuals, and this figure is predicted to skyrocket to 23 million by 2030 [2]. This emergency is also reflected at the regional level, where data from the Cimahi City Health Office recorded a sharp 20% increase in diabetes cases throughout 2023 [3]. T2DM rarely occurs in isolation and is frequently accompanied by comorbidities, with hypertension being the most predominant macrovascular complication [4].

The combination of T2DM and hypertension is a mutually exacerbating pathophysiological condition that serves as a central risk factor for fatal complications such as coronary heart disease, stroke, and kidney failure. The presence of hypertension in diabetic patients is known to multiply the risk of cardiovascular morbidity and mortality by up to 60% [5]. Therefore, pharmacotherapeutic management of this comorbid condition demands a high level of caution. The selection of antidiabetic regimens and protective antihypertensive agents (such as ACE inhibitors or ARBs) must be highly targeted to suppress the progression of target organ damage [6].

Nevertheless, polypharmacy prescribing in T2DM patients with hypertension is highly susceptible to irrational therapy issues. Empirical evidence from a study at RSUD dr. Soekardjo revealed that the percentage of appropriate antidiabetic drug dosing in T2DM patients with hypertension remains at an alarming rate of only 45.45% [7]. Inappropriate selection of combination regimens, dose adjustment errors, and the failure to individualize therapy especially regarding the use of insulin and Oral Hypoglycemic Drugs (OHDs) pose significant challenges that risk triggering glycemic control failure, harmful adverse effects like hypoglycemia, and an escalation in medical care costs [8].

Thus far, the largest proportion of studies evaluating the rationality of drug use in T2DM patients in Indonesia has focused on monotherapy or been restricted to large tertiary referral hospitals, thereby failing to represent the dynamics of polypharmacy prescribing in secondary healthcare facilities. There is a literature gap regarding the comprehensive evaluation of adherence to combination antidiabetic therapy in satellite cities such as Cimahi, particularly structured evaluations measured using the clinical standard guidelines of the Indonesian Society of Endocrinology (PERKENI) [9]. Stemming from this scientific gap and urgency, this study was conducted to comprehensively evaluate the patterns and rationality levels (including the parameters of appropriate indication, drug selection, dosage, administration interval, and duration of therapy) of antidiabetic drug use in T2DM patients with hypertension complications within the inpatient ward of a hospital in Cimahi City for the period of January 2023 to December 2024. The findings of this study are expected to provide an evidence-based evaluative foundation for medical personnel and clinical pharmacists to minimize irrational polypharmacy and consolidate collaborative, patient-centered care practices.

Research Methodology

Research Design and Materials

This study utilized a non-experimental, retrospective observational design with a descriptive-analytical approach. The primary materials for this research were the medical records of patients diagnosed with type 2

Electronic ISSN : 2656-3088
Homepage: https://www.journal-jps.com

diabetes mellitus (T2DM) and hypertension complications, admitted to the inpatient ward of a hospital in Cimahi City between January 2023 and December 2024. Ethical clearance was granted by the hospital's Ethics Committee under approval number RSD/024/IV/2025, dated April 10, 2025. Data collection was conducted from March to May 2025.

Population and Sample

A total sampling technique was employed, encompassing all patient medical records that satisfied the inclusion criteria. The inclusion criteria comprised adult patients aged 18–85 years diagnosed with T2DM and hypertension complications (blood pressure ≥140/90 mmHg) who received antidiabetic pharmacotherapy during their hospitalization. Additionally, the patients were required to have complete medical records, including name initials, medical record number, age, sex, body weight, dates of admission and discharge, clinical diagnosis, prescribed drug names, dosage forms, strengths, actual doses administered, blood glucose levels, HbA1c, and blood pressure measurements. Pregnant patients, those transferred or referred to other healthcare facilities, and deceased patients were excluded from the study. Following the screening process, 79 out of 116 medical records met the inclusion criteria and constituted the final study sample.

