IJPHS:
International Journal of Psychology and Health Science
GREENATION PUBLISHER
+62 812 1046 7572 http://greenpub.org greenation.info@gmail.com
DOI: https://doi.org/10.38035/ijphs.v4i3.2275
https://creativecommons.org/licenses/by/4.0/
Received: 01 August 2026 | **Revised:** 05 August 2026 | **Accepted:** 16 August 2026

Analysis of Dapagliflozin and Empagliflozin Prescribing Patterns Based on the Clinical Profiles of Patients with Type 2 Diabetes Mellitus at Pharmacy X, Bandung

Nadlira Dzakiah Hermawan[1], Rida Emelia[2]
[1]Politeknik Piksi Ganesha, Bandung, Indonesia, nadliradzakiah@gmail.com
[2]Politeknik Piksi Ganesha, Bandung, Indonesia, emeliarida945@gmail.com

Corresponding Author: nadliradzakiah@gmail.com[1]

Abstract: Type 2 Diabetes Mellitus (T2DM) is a chronic disease with a prevalence that continues to increase annually worldwide. SGLT2 inhibitors such as dapagliflozin and empagliflozin not only effectively lower blood glucose levels but also provide cardioprotective and renoprotective benefits, as demonstrated in various clinical trials. This study aims to analyze the prescribing patterns of dapagliflozin and empagliflozin and their association with the clinical characteristics of T2DM patients at Pharmacy X in Bandung. This quantitative study with a descriptive observational design involved 60 patients selected through consecutive sampling. Data were collected through structured interviews via WhatsApp and prescription verification. Data analysis employed descriptive statistics and the Chi-Square test. The results showed that respondents were predominantly male (66.67%) and aged >65 years (41.67%). Prescribing patterns showed balanced use of dapagliflozin and empagliflozin (50.00% each), with monotherapy being the most common pattern (60.00%). The most frequent comorbidity was ASCVD (30.00%). The Chi-Square test revealed no significant association between age (p=0.96), gender (p=0.10), therapy pattern (p=0.71), or comorbidity profile (p=0.31) with the type of SGLT2 inhibitor prescribed. The study concludes that the selection of dapagliflozin or empagliflozin at Pharmacy X is not influenced by demographic characteristics or therapy patterns, but is rather determined by clinical considerations such as the patient's cardiovascular and renal risk profile. Further studies with larger populations are needed to confirm these findings.

Keywords: Dapagliflozin, Empagliflozin, Type 2 Diabetes Mellitus, Rescribing Patterns, Clinical Profile.

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a metabolic disorder characterized by peripheral insulin resistance and inadequate insulin production by the body (American Diabetes Association Professional Practice Committee, 2022). Hyperglycemia is one of the principal clinical manifestations of T2DM. This disease represents a major global health challenge, accounting for nearly 90% of all diabetes cases. According to the International Diabetes Federation (IDF), approximately 537 million people worldwide were living with diabetes in

2021, and this number is projected to increase to 643 million by 2030 (Magliano & Boyko, 2021). Indonesia has also experienced a substantial increase in the prevalence of T2DM. The Indonesian Basic Health Research (Riskesdas) reported that the prevalence of diabetes mellitus among adults increased from 6.9% in 2013 to 10.9% in 2018 based on physician diagnosis and clinical symptoms (Ministry of Health of the Republic of Indonesia, 2019). Chronic hyperglycemia initiates a cascade of physiological disturbances. Initially, it produces the classic symptoms of diabetes, including polydipsia, resulting from increased plasma osmolality, and polyuria, caused by osmotic diuresis as excess glucose is excreted through the urine. Persistent uncontrolled hyperglycemia subsequently damages the vascular system, particularly the microvasculature, leading to serious complications such as diabetic retinopathy, diabetic nephropathy characterized by progressive renal dysfunction, and diabetic neuropathy resulting from peripheral nerve damage (Lin et al., 2020).

Historically, the primary goal of early intervention in T2DM was to maintain blood glucose levels as close to normal as possible, with limited emphasis on preventing complications affecting specific organs (Davies et al., 2022). However, diabetes management has evolved toward a principle-based approach that prioritizes not only glycemic control but also the prevention of cardiovascular and renal complications (Cowie & Fisher, 2020). Consequently, sodium-glucose cotransporter-2 (SGLT2) inhibitors have emerged as an innovative therapeutic option because of their unique insulin-independent mechanism of action (DeFronzo, Norton, & Abdul-Ghani, 2017). This mechanism is exemplified by the two most commonly prescribed SGLT2 inhibitors, dapagliflozin and empagliflozin, which reduce glucose reabsorption in the proximal renal tubules. As a relatively new class of antihyperglycemic agents, SGLT2 inhibitors selectively inhibit sodium-glucose cotransporter-2 proteins located in the proximal tubules of the kidneys. Under physiological conditions, these transporters are responsible for reabsorbing approximately 90% of filtered glucose back into the bloodstream. Inhibition of SGLT2 lowers the renal threshold for glucose reabsorption, thereby promoting urinary glucose excretion and reducing plasma glucose concentrations. Unlike many conventional oral antidiabetic drugs, this mechanism does not depend on insulin secretion or insulin sensitivity. Furthermore, urinary glucose loss results in caloric depletion, contributing to modest weight reduction. SGLT2 inhibition also induces mild osmotic diuresis and natriuresis, leading to favorable hemodynamic effects, including reductions in blood pressure and cardiac workload. These additional metabolic and cardiovascular benefits have attracted considerable attention in contemporary diabetes management. Consequently, increasing interest has emerged in understanding how dapagliflozin and empagliflozin are prescribed across different patient clinical profiles in routine clinical practice (McGuire et al., 2021). Therefore, evaluating prescribing patterns of SGLT2 inhibitors in primary healthcare settings is essential to determine their alignment with current clinical recommendations.

