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Prospective Observational Study of Prescription Pattern from Diabetic Patients

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Abstract

Background: Diabetes mellitus is a major chronic metabolic disorder requiring long-term pharmacological management. Prescription-pattern studies help evaluate drug utilization and promote rational prescribing. This study assessed the prescribing pattern of antidiabetic medicines among diabetic outpatients.

Methods: A prospective observational study was conducted among diabetic patients attending an outpatient clinic in Vasudevanallur from June 2026 to September 2026. Patients aged above 20 years, irrespective of gender and comorbid status, were included. Demographic characteristics, comorbid conditions, medical history, and prescribed medicines were recorded using a structured data-collection form. The collected data were entered and analyzed using Microsoft Excel 365 with descriptive statistics.

Results: A total of 150 prescriptions were evaluated, comprising 80 male patients (53.33%) and 70 female patients (46.67%). The 50–60-year age group was predominant (31.33%). Comorbidities were present in 79 patients, with cardiovascular disease being the most frequently reported condition. Double-drug therapy was the most common treatment pattern, accounting for 58 prescriptions (38.67%), followed by triple-drug therapy in 33 (22.00%) and single-drug therapy in 29 (19.33%) prescriptions. Metformin was the most frequently prescribed oral antidiabetic medicine (38.29%). Biguanide–sulfonylurea combinations were the predominant dual-drug regimen (70.93%). A total of 607 medicines were prescribed, with an average of 4.05 medicines per prescription. Injectable therapy was recorded in 13 prescriptions (8.67%).

Conclusion: Metformin-based combination therapy was the predominant prescribing pattern. The observed comorbidities and polypharmacy highlight the need for regular prescription review, pharmacist involvement, patient counselling, and individualized treatment to promote safe and rational antidiabetic drug use.

Keywords: Diabetes mellitus; antidiabetic drugs; prescription pattern; drug utilization; metformin; combination therapy; polypharmacy.

INTRODUCTION

Diabetes mellitus (DM) is one of the most common metabolic disorders worldwide and has become a major public health concern due to its increasing prevalence and associated complications. India carries a substantial burden of diabetes and is often regarded as one of the countries most affected by this disease. Diabetes is characterized by chronic hyperglycaemia resulting from defects in insulin secretion, insulin action, or both. Persistent elevation of blood glucose levels can lead to acute and chronic complications affecting multiple organ systems, thereby increasing morbidity, mortality, and healthcare costs. [1-5]

According to global reports, the prevalence of diabetes continues to rise due to urbanization, sedentary lifestyles, unhealthy dietary habits, obesity, and population ageing. [6-8] Diabetes mellitus is broadly classified into Type 1 diabetes mellitus (T1DM), Type 2 diabetes mellitus (T2DM), and gestational diabetes. Type 1 diabetes is an autoimmune disorder characterized by destruction of pancreatic β-cells leading to absolute insulin deficiency, whereas Type 2 diabetes is characterized by insulin resistance and progressive β-cell dysfunction. Among all forms of diabetes, T2DM accounts for the majority of cases worldwide. [9-11]

The diagnosis and monitoring of diabetes are commonly performed using glycated hemoglobin (HbA1c), fasting blood glucose, random blood glucose, and other laboratory investigations. Early diagnosis and regular monitoring are essential for preventing disease progression and reducing the risk of complications.[12]

Comorbidities are conditions that coexist with a primary disease and significantly influence treatment outcomes and quality of life. In patients with diabetes, common comorbid conditions include hypertension, cardiovascular diseases, obesity, kidney disorders, and dyslipidaemia. The coexistence of these conditions complicates disease management and increases the risk of adverse clinical outcomes. [13,14]

Long-term uncontrolled diabetes can result in both macrovascular and microvascular complications. Macrovascular complications include coronary artery disease, stroke, and peripheral arterial disease, which are major causes of mortality among diabetic patients. [19-27] Microvascular complications include diabetic retinopathy, nephropathy, and neuropathy, which contribute substantially to disability and reduced quality of life. [28-31] Effective glycaemic control has been shown to reduce the development and progression of these complications.