Data Analysis

The collected data were evaluated using a descriptive-analytical approach. An initial analysis was performed to present the distribution of the patients' demographic characteristics (age and sex) alongside the prescribing patterns of the antidiabetic regimens. The primary objective of this analysis was to assess the rationality level of antidiabetic drug use in T2DM patients with hypertension complications. The rationality assessment was measured using five clinical parameters based on the 2019 Guidelines for Pharmaceutical Services in Diabetes Mellitus Patients established by the Indonesian Ministry of Health: appropriate indication, appropriate drug selection, appropriate dosage, appropriate administration time interval, and appropriate duration of therapy [10]. All evaluation outcomes were subsequently compared against the 2021 Guidelines for the Management and Prevention of Type 2 Diabetes Mellitus in Adults in Indonesia by PERKENI, and the results were presented as percentages [9].

Results and Discussion

In this study, a total of 79 patients met the inclusion criteria. The majority of the patients were female (62%) and belonged to the pre-elderly and elderly age groups. The observed pharmacological therapy patterns indicated that 50.6% of the patients received a combination therapy of insulin and Oral Hypoglycemic Drugs (OHDs), while 30.1% received monotherapy. The antidiabetic drugs most frequently prescribed during hospitalization were metformin and glimepiride. A comprehensive evaluation of drug use rationality revealed that the appropriateness of indication and the duration of therapy reached 100%, appropriate administration time intervals were at 96%, appropriate dosage at 90%, and appropriate drug selection at 70%. Overall, the pharmacological management of T2DM patients with hypertension in the inpatient ward was classified as rational; however, an in-depth evaluation demonstrated that challenges remain in individualizing treatment regimens, particularly concerning insulin therapy.

Patient Demographic Characteristics

Based on Table 1, the majority of T2DM patients with hypertension complications were female (62%) and fell within the pre-elderly to elderly age brackets (89%). These findings align with a retrospective study by Julaeha et al. (2020), which reported that T2DM patients with comorbid hypertension in Indonesia are predominantly in the age group of 50-59 years and older [4]. Advancing age strongly correlates with a progressive decline in pancreatic beta-cell function and a reduction in insulin receptor sensitivity [11]. Furthermore, the predominance of female patients is closely related to a higher susceptibility to metabolic cardiovascular complications caused by the fluctuation and decline of protective estrogen hormones, especially during the postmenopausal period. These hormonal changes contribute to the redistribution of body fat (visceral obesity), which pathophysiologically exacerbates insulin resistance and triggers persistent blood pressure dysregulation [7,9].

Electronic ISSN : 2656-3088
Homepage: https://www.journal-jps.com

Table 1. Patient Demographic Characteristics

No.	Characteristics	n = 79	
		Number of patients	Percentage (%)
1.	Sex		
	a. Male	30	38
	b. Female	49	62
2.	Age (Years)		
	a. 19 – 44	9	11
	b. 45 – 59	38	48
	c. ≥60	32	41

Antidiabetic Pharmacological Therapy Patterns

The pharmacological management of T2DM patients with hypertension complications at this hospital was predominantly characterized by the use of combination therapy (69.9%), with a two-drug combination regimen being the most prevalent (50.6%). Metformin and glimepiride were the most frequently prescribed concomitant medications. This high proportion of combination therapy is highly rational and aligns with the PERKENI guidelines. This finding indicates that the majority of patients required intervention with more than one class of antidiabetic drugs to achieve optimal glycemic control targets during their hospitalization [7,9]. The administration of metformin (a biguanide) and glimepiride (a sulfonylurea) has also been widely reported in various Indonesian literatures as an OHD combination therapy line possessing excellent efficacy and pharmacoeconomic profiles [12]. Metformin acts centrally by reducing hepatic glucose production, whereas glimepiride peripherally stimulates endogenous insulin secretion, thereby providing a potent synergistic effect when the two are combined [13]. Furthermore, the high rate of combination insulin interventions in this inpatient ward reflects a significant number of patients presenting with hyperglycemic crises who necessitated rapid glycemic control during their care period [14].