Recent clinical trials have demonstrated that SGLT2 inhibitors provide benefits beyond glycemic control, including weight reduction and substantial cardiovascular and renal protection, thereby transforming the management paradigm of T2DM (Tsapas et al., 2020). Their cardioprotective and renoprotective properties are now recognized as major therapeutic advantages. A recent meta-analysis reported that both dapagliflozin and empagliflozin significantly reduce adverse clinical outcomes among patients at high cardiovascular risk, although differences exist between the two agents. Dapagliflozin appears to be more effective in preventing new-onset heart failure, whereas empagliflozin has demonstrated greater reductions in cardiovascular mortality (Savarese et al., 2022). Consistent with these findings, contemporary clinical practice guidelines recommend individualized treatment based on patient characteristics, particularly for individuals with established atherosclerotic cardiovascular disease, heart failure, or chronic kidney disease (American Diabetes Association Professional Practice Committee, 2024). Although these recommendations have

become widely accepted, evidence regarding their implementation in primary healthcare settings remains limited. In addition, medication availability and prescribing practices may influence treatment adherence and clinical decision-making beyond evidence-based recommendations alone (Aziz, Absetz, Oldroyd, Pronk, & Oldenburg, 2015).

Community pharmacies represent the final point of medication dispensing and therefore provide valuable real-world data reflecting actual prescribing behavior. Prescription records maintained by community pharmacies can offer important insights into the extent to which current clinical evidence has been translated into routine therapeutic practice (George, McNamara, & Stewart, 2011). To address this evidence gap, the present study was conducted at one of the busiest community pharmacies in Bandung, Indonesia. The selected pharmacy experiences a high volume of prescription transactions and serves patients with diverse clinical characteristics, making it representative of urban prescribing practices. This descriptive observational study aimed to analyze the prescribing patterns of dapagliflozin and empagliflozin and examine their association with the clinical profiles of patients diagnosed with type 2 diabetes mellitus. Specifically, the study sought to generate local real-world evidence regarding whether prescribing practices align with the contemporary principles of personalized diabetes management (Kunasegaran, Beig, Khanolkar, & Cundy, 2018). Furthermore, the study aimed to identify clinical factors influencing the selection of SGLT2 inhibitors and to detect potential discrepancies between routine prescribing practices and established clinical guidelines. The findings are expected to provide a foundation for future clinical audits, educational interventions, and evidence-based strategies to optimize individualized treatment for patients with T2DM in Indonesia, particularly by maximizing the cardiovascular and renal benefits associated with SGLT2 inhibitor therapy.

METHOD

This study employed a quantitative approach using a descriptive observational design with an analytical component to evaluate the prescribing patterns of sodium-glucose cotransporter-2 (SGLT2) inhibitors among patients with type 2 diabetes mellitus (T2DM). The study was designed to describe the distribution of dapagliflozin and empagliflozin prescriptions according to patients' clinical characteristics and to examine the association between clinical profiles and the selection of SGLT2 inhibitor therapy in routine pharmacy practice. Primary data were collected through structured patient interviews conducted via WhatsApp, while secondary data were obtained from prescription records and medication purchase documentation maintained by the study pharmacy. The research was conducted at Pharmacy X, Bandung, Indonesia, one of the community pharmacies with a high volume of antidiabetic prescriptions. The pharmacy was selected because it routinely dispenses SGLT2 inhibitors and serves a diverse population of patients with T2DM, providing an appropriate setting for evaluating real-world prescribing practices. Data collection was performed between January and February 2026.

The target population comprised all adult patients diagnosed with type 2 diabetes mellitus receiving SGLT2 inhibitor therapy. The accessible population included all patients with T2DM who redeemed prescriptions for either dapagliflozin or empagliflozin at Pharmacy X during the study period. Participants were eligible if they were aged 18 years or older, had a confirmed diagnosis of T2DM, obtained dapagliflozin or empagliflozin from the study pharmacy, provided written digital informed consent to participate, agreed to be contacted via WhatsApp, and had verifiable prescription or purchase records available in the pharmacy database. Patients diagnosed with type 1 diabetes mellitus, gestational diabetes, or other forms of diabetes were excluded. Patients who declined participation or whose prescription information could not be verified because of incomplete or inconsistent records were also excluded.

Participants were recruited using a consecutive sampling technique. All eligible patients visiting the pharmacy during the study period were invited to participate until the required sample size was achieved. This approach minimized selection bias and allowed recruitment of all accessible patients who met the predefined eligibility criteria. Data were obtained from both primary and secondary sources. Primary data were collected through structured interviews conducted using WhatsApp after participants had provided informed consent. The questionnaire gathered demographic and clinical information, including age, sex, prescribed SGLT2 inhibitor, concurrent antidiabetic therapy, history of cardiovascular disease, heart failure, chronic kidney disease, and other relevant comorbidities. Secondary data consisted of prescription records and medication purchase documentation extracted from the pharmacy information system. Patient responses were cross-checked against prescription and dispensing records to ensure data accuracy and consistency.