Table 2. Prescribing Patterns of Antidiabetic Regimens Grouped by Therapeutic Class (n = 79)

Drug Class	Drug Name	Number of patients (n)	Percentage (%)
Monotherapy			
Biguanide	Metformin	6	7.6
Sulfonylurea	Glimepiride, Gliclazide, Gliquidon	3	3.8
Thiazolidinedione	Pioglitazone	1	1.3
Long-acting insulin analog	Insulin glargine, Insulin detemir	6	7.6
Rapid-acting insulin analog	Insulin aspart	3	3.6
Total Monotherapy		24	30.1
Two Drug Combination			
Long-acting insulin + Rapid-acting insulin	Insulin glargine/detemir + Insulin aspart/glulisine	15	19.0
Biguanide + Sulfonylurea	Metformin + Gliclazide/Glimepiride/Gliquidone	7	8.9
Sulfonylurea + Long-acting insulin	Gliclazide/Glimepiride + Insulin glargine	3	3.8
Biguanide + Long-acting insulin	Metformin + Insulin detemir/glargine	3	3.8
SGLT-2 inhibitor + Rapid-acting insulin	Empagliflozin/Dapagliflozin + Insulin aspart	2	2.5
Sulfonylurea + Thiazolidinedione	Gliclazide + Pioglitazone	2	2.5
Dual Rapid-acting insulin*	Insulin aspart + Insulin aspart (different brands)	2	2.5
Biguanide + SGLT-2 inhibitor	Metformin + Empagliflozin	1	1.3
Biguanide + Premixed insulin	Metformin + Insulin degludec/aspart	1	1.3
Sulfonylurea + Rapid-acting insulin	Gliclazide + Insulin aspart	1	1.3
Premixed insulin + Rapid-acting insulin	Insulin degludec/aspart + Insulin aspart	1	1.3
Alpha-glucosidase inhibitor + SGLT-2 inhibitor	Acarbose + Empagliflozin	1	1.3
Total Two Drug Combination		40	50.6
Three Drug Combination			

Electronic ISSN : 2656-3088
Homepage: https://www.journal-jps.com

Long-acting insulin + Rapid-acting insulin + Biguanide	Insulin glargine + Insulin aspart + Metformin	2	2.5
Long-acting insulin + Rapid-acting insulin + SGLT-2 inhibitor	Insulin glargine + Insulin aspart + Empagliflozin/Dapagliflozin	2	2.5
SGLT-2 inhibitor + Biguanide + **Thiazolidinedione**	Empagliflozin + Metformin + Pioglitazone	1	1.3
SGLT-2 inhibitor + Biguanide + Rapid-acting insulin	Dapagliflozin + Metformin + Insulin aspart	1	1.3
Biguanide + Dual Rapid-acting insulin*	Metformin + Insulin aspart + Insulin aspart	1	1.3
Sulfonylurea + Thiazolidinedione + Biguanide	Gliclazide + Pioglitazone + Metformin	1	1.3
Sulfonylurea + SGLT-2 inhibitor + Biguanide	Gliclazide + Empagliflozin + Metformin	1	1.3
Long-acting insulin + Premixed insulin + Rapid-acting	Insulin glargine + Insulin degludec/aspart + Insulin aspart	1	1.3
Alpha-glucosidase inhibitor + Sulfonylurea + Biguanide	Acarbose + Gliclazide + Metformin	1	1.3
Long-acting insulin + Sulfonylurea + Biguanide	Insulin glargine + Gliclazide + Metformin	1	1.3
Total Three Drug Combination		12	15.5
Four Drug Combination			
SGLT-2 inhibitor + Long-acting insulin + Biguanide + Rapid-acting insulin	Empagliflozin + Insulin glargine + Metformin + Insulin aspart	1	1.3
Total Four Drug Combination		1	1.3
Five Drug Combination			
Sulfonylurea + Biguanide + SGLT-2 inhibitor + Long-acting insulin + Rapid-acting insulin	Glimepiride + Metformin + Empagliflozin + Glargine + Insulin Aspart	2	2.5
Total Five Drug Combination		2	2.5
Total		79	100

*Note: Flagged as a potential administrative transcription or documentation error (duplication of rapid-acting insulin class).

Interestingly, the evaluation revealed a small subset of unconventional regimens, specifically the concurrent use of two rapid-acting insulin analogues (insulin aspart from different commercial brands) in the two-drug (2.5%) and three-drug (1.3%) combination groups. Pharmacologically, this dual rapid-acting insulin approach represents a therapeutic duplication that offers no synergistic clinical benefit and significantly inflates the risk of severe hypoglycemic events. A deeper clinical chart review suggested that these instances did not reflect intentional medical prescriptions, but rather pointed toward potential administrative transcription or documentation errors during the medication reconciliation process across shifting nursing wards. This underscores the critical need for meticulous double checking by clinical pharmacists during inpatient transitions.

Table 3. Evaluation of Appropriateness in a Hospital in Cimahi City

Rationality Criteria	Number of Appropriate Drug Uses	Percentage (%)
Appropriate Indication	79	100
Appropriate Drug Selection	55	70
Appropriate Dosage	71	90
Appropriate Administration Time Interval	76	96
Appropriate Duration of Therapy	79	100

The high prevalence of combination therapy in this inpatient cohort aligns with the progressive nature of T2DM. The progressive decline in pancreatic beta-cell function and high insulin resistance, which are frequently exacerbated by cardiovascular comorbidities such as hypertension, often render monotherapy insufficient [15]. According to the PERKENI (2021) and American Diabetes Association (ADA) guidelines, the initiation of or escalation to combination therapy is highly recommended if the HbA1c target is not achieved with monotherapy after 3 months, or if the patient presents with severe hyperglycemia and a high baseline HbA1c level (≥7.5% or ≥9.0%) [9,16].

Furthermore, the use of three to five drug combinations was observed in a smaller proportion of patients (19.3%). This polypharmacy regimen is typically indicated for patients presenting with significantly more complex clinical conditions, exceedingly poor glycemic control, or a hyperglycemic crisis requiring a basal-

Electronic ISSN : 2656-3088
Homepage: https://www.journal-jps.com

bolus insulin intervention alongside OHDs [7,16]. This prescribing pattern reflects the implementation of a rational and adaptive therapeutic escalation corresponding to the severity of the patient's illness. Nevertheless, drug administration necessitates comprehensive clinical monitoring by healthcare professionals, particularly pharmacists, to minimize the risk of hypoglycemia, ensure dosage rationality, and prevent potentially adverse drug interactions [9,17].

Table 4. Stratification of Antidiabetic Drug Rationality Parameters Based on Patient Age Groups (n = 79)

Rationality Criteria	19–44 Years (n=9)Appropriate n (%)	45–59 Years (n=38)Appropriate n (%)	≥60 Years (n=32)Appropriate n (%)	Total Appropriate (n=79)
Appropriate Indication	9 (100.0%)	38 (100.0%)	32 (100.0%)	79 (100.0%)
Appropriate Drug Selection	8 (88.9%)	28 (73.7%)	19 (59.4%)	55 (70.0%)
Appropriate Dosage	7 (77.8%)	36 (94.7%)	28 (87.5%)	71 (90.0%)
Appropriate Administration Time Interval	8 (88.9%)	36 (94.7%)	32 (100.0%)	76 (96.0%)
Appropriate Duration of Therapy	9 (100.0%)	38 (100.0%)	32 (100.0%)	79 (100.0%)