Data collection followed a standardized procedure. Eligible patients were identified from prescription dispensing records for dapagliflozin or empagliflozin. Patients were subsequently contacted through WhatsApp and provided with information regarding the study objectives, confidentiality, and voluntary participation. Following digital informed consent, structured interviews were conducted using standardized questionnaires. The collected information was then verified against prescription records and medication purchase receipts. Verified data were recorded in a standardized electronic data collection form developed using Microsoft Excel. The research instruments included a structured questionnaire, WhatsApp as the communication platform for participant interviews, and a standardized electronic data collection sheet designed to ensure consistency during data entry and verification.

Statistical analysis was performed using Microsoft Excel with PivotTable functions, descriptive statistical formulas, and the Analysis ToolPak where appropriate. Descriptive statistics were used to summarize participant characteristics, including age group (18–35, 36–45, 46–55, 56–65, and >65 years), sex, prescribed SGLT2 inhibitor (dapagliflozin or empagliflozin), treatment pattern (monotherapy, combination with other oral antidiabetic drugs, or combination with insulin), and comorbidities, including atherosclerotic cardiovascular disease (ASCVD), heart failure, and chronic kidney disease. Categorical variables were presented as frequencies and percentages. Inferential statistical analysis was conducted to examine the association between patient clinical characteristics and the prescribed SGLT2 inhibitor. Pearson's Chi-square test was used to assess relationships between categorical variables, including age group, sex, treatment pattern, comorbidities, and the prescribed SGLT2 inhibitor. Prior to analysis, expected cell frequencies were evaluated to ensure that the assumptions of the Chi-square test were satisfied. When more than 20% of cells had expected frequencies below five, Fisher's Exact Test was applied for 2 × 2 contingency tables. For contingency tables with more than two categories, clinically appropriate category merging was performed where necessary. Statistical significance was established at a two-sided p-value of less than 0.05, corresponding to a 95% confidence level.

RESULTS AND DISCUSSION

A total of 60 patients in Table 1 with type 2 diabetes mellitus (T2DM) who received sodium-glucose cotransporter-2 (SGLT2) inhibitors at Pharmacy X were included in this study. Demographic and clinical data collected included age, sex, prescribed SGLT2 inhibitor, treatment pattern, and the presence of comorbid conditions. The findings are presented in the following tables. The age distribution of the respondents indicated that most patients were older adults. The largest proportion belonged to the age group of over 65 years (n = 25, 41.67%), followed by those aged 46–55 years (n = 18, 30.00%) and 56–65 years (n = 14, 23.33%). Only three respondents (5.00%) were aged 36–45 years, while no participants were identified in the 18–25 or 26–35-year age groups. These findings indicate that SGLT2

inhibitor therapy was predominantly prescribed to middle-aged and elderly patients, reflecting the increasing prevalence of T2DM with advancing age. Regarding sex distribution, male patients accounted for two-thirds of the study population, with 40 respondents (66.67%), whereas female patients represented one-third, with 20 respondents (33.33%). This predominance of male patients suggests that, within the study setting, SGLT2 inhibitor prescriptions were more frequently dispensed to men than to women during the study period.

Table 1. Demographic Characteristics of the Study Participants (N = 60)

Characteristic	Category	Frequency (n)	Percentage (%)
Age (years)	36–45	3	5.00
	46–55	18	30.00
	56–65	14	23.33
	>65	25	41.67
Sex	Male	40	66.67
	Female	20	33.33

Prescribing Patterns of SGLT2 Inhibitors

Table 2 presents the distribution of SGLT2 inhibitor prescribing patterns among the study participants. An equal number of patients received dapagliflozin and empagliflozin, with 30 patients (50.00%) prescribed each medication, indicating a balanced utilization of the two SGLT2 inhibitors within the study setting. Regarding treatment patterns, the majority of patients received SGLT2 inhibitors as monotherapy, accounting for 36 patients (60.00%). The remaining participants received combination therapy, including 14 patients (23.00%) who were prescribed SGLT2 inhibitors in combination with other oral antidiabetic drugs (OADs) and 10 patients (17.00%) who received SGLT2 inhibitors in combination with insulin. These findings suggest that monotherapy remained the predominant treatment strategy, while combination regimens were prescribed for approximately two-fifths of the study population.

Table 2. Distribution of SGLT2 Inhibitor Prescriptions (N = 60)

Variable	Category	Frequency (n)	Percentage (%)
SGLT2 Inhibitor	Dapagliflozin	30	50.00
	Empagliflozin	30	50.00

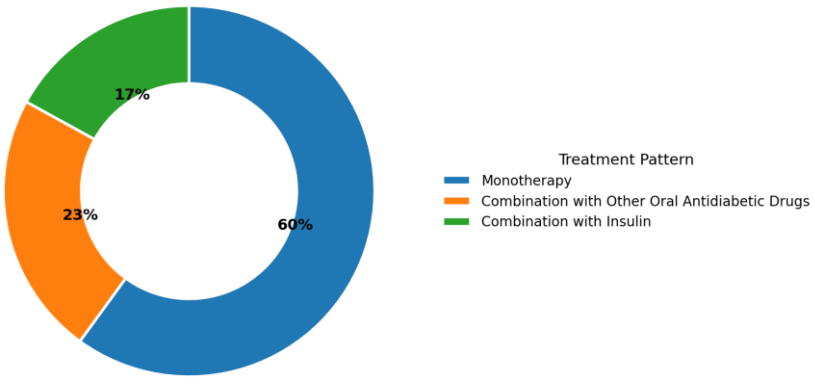


Figure 1. Distribution of Treatment Patterns Among Patients

Comorbidity Profile

The distribution of comorbidities among the study participants is presented in Figure 2. A total of 29 patients (48.00%) had no documented comorbidities, including atherosclerotic cardiovascular disease (ASCVD), heart failure (HF), or chronic kidney

disease (CKD). Among participants with comorbid conditions, ASCVD was the most frequently reported, affecting 18 patients (29.00%), followed by CKD in 8 patients (13.00%) and heart failure in 6 patients (10.00%). Some participants were reported to have more than one comorbid condition, indicating the presence of multiple concurrent chronic diseases.