The stratified analysis presented in Table 4 reveals distinct patterns across age groups regarding antidiabetic drug rationality. Geriatric patients aged $\ge$60 years exhibited the lowest rate of appropriate drug selection (59.4%) compared to the younger cohorts. Pathophysiologically, elderly patients with concurrent T2DM and hypertension present a higher clinical complexity due to age-related progressive declines in renal glomerular filtration rates (eGFR) and hepatic metabolic clearance [9,16]. These physiological shifts render elderly individuals highly susceptible to severe hypoglycemic crises and drug-drug interactions resulting from polypharmacy [17,18]. Interestingly, deviations in appropriate dosage (77.8%) and appropriate administration time interval (88.9%) were most pronounced in the youngest cohort (19–44 years). The higher rates of dosage inappropriateness across the subgroups underscore that empirical dosing guidelines are frequently applied in clinical practice without undergoing meticulous, individualized titration or consideration of age-specific pharmacokinetics [10,19]. Consequently, these findings highlight the necessity of implementing comprehensive, age-tailored protocols and active pharmacist-led medication reviews for patients across all age groups in the inpatient ward [20,21].

Evaluation of Appropriateness

Based on Table 3, the evaluation results demonstrated that all antidiabetic drug prescriptions for type 2 diabetes mellitus (T2DM) patients with hypertension complications in the inpatient ward achieved an appropriate indication rate of 100%. This signifies that the initiation of pharmacological therapy was based on valid and well-documented clinical diagnoses within the medical records. All study subjects (79 patients) were confirmed to have T2DM and exhibited an absolute clinical necessity for pharmacotherapeutic intervention to manage blood glucose levels during their hospitalization. This achievement reflects that the diagnostic process and the determination of therapeutic indication urgency by medical personnel were conducted comprehensively, adhering to medical service standards, and aligning with the clinical guideline recommendations of PERKENI [7,9,18].

Regarding the parameter of appropriate drug selection, the research findings revealed an achievement rate of 70%, while 30% of drug usage was deemed inappropriate in terms of rationality. Further analysis demonstrated that the inappropriateness of this regimen selection primarily stemmed from the prescription of insulin types that had not been adequately individualized. Crucial factors such as the patient's daily blood glucose fluctuation profile, nutritional status, severity of insulin resistance due to comorbid hypertension, and individual response to therapy were not fully reflected in the chosen regimens [9,16]. Specifically, this 30% inappropriateness was characterized by three main clinical findings: first, the selection of insulin regimens that failed to match patients fasting glucose profiles, often relying solely on reactive sliding scale insulin without basal coverage; second, the omission of guideline directed ACE inhibitors or ARBs for renal protection in patients with concurrent hypertension and third, the continuation of metformin in a small number of patients with underlying renal insufficiency. Although the majority of patients received appropriate combination therapies, the discovery of suboptimal empirical regimen usage indicates the need for a patient-

Electronic ISSN : 2656-3088
Homepage: https://www.journal-jps.com

centered care approach. According to the American Diabetes Association (ADA), the adjustment of antidiabetic therapy in inpatient settings must be highly specific, avoiding the sole use of reactive sliding-scale insulin to prevent adverse clinical outcomes [16].

The evaluation of dosage appropriateness indicated that 90% of antidiabetic drug prescriptions complied with the recommended therapeutic dose ranges, whereas the remaining 10% were considered inappropriate [9]. Further analysis revealed that this dosage inappropriateness occurred exclusively in the administration of insulin regimens, where the doses had not been fully and precisely titrated to accommodate the patients' daily blood glucose profiles and nutritional statuses during hospitalization. Determining both basal and prandial insulin doses essentially requires strict capillary blood glucose monitoring (point-of-care testing) and gradual dose adjustments. According to the American Diabetes Association (ADA), the management of hyperglycemia in hospitals, particularly in elderly patients with complicating comorbidities such as hypertension, is highly susceptible to hypoglycemic crises if the insulin dose is not strictly individualized [16].