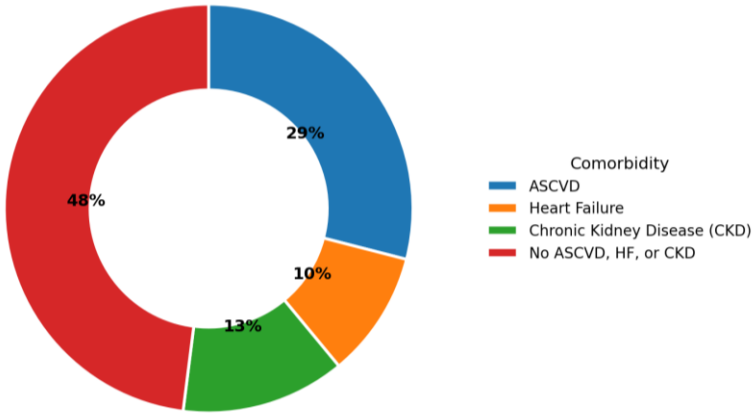


Figure 2. Frequency Distribution of Comorbidities Among the Study Participants

Table 3. Association Between Patient Characteristics and the Type of SGLT2 Inhibitor Prescribed

Variable	Category	Dapagliflozin (n)	Empagliflozin (n)	Row Total	*p*-value
Age	36–55 years	11	10	21	0.96
	56–65 years	7	7	14	
	>65 years	12	13	25	
	Column Total	30	30	60	
Sex	Male	17	23	40	0.10
	Female	13	7	20	
	Column Total	30	30	60	

Table 4. Association Between Treatment Pattern, Comorbidity Profile, and the Type of SGLT2 Inhibitor Prescribed

Variable	Category	Dapagliflozin (n)	Empagliflozin (n)	Row Total	*p*-value
Treatment Pattern	Monotherapy	18	18	36	0.71
	Combination with Other Oral Antidiabetic Drugs	6	8	14	
	Combination with Insulin	6	4	10	
	Column Total	**30**	**30**	**60**	
Comorbidity Profile	Atherosclerotic Cardiovascular Disease (ASCVD)	7	11	18	0.31
	Heart Failure	4	2	6	
	Chronic Kidney Disease (CKD)	6	2	8	
	No ASCVD, Heart Failure, or CKD	14	15	29	
	Column Total	**31**	**30**	**61***	

The inferential statistical analysis demonstrated that there were no statistically significant associations between patient characteristics and the type of SGLT2 inhibitor prescribed ($p > 0.05$). The distributions of age and sex were comparable between patients receiving dapagliflozin and those receiving empagliflozin, with p-values of 0.96 and 0.10, respectively, indicating that demographic characteristics did not significantly influence the selection of either SGLT2 inhibitor. Regarding treatment patterns, monotherapy was the predominant therapeutic approach in both treatment groups, with 18 patients receiving dapagliflozin and 18 patients receiving empagliflozin as monotherapy. Combination therapy with other oral antidiabetic drugs (OADs) and insulin was distributed relatively evenly

between the two groups. Pearson's Chi-square analysis confirmed that treatment pattern was not significantly associated with the prescribed SGLT2 inhibitor ($p = 0.71$).

With respect to comorbidity profiles, most participants had no documented history of atherosclerotic cardiovascular disease (ASCVD), heart failure, or chronic kidney disease (CKD). Among patients with comorbid conditions, ASCVD was the most frequently observed condition and occurred more often among patients receiving empagliflozin than dapagliflozin. However, the overall distribution of comorbidities did not differ significantly between the two treatment groups ($p = 0.31$), suggesting that the presence of these comorbid conditions was not significantly associated with the choice of SGLT2 inhibitor in this study population.

Discussion

Respondent Characteristics

The present study demonstrated that the majority of patients receiving SGLT2 inhibitors were older adults, with 41.67% aged over 65 years. This finding is consistent with the epidemiology of type 2 diabetes mellitus (T2DM), whose prevalence increases substantially with advancing age because of progressive β-cell dysfunction, increasing insulin resistance, and the cumulative effects of metabolic risk factors (Htike et al., 2025). The absence of participants younger than 36 years further reflects the predominance of T2DM among middle-aged and elderly populations. Age is also an important determinant of pharmacological management because declining renal function, polypharmacy, and frailty in older adults influence drug selection, dosage adjustment, and medication safety considerations (NICE Guideline, 2026).

Male patients accounted for approximately two-thirds of the study population, indicating that SGLT2 inhibitors were prescribed more frequently to men than to women. This finding is consistent with previous real-world evidence reporting higher SGLT2 inhibitor utilization among male patients (Azegami et al., 2025). Several factors may explain this difference, including the higher prevalence of cardiovascular disease among men with T2DM and potential differences in healthcare-seeking behavior and prescribing preferences (Somaili et al., 2022). Furthermore, sex-specific safety considerations may influence prescribing decisions. Women, particularly those aged over 50 years, have been reported to experience a higher incidence of urinary tract and genital infections during SGLT2 inhibitor therapy, which may contribute to more cautious prescribing in female patients (Bhat et al., 2024).

Prescribing Patterns of SGLT2 Inhibitors

An equal proportion of participants received dapagliflozin and empagliflozin, suggesting that both agents were considered comparable therapeutic options in routine clinical practice at the study pharmacy. This balanced prescribing pattern is consistent with current international guidelines, which recommend either agent for patients with T2DM according to individual cardiovascular, renal, and metabolic profiles rather than prioritizing one drug over another (American Diabetes Association Professional Practice Committee, 2024). Evidence from the EMPA-REG OUTCOME trial demonstrated that empagliflozin significantly reduces major adverse cardiovascular events and cardiovascular mortality, whereas the DECLARE–TIMI 58 trial showed that dapagliflozin provides substantial benefits in reducing hospitalization for heart failure and slowing the progression of chronic kidney disease. Consequently, the choice between these two agents is often influenced by physician preference, patient-specific clinical indications, medication availability, and treatment cost rather than clear superiority of one drug over the other (Yang et al., 2025).

Most patients (60.00%) received SGLT2 inhibitors as monotherapy. This finding is consistent with current recommendations indicating that SGLT2 inhibitors may be used as

first-line therapy in patients who are unable to tolerate metformin or have contraindications to its use (NICE Guideline, 2026). Approximately one-quarter of participants received SGLT2 inhibitors in combination with other oral antidiabetic drugs, reflecting routine practice for patients requiring additional glycemic control beyond monotherapy (Davies et al., 2022). Meanwhile, combination therapy with insulin was observed in 17.00% of participants, likely representing patients with more advanced disease or inadequate glycemic control. In such patients, careful monitoring is required because concomitant insulin therapy increases the risk of hypoglycemia despite the intrinsically low hypoglycemic potential of SGLT2 inhibitors (NICE Guideline, 2026).

Comorbidity Profile

Nearly half of the study participants had no documented history of atherosclerotic cardiovascular disease (ASCVD), heart failure, or chronic kidney disease (CKD). This finding suggests that, within the study setting, SGLT2 inhibitors continue to be prescribed primarily for glycemic control rather than predominantly for their established cardiovascular and renal protective effects. Although contemporary guidelines strongly recommend SGLT2 inhibitors for patients with cardiovascular or renal disease, these medications remain effective glucose-lowering agents for patients without major comorbidities (Davies et al., 2022; Paulino-Gonzalez et al., 2022). Among patients with documented comorbidities, ASCVD was the most prevalent condition. This observation is expected because individuals with T2DM have a two- to four-fold greater risk of developing atherosclerotic cardiovascular disease than the general population. Current clinical guidelines therefore prioritize SGLT2 inhibitors for patients with established ASCVD because of their demonstrated ability to reduce cardiovascular morbidity and mortality (Paulino-Gonzalez et al., 2022).

The prevalence of CKD in this study (13.00%) was lower than estimates reported in studies involving older diabetic populations, where CKD prevalence commonly ranges between 30% and 40% (Azegami et al., 2025). This discrepancy may reflect differences in study populations, diagnostic criteria, disease severity, or referral patterns. Nevertheless, accumulating evidence from recent meta-analyses consistently supports the renoprotective effects of SGLT2 inhibitors by slowing the decline in renal function and reducing progression to kidney failure (Yang et al., 2025). Heart failure was the least common comorbidity, affecting only 10.00% of participants. Despite its relatively low prevalence, heart failure remains one of the strongest indications for SGLT2 inhibitor therapy because these agents substantially reduce hospitalization for heart failure and improve clinical outcomes regardless of diabetes status (Paulino-Gonzalez et al., 2022). Consequently, current treatment guidelines emphasize systematic assessment of cardiovascular and renal comorbidities before selecting glucose-lowering therapy to maximize both metabolic and organ-protective benefits (NICE Guideline, 2026).

Association Between Clinical Characteristics and SGLT2 Inhibitor Selection

The present study found no statistically significant associations between age, sex, treatment pattern, comorbidity profile, and the type of SGLT2 inhibitor prescribed. These findings suggest that dapagliflozin and empagliflozin were prescribed in a relatively balanced manner across different patient subgroups. Although current guidelines recommend individualized treatment according to cardiovascular and renal risk profiles, both agents possess broadly comparable efficacy and safety profiles, which may explain the absence of significant prescribing differences observed in routine practice. Additionally, local factors such as physician preference, institutional prescribing policies, medication availability, insurance reimbursement, and patient affordability may have exerted a greater influence on prescribing decisions than clinical characteristics alone. Future multicenter studies with larger

sample sizes and multivariable analyses are warranted to identify independent predictors of SGLT2 inhibitor selection in real-world clinical settings.

Comparison of Forxiga (Dapagliflozin) and Jardiance (Empagliflozin) Drug Profiles

To complement the analysis of prescribing patterns, it is important to understand the similarities and differences between the two medications based on the official prescribing information provided in their respective product leaflets. Table 6 presents a comparison of Forxiga (dapagliflozin) and Jardiance (empagliflozin), including their indications, contraindications, recommended dosages, adverse effects, and special warnings.