A closer inspection of the 10% dosage inappropriateness (n = 8 cases) revealed that overdosing was the predominant clinical issue, accounting for 6 cases (75%), while underdosing occurred in 2 cases (25%). The overdosing cases were primarily driven by aggressive clinical practices where patients, particularly geriatric individuals, were initiated on fixed high-dose long-acting basal insulin (e.g., >20 units/day) upon admission without adequate consideration of their underlying renal impairment. According to clinical standards, the failure to down-titrate baseline insulin in renal insufficiency significantly escalates the risk of severe, prolonged hypoglycemic events due to delayed metabolic clearance of exogenous insulin[9,16]. On the other hand, the 2 underdosing cases stemmed from a conservative clinical tendency to prescribe fixed, low empirical doses of prandial insulin (e.g., 4–6 units thrice daily) for patients presenting with severe admission hyperglycemia (blood glucose >300 mg/dL), without subsequent proactive daily titration. Both ADA and PERKENI guidelines recommend that inpatient insulin management should involve active weight-based initiation (typically 0.3–0.5 U/kg/day) coupled with daily corrective adjustments based on point-of-care capillary glucose tracking to avoid prolonged hyperglycemia and extended hospital stays [9,16]

The study results also demonstrated that the appropriateness of drug administration time intervals reached 96%, representing that the majority of medications were administered in alignment with their pharmacokinetic and pharmacodynamic profiles [9,17]. However, a closer inspection of the 4% interval inappropriateness revealed specific pharmacological and documentation discrepancies. A primary issue identified was the twice-daily administration of glimepiride when used in combination with metformin. From a pharmacokinetic standpoint, glimepiride possesses a prolonged duration of action that typically warrants only once-daily dosing; thus, split-dosing represents an unnecessary frequency escalation [9,17]. Additionally, several therapeutic regimens exhibited incomplete or non-specific documentation, where orders were simply recorded as '1x1' without specifying exact administration hours or mandatory instructions regarding its relationship to meals (preprandial vs. postprandial). Such ambiguous scheduling directly risks compromising optimal clinical efficacy if the drug is administered at sub-optimal times. Nevertheless, the overall appropriate administration time interval rate of 96% reflects that the antidiabetic management at the hospital in Cimahi City substantially adheres to established good clinical practices, though minor refinements in prescription documentation and dosing consistency remain essential [9].

The appropriateness of the duration of antidiabetic drug therapy in this study achieved a perfect rate of 100% [9,22]. The duration of treatment during the patients' hospitalization (generally ranging from 3 to 7 days) was considered highly rational because pharmacological interventions were immediately initiated upon glycemic dysregulation and were discontinued or transitioned to outpatient regimens once the patients' hemodynamic and glycemic conditions stabilized. This appropriateness manifests a solid continuum of care concept, wherein therapeutic monitoring remains effective to reduce the risk of unnecessary prolonged polypharmacy [9].

Comprehensively, these research findings confirm that the pharmacological management of T2DM patients with hypertension complications in the inpatient ward of a hospital in Cimahi City has met high rationality criteria. Even so, opportunities for escalating the quality of care remain open, particularly in the aspects of regimen adjustment and insulin dose titration. In this context, integrating the role of clinical pharmacists alongside other medical personnel plays a crucial part. Optimizing integrated pharmaceutical care through medication reconciliation, proactive prescription review, patient adherence education, and interprofessional collaboration serves as an essential pillar to ensure the effectiveness, safety, and sustainable success of therapeutic outcomes [21]

Electronic ISSN : 2656-3088
Homepage: https://www.journal-jps.com

Study Limitations

This study acknowledges a notable methodological limitation regarding its exclusion criteria. The exclusion of patients who were transferred to other healthcare facilities or deceased during hospitalization may introduce a potential selection bias. As evaluating only patients who completed their full course of stay might lead to an overestimation of the drug rationality level, the findings of this study should be interpreted with caution. These results strictly reflect the quality of antidiabetic management in patients with a relatively stable clinical course, and cannot be generalized to patients experiencing fatal complications or hyperacute crises that require immediate tertiary care transfer.