Table 5. Comparison of the Clinical Profiles of Forxiga (Dapagliflozin) and Jardiance (Empagliflozin)

Aspect	Forxiga (Dapagliflozin)	Jardiance (Empagliflozin)
Drug Class	SGLT2 inhibitor	SGLT2 inhibitor
Primary Indication	Type 2 diabetes mellitus in adults	Type 2 diabetes mellitus in adults
Additional Benefits	Chronic heart failure; chronic kidney disease	Heart failure; cardiovascular protection
Contraindications	Hypersensitivity to dapagliflozin; type 1 diabetes mellitus; diabetic ketoacidosis	Hypersensitivity to empagliflozin; severe renal impairment (eGFR <20 mL/min/1.73 m²); type 1 diabetes mellitus; galactosemia
Renal Impairment	Renal function should be assessed before and during treatment; alternative therapy may be required if renal function declines	Contraindicated when eGFR <20 mL/min/1.73 m²; not recommended for glycemic control in T2DM when eGFR <45 mL/min/1.73 m²
Hepatic Impairment	Initial dose of 5 mg recommended	No specific dose adjustment stated; use with caution
Older Adults (>75 years)	No specific recommendation	Increased risk of dehydration due to osmotic diuresis
Pregnancy	Avoid during the second and third trimesters; consult a physician	Use is not recommended because safety has not been established
Breastfeeding	Not recommended during breastfeeding	Not recommended because excretion into human milk is unknown
Children and Adolescents	Not recommended for individuals <18 years	Not recommended for individuals <18 years
Major Drug Interactions	Diuretics; insulin or sulfonylureas (increased risk of hypoglycemia); lithium (may reduce serum lithium concentrations)	Diuretics (increased risk of dehydration); sulfonylureas (increased risk of hypoglycemia); lithium (may reduce serum lithium concentrations)
Initial Dose	10 mg once daily (5 mg in patients with hepatic impairment)	10 mg once daily
Maximum Dose	10 mg once daily (5 mg in hepatic impairment)	25 mg once daily (may be increased if clinically indicated)
Administration	Swallow whole with water; may be taken with or without food; administer at the same time each day	Swallow whole with water; may be taken with or without food; administer at the same time each day
Missed Dose	Take as soon as remembered if ≥12 hours before the next scheduled dose; otherwise skip the missed dose	Take as soon as remembered if ≥12 hours before the next scheduled dose; otherwise skip the missed dose
Very Common Adverse Effects (>1/10)	Hypoglycemia (primarily when combined with sulfonylureas or insulin)	Hypoglycemia (primarily when combined with sulfonylureas or insulin)
Common Adverse Effects (≥1/100 to <1/10)	Urinary tract infection, genital infection, back pain, increased urination, changes in cholesterol levels, dizziness, rash	Urinary tract infection
Uncommon Adverse Effects (≥1/1,000 to <1/100)	Dehydration, thirst, constipation, nocturia, dry mouth, weight loss, altered renal function, increased serum creatinine and urea	Dehydration
Rare Adverse Effects	Not explicitly reported in the product	Diabetic ketoacidosis

(≥1/10,000 to <1/1,000)	information	
Special Warnings	Risk of dehydration during vomiting, diarrhea, fever, or reduced fluid intake; renal function monitoring recommended; urine glucose tests will be positive	Risk of diabetic ketoacidosis (sweet-smelling breath, rapid weight loss, nausea, vomiting, confusion); foot care is recommended; urine glucose tests will be positive
Storage	No special storage conditions; keep out of the reach of children	No special storage conditions; keep out of the reach of children
Dosage Forms	5 mg tablet (round, yellow, marked "5" and "1427"); 10 mg tablet (diamond-shaped, yellow, marked "10" and "1428")	10 mg tablet (round, pale yellow, marked "S10"); 25 mg tablet (oval, pale yellow, marked "S25")

Overall, Forxiga (dapagliflozin) and Jardiance (empagliflozin) share the same mechanism of action as SGLT2 inhibitors and have similar primary indications for treating type 2 diabetes mellitus. Both provide cardiovascular and renal benefits, although Forxiga specifically highlights chronic heart failure and chronic kidney disease, whereas Jardiance emphasizes cardiovascular protection and heart failure outcomes. The main differences involve renal considerations and dosing. Jardiance has stricter renal function restrictions (eGFR <20 mL/min/1.73 m² is contraindicated) and allows dose escalation up to 25 mg/day, while Forxiga recommends renal function monitoring and has a maximum daily dose of 10 mg. Both drugs have similar adverse effect profiles, including hypoglycemia (when combined with insulin or sulfonylureas), urinary tract infections, genital infections, and dehydration. Jardiance provides a stronger warning regarding diabetic ketoacidosis, whereas Forxiga emphasizes dehydration risk. These findings are consistent with the present study, which found no significant differences in the prescribing of dapagliflozin and empagliflozin according to patient demographics or treatment patterns. This suggests that prescribing decisions are more likely influenced by medication availability, cost, physician preference, and individual clinical considerations, particularly renal function and ketoacidosis risk.

Association Between Patient Characteristics and the Prescribed SGLT2 Inhibitor

No statistically significant association was found between age and the type of SGLT2 inhibitor prescribed (p = 0.96). The distribution of dapagliflozin and empagliflozin was comparable across all age groups, suggesting that age alone did not influence prescribing decisions. This finding is consistent with current clinical guidelines, which do not recommend selecting a specific SGLT2 inhibitor based solely on patient age. Instead, treatment decisions are more likely influenced by factors such as renal function and overall clinical status (Hanlon et al., 2025; Azegami et al., 2025). Similarly, sex was not significantly associated with the prescribed SGLT2 inhibitor (p = 0.10). Although empagliflozin was prescribed more frequently to male patients and dapagliflozin to female patients, these differences were not statistically significant. This suggests that prescribing decisions were primarily driven by clinical considerations rather than patient sex, although larger studies are needed to confirm these findings (Azegami et al., 2025; Yang et al., 2025).

No significant association was observed between treatment pattern and the prescribed SGLT2 inhibitor (p = 0.71). Monotherapy was the predominant regimen for both dapagliflozin and empagliflozin, while combination therapy with other oral antidiabetic drugs or insulin was similarly distributed. These findings are consistent with current guidelines recommending either SGLT2 inhibitor as monotherapy or combination therapy according to individual patient needs rather than preference for a specific agent (Davies et al., 2022).

Likewise, comorbidity profile was not significantly associated with SGLT2 inhibitor selection (p = 0.31). Nevertheless, empagliflozin was prescribed more frequently among patients with atherosclerotic cardiovascular disease (ASCVD), whereas dapagliflozin was more commonly used in patients with heart failure and chronic kidney disease (CKD).

Although these trends did not reach statistical significance, they are consistent with evidence indicating stronger cardiovascular mortality benefits for empagliflozin and greater benefits of dapagliflozin in heart failure and renal outcomes (McGuire et al., 2021). The absence of statistical significance is likely attributable to the relatively small sample size, particularly within the comorbidity subgroups. In addition, prescribing decisions may have been influenced by physician preference, medication availability, and treatment cost, factors that were not evaluated in the present study (Yang et al., 2025).

CONCLUSIONS

Conclusion

This study found that SGLT2 inhibitor users at Pharmacy X were predominantly older adults and male patients, reflecting the epidemiological characteristics of type 2 diabetes mellitus. Dapagliflozin and empagliflozin were prescribed with similar frequency, with monotherapy being the most common treatment approach. Although a considerable proportion of patients had cardiovascular or renal comorbidities, no statistically significant associations were observed between age, sex, treatment pattern, comorbidity profile, and the type of SGLT2 inhibitor prescribed. These findings suggest that the selection of dapagliflozin or empagliflozin in routine community pharmacy practice is influenced more by individualized clinical judgment, medication availability, and physician preference than by patient demographic or clinical characteristics alone. Furthermore, the comparable indications, efficacy, and safety profiles of Forxiga (dapagliflozin) and Jardiance (empagliflozin), as described in their official prescribing information, support the observed similarity in prescribing patterns. Larger multicenter studies with longitudinal designs are recommended to further identify factors influencing SGLT2 inhibitor prescribing in real-world clinical practice.

Limitations

This study has several limitations. First, it was conducted at a single community pharmacy with a relatively small sample size, which may limit the generalizability of the findings to other healthcare settings or regions. Second, the cross-sectional observational design captured prescribing practices only during the study period and did not allow assessment of longitudinal changes in prescribing behavior or patient outcomes. Third, several potentially influential factors, including physician prescribing preferences, medication availability, treatment costs, health insurance coverage, renal function parameters, glycated hemoglobin (HbA1c), and medication adherence, were not evaluated. Finally, the comorbidity data were obtained from prescription records and patient interviews, which may not have fully reflected the complete clinical condition of each participant. Therefore, the findings should be interpreted within the context of these limitations.

Recommendations

Future research should involve larger multicenter populations from multiple community pharmacies or healthcare facilities to improve the generalizability of the findings. Longitudinal or prospective study designs are recommended to evaluate changes in prescribing patterns over time and their impact on clinical outcomes, including glycemic control, cardiovascular events, renal function, and medication safety. Further studies should also incorporate additional clinical variables, such as HbA1c, estimated glomerular filtration rate (eGFR), duration of diabetes, medication adherence, physician prescribing preferences, drug availability, and treatment costs, to better identify factors influencing the selection of dapagliflozin or empagliflozin. Moreover, integrating pharmacy dispensing data with electronic medical records would provide more comprehensive real-world evidence to

support evidence-based prescribing of SGLT2 inhibitors in patients with type 2 diabetes mellitus.

Author Contributions

All authors made significant contributions to this study. These contributions included research conceptualization, development of the theoretical framework, data collection, data analysis, interpretation of results, manuscript preparation, scholarly revision, and final approval of the manuscript for publication. All authors confirm that they have read and approved the final version of the article.

REFERENCES

American Diabetes Association Professional Practice Committee. (2022). Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes 2022. *Diabetes Care*, *45*(1), S17--S38. https://doi.org/10.2337/dc22-S002

American Diabetes Association Professional Practice Committee. (2024). 9. Pharmacologic Approaches to Glycemic Treatment: Standards of Care in Diabetes-2024. *Diabetes Care*, *47*(Suppl 1), S158–S178. https://doi.org/10.2337/dc24-S009

American Diabetes Association Professional Practice Committee for Diabetes. (2026). 11. Chronic Kidney Disease and Risk Management: Standards of Care in Diabetes-2026. *Diabetes Care*, *49*(Supplement_1), S246–S260. https://doi.org/10.2337/dc26-S011

Azegami, T., Kaneko, H., Okada, A., Suzuki, Y., Aoyama, K., Nakayama, T., … Hayashi, K. (2025). Gender differences in the prescription of SGLT2 inhibitors in chronic kidney disease: A real-world database study. *Diabetes, Obesity and Metabolism*, *27*(11), 6294–6303. https://doi.org/10.1111/dom.70020

Aziz, Z., Absetz, P., Oldroyd, J., Pronk, N. P., & Oldenburg, B. (2015). A systematic review of real-world diabetes prevention programs: Learnings from the last 15 years. *Implementation Science*, *10*(1), 172. https://doi.org/10.1186/s13012-015-0354-6

Bhat, M. H., Baba, M. S., Alam, M. E., Bhat, A. H., Mir, S., Dar, B. Q., … Sharma, P. (2024). Gender differences in the clinical profile of sodium-glucose cotransporter-2 inhibitor-related urinary tract infections. *Cureus*, *16*(8), e67590. https://doi.org/10.7759/cureus.67590