Conclusions

Overall, the pharmacological management of antidiabetic drugs in type 2 diabetes mellitus patients with hypertension complications in the inpatient ward of a hospital in Cimahi City is generally classified as rational. The evaluation results revealed an appropriateness rate of 100% for the parameters of appropriate indication and duration of therapy, 96% for appropriate administration time interval, 90% for appropriate dosage, and 70% for appropriate drug selection. The majority of the identified discrepancies stemmed from the selection of treatment regimens that were not yet fully individualized to accommodate the patients' HbA1c profiles. As a prospect for elevating the quality of future healthcare services, a comprehensive multidisciplinary approach and robust interprofessional coordination between physicians and clinical pharmacists are required. This collaboration is highly essential to ensure consistent adherence to standard therapeutic guidelines, thereby preventing irrational polypharmacy practices, minimizing variations in empirical prescribing, and optimizing the effectiveness and safety of clinical outcomes for patients with complex comorbidities.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

Acknowledgment

The authors express their profound gratitude to the hospital administration in Cimahi City for granting permission and providing support during the medical record data collection process for this study.

References

[1] Trusda SAD, Purbaningsih W, Budiman B, Fitriadi SSN. Characteristics of Patients with Type 2 Diabetes Mellitus in Al-Ihsan Regional General Hospital. Global Medical and Health Communication (GMHC) 2021;9:150–7. https://doi.org/10.29313/gmhc.v9i2.8123.

[2] Nur Aeni S, Yulinah Sukandar E, Hermanto F. Study of Drug Interactions in Diabetes Patients at Several Hospitals in Indonesia. Jurnal Ilmiah Farmasi 2024;4:204–18. https://doi.org/10.36805/jbf.v4i3.1123.

[3] Salma Dhiya A, Karjatin A, Terapan S, Kesehatan P, Kesehatan P, Bandung K. Interactive Educational Website Media for the Prevention of Type 2 Diabetes Mellitus at SMAN 4 Cimahi. Jurnal Kesehatan Siliwangi 2024;5:15–25. https://doi.org/10.34011/jks.v5i1.2453.

[4] Julaeha J, Fudjiati E, Eff ARY. Assessment of Drug Therapy Problems Among Type 2 Diabetes Patients with Hypertension Comorbidity in Indonesia. Borneo Journal of Pharmacy 2020;3:190–8. https://doi.org/10.33084/bjop.v3i3.1359.

[5] Natanael J, Damayanti E, Himayani R. Literature Review: Study of Potential Antidiabetic Drug Interactions in Type 2 Diabetes Mellitus Patients with Hypertension Complications. Sains Medisina 2024;2:201–6. https://doi.org/https://doi.org/10.63004/snsmed.v2i6.468.

[6] Alexander T, Hiremath JS, Swahney JPS, Chandra S, Jain P, Chandra P, et al. Identifying Drug Prescription in Newly Diagnosed Hypertension Patients in India. J Clin Hypertens 2025;27. https://doi.org/10.1111/jch.14963.

[7] Adi Ismaya N, Dwi Pratiwi R, Purnama Sari Indah F, Azzahra E. Evaluation of Antidiabetic Medication Use in Diabetes Mellitus Patients with Hypertension Complications at UIN Syarif Hidayatullah Hospital. Edu Masda Journal 2024;08:72–86. https://doi.org/10.52118/edumasda.v8i1.214.

Electronic ISSN : 2656-3088
Homepage: https://www.journal-jps.com

[8] Andriyani R, Fortuna TA. Evaluation of the Use of Antihypertension Drugs and The Success of Antihypertension Therapy in Hypertension Patients with Diabetes Mellitus in The Outpatient Installation of Dr. Moewardi In 2021. Usadha: Journal of Pharmacy 2023;2:341–60. https://doi.org/https://doi.org/10.23917/ujp.v2i3.108.

[9] PERKENI. Guidelines for the Management and Prevention of Type 2 Diabetes Mellitus in Indonesia. PB PERKENI; 2021.

[10] Ministry of Health of the Republic of Indonesia. Guidelines for Pharmaceutical Services in Diabetes Mellitus. 2019.

[11] Masiani WO, Fauziah R, Hanafi LOA. Analysis of the Effectiveness of Oral Antidiabetic Drug Use in Type 2 Diabetes Mellitus Patients at the Inpatient Unit of Kendari City Hospital in 2021. Jurnal Pharmacia Mandala Waluya 2024;3:87–99. https://doi.org/10.54883/jpmw.v3i2.99.

[12] Puspita D, Fauziah F, Samodra G. Cost-effectiveness analysis of metformin and glimepiride therapy in patients with type 2 diabetes mellitus at cilongok i health center. Health and Biological Science ICHBS 2024;1:44–53.

[13] Apriliany F, Cholisah E, Erlianti K. Effect of metformin and metformin+glimepiride on outcome HbA1c in type 2 diabetes mellitus. Jurnal Manajemen Dan Pelayanan Farmasi (Journal of Management and Pharmacy Practice) 2022;12:97. https://doi.org/10.22146/jmpf.72192.

[14] Prasanna Kumar K, Seshadri K, Aravind S, Deb P, Modi K, Gopal RA, et al. Real-World Observational Study of Glimepiride and Metformin Fixed-Dose Combination Along With Insulin in the Management of Type 2 Diabetes Mellitus: Indian Experience. Cureus 2021. https://doi.org/10.7759/cureus.13020.

[15] Davies MJ, Aroda VR, Collins BS, Gabbay RA, Green J, Maruthur NM, et al. Management of Hyperglycemia in Type 2 Diabetes, 2022. A Consensus Report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). Diabetes Care 2022;45:2753–86. https://doi.org/10.2337/dci22-0034.

[16] ADA. 2. Diagnosis and Classification of Diabetes: Standards of Care in Diabetes—2024. Diabetes Care 2024;47:S20–42. https://doi.org/10.2337/dc24-S002.

[17] Triplitt C, Repas T, Alvarez C. Pharmacotherapy: A Pathophysiologic Approach. In: DiPiro JT, Yee GC, Posey L, et al., editors. Diabetes Mellitus. 11th ed., New York: McGraw-Hill Education; 2020.

[18] Malihah D, Emelia R, Kesehatan F, Piksi P, Bandung G. Treatment Pattern of Antidiabetic Drugs Use One Type II Diabetes Mellitus Patients at RSAU dr. M. Salamun. Jurnal Delima Harapan 2022;9:83–94. https://doi.org/10.31935/delima.v9i1.161.

[19] American Diabetes Association Professional Practice Committee. 13. Older Adults: Standards of Care in Diabetes—2024. Diabetes Care 2024;47:S244–57. https://doi.org/10.2337/dc24-S013.

[20] Graham Gibraltar Sihombing A, Author C, Pendidikan Dokter P, Kedokteran F, Lampung U. Rationale for Type II Diabetes Mellitus Treatment. Jurnal Medika Hutama 2022;3:2175–9.

[21] Syifannisa R, Muthoharoh A, Ningrum WA, Rahmatullah S, Studi P, Farmasi S, et al. Pharmacist Counseling Improves Medication Compliance and Lowers Blood Sugar Levels in Type 2 DM Patients. Jurnal Ilmiah Kesehatan 2022;15:93–102.

[22] Normila N, Soemarie YB, Ramadhani J. Rasionality of Drug Use in Patients with Type II Diabetes Mellitus at The Martapura City Health Center in 2023. Journal of Islamic Pharmacy 2025;10:45–9. https://doi.org/10.18860/jip.v10i1.32341.

Electronic ISSN : 2656-3088
Homepage: https://www.journal-jps.com