Cowie, M. R., & Fisher, M. (2020). SGLT2 inhibitors: Mechanisms of cardiovascular benefit beyond glycaemic control. *Nature Reviews Cardiology*, *17*(12), 761–772. https://doi.org/10.1038/s41569-020-0406-8

Davies, M. J., Aroda, V. R., Collins, B. S., Gabbay, R. A., Green, J., Maruthur, N. M., … others. (2022). Management of hyperglycaemia in type 2 diabetes, 2022. A consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). *Diabetologia*, *65*(12), 1925–1966. https://doi.org/10.1007/s00125-022-05787-2

DeFronzo, R. A., Norton, L., & Abdul-Ghani, M. (2017). Renal, metabolic and cardiovascular considerations of SGLT2 inhibition. *Nature Reviews Nephrology*, *13*(1), 11–26. https://doi.org/10.1038/nrneph.2016.170

Dewi, I., Khotimah, H., Nasution, R., Zulpan, Z., Hariyati, T., & Rusli, A. (2025). Teori Populasi dan Pengambilan Sampel. *Jurnal Literasiologi*, *14*(2). https://doi.org/10.47783/literasiologi.v14i2.1026

George, J., McNamara, K., & Stewart, K. (2011). The roles of community pharmacists in cardiovascular disease prevention and management. *The Australasian Medical Journal*, *4*(5), 266. https://doi.org/10.4066/AMJ.2011.698

Hanlon, P., Butterly, E., Wei, L., Wightman, H., Almazam, S. A. M., Alsallumi, K., … McAllister, D. A. (2025). Age and sex differences in efficacy of treatments for type 2 diabetes: A network meta-analysis. *Jama*, *333*(12), 1062–1073.

https://doi.org/10.1001/jama.2024.27402

Htike, K. M., Thi, W. M., & Mahato, R. K. (2025). Understanding the burden and associated risk factors of type 2 diabetes mellitus among middle-aged and aging population in Yangon, Myanmar: A cross-sectional analytical study. *Journal of Diabetes & Metabolic Disorders*, *24*(2), 1–10. https://doi.org/10.1007/s40200-025-01768-5

Kementerian Kesehatan RI. (2019). *Laporan Nasional Riskesdas 2018*. Jakarta: Jakarta: Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan.

Kunasegaran, S., Beig, J., Khanolkar, M., & Cundy, T. (2018). Adherence to medication, glycaemic control and hospital attendance in young adults with type 2 diabetes. *Internal Medicine Journal*, *48*(6), 728–731. https://doi.org/10.1111/imj.13808

Lin, X., Xu, Y., Pan, X., Xu, J., Ding, Y., Sun, X., … Shan, P.-F. (2020). Global, regional, and national burden and trend of diabetes in 195 countries and territories: An analysis from 1990 to 2025. *Scientific Reports*, *10*(1), 14790. https://doi.org/10.1038/s41598-020-71908-9

Magliano, D. J., & Boyko, E. J. (2021). *IDF Diabetes Atlas 2021 (10th Ed.)*. Brussel: International Diabetes Federation.

McGuire, D. K., Shih, W. J., Cosentino, F., Charbonnel, B., Cherney, D. Z. I., Dagogo-Jack, S., … Cannon, C. P. (2021). Association of SGLT2 inhibitors with cardiovascular and kidney outcomes in patients with type 2 diabetes: A meta-analysis. *JAMA Cardiology*, *6*(2), 148–158. https://doi.org/10.1001/jamacardio.2020.4511

NICE Guideline. (2026). *Type 2 Diabetes in Adults: Management*. London: NICE Guideline.

Paulino-Gonzalez, D., Pardiño-Vega, M. A., Andrade-Arbaiza, E., Xiloj-López, S. A., Juárez-Aldana, K. V, Cruz-Hernandez, S. E., … Navarro-Martinez, D. A. (2022). SGLT-2 Inhibitors After Acute Coronary Syndrome: A Preventive Approach for Heart Failure-Related Complications: A Meta-Analysis. *American Journal of Therapeutics*, pp. 10–1097. LWW. https://doi.org/10.1097/MJT.0000000000002039

Savarese, G., Becher, P. M., Lund, L. H., Seferovic, P., Rosano, G. M. C., & Coats, A. J. S. (2022). Global burden of heart failure: A comprehensive and updated review of epidemiology. *Cardiovascular Research*, *118*(17), 3272–3287. https://doi.org/10.1093/cvr/cvac013

Somaili, M., Oraibi, O., Mohrag, M., Hommadi, A., Moafa, E., Kulaybi, A., … Majrashi, K. (2022). Baseline characteristics associated with sodium-glucose cotransporter inhibitor prescriptions in type 2 diabetic patients in Jazan, Saudi Arabia. *Cureus*, *14*(4), e24284. https://doi.org/10.7759/cureus.24284

Tsapas, A., Avgerinos, I., Karagiannis, T., Malandris, K., Manolopoulos, A., Andreadis, P., … Bekiari, E. (2020). Comparative effectiveness of glucose-lowering drugs for type 2 diabetes: A systematic review and network meta-analysis. *Annals of Internal Medicine*, *173*(4), 278–286. https://doi.org/10.7326/M20-0864

Yang, I.-N., Chong, K.-S., Peng, Z.-Y., Ou, H.-T., & Wang, M.-C. (2025). Comparative effectiveness and prescribing patterns of dapagliflozin vs empagliflozin in type 2 diabetes patients: A target trial emulation. *Diabetes Research and Clinical Practice*, *228*, 112427. https://doi.org/10.1016/j.diabres.2025.112427