The management of diabetes aims to achieve optimal glycaemic control, prevent complications, and improve overall patient outcomes. Treatment strategies include lifestyle modifications such as dietary management, weight reduction, physical activity, and patient education, along with pharmacological interventions. [32-40] Pharmacotherapy may involve insulin, oral antidiabetic drugs, or combination therapy depending on the type and severity of the disease. Current treatment guidelines recommend individualized therapy based on patient characteristics, glycaemic status, comorbidities, and treatment goals.

Prescription pattern studies are important tools for evaluating drug utilization, prescribing trends, rational use of medicines, and adherence to treatment guidelines. Such studies provide valuable information regarding the selection and utilization of antidiabetic medications in clinical practice. [41;42] Understanding prescribing patterns helps identify commonly used drugs, assess the appropriateness of therapy, and improve the quality of patient care.

Among oral antidiabetic agents, biguanides, particularly metformin, remain the first-line therapy for the management of T2DM because of their efficacy, safety profile, and cost-effectiveness.[43-49] Sulfonylureas such as glimepiride, glibenclamide, and glipizide are widely prescribed insulin secretagogues used either alone or in combination therapy.[50-56] Meglitinides, including repaglinide and nateglinide, stimulate rapid insulin release and are primarily used to control postprandial hyperglycaemia.[57-60] Alpha-glucosidase inhibitors delay carbohydrate absorption and help reduce postprandial blood glucose levels.[61] Dipeptidyl peptidase-4 (DPP-4) inhibitors such as sitagliptin and vildagliptin improve glycaemic control by enhancing incretin activity.[62,63] Sodium-glucose cotransporter-2 (SGLT2) inhibitors including dapagliflozin, canagliflozin, and empagliflozin reduce blood glucose levels by increasing urinary glucose excretion and have demonstrated additional cardiovascular and renal benefits.[64-66]

Considering the growing burden of diabetes and the expanding range of therapeutic options, continuous evaluation of prescribing practices is essential. Prescription pattern studies help assess the utilization of antidiabetic drugs, identify prevailing treatment trends, and promote rational prescribing. Therefore, the present study was undertaken to evaluate the prescription pattern of antidiabetic drugs

among diabetic patients and to generate evidence that may contribute to improved diabetes management and patient care.

Methodology

Study Design and Duration

A prospective observational study was conducted among diabetic outpatients of both genders from June 2026 to September 2026.

Study Site and Data Source

The study was carried out using prescriptions collected from the outpatient clinic at Vasudevanallur. Patient information was obtained from prescriptions through a structured data collection form (proforma).

Data Collection

The proforma was designed to record demographic details, laboratory investigations, medical and medication history, and treatment-related information including prescribed drugs, dosage, route of administration, and frequency of use.

Study Population

Patients aged above 20 years, including those with associated comorbidities, were included in the study. Patients unwilling to participate were excluded.

Study Procedure

Prescription data were prospectively collected and recorded in the designed proforma. Information regarding patient age, gender, diagnosis, and prescribed medications was entered into Microsoft Excel 365 for analysis. The collected data were then statistically analyzed to evaluate prescribing patterns among diabetic patients.

Statistical Analysis

Data were entered and analyzed using Microsoft Excel 365. Descriptive statistics were used to summarize demographic characteristics and prescription patterns.

RESULTS and DISCUSSION

The present prospective study evaluated the prescription pattern of antidiabetic medicines among 150 patients. The study included demographic characteristics, comorbid conditions, number of medicines per prescription, type of antidiabetic therapy, commonly prescribed antidiabetic medicines, injectable use, and drug-class combinations.

The present study shows a slight male predominance, with males accounting for 53.33% and females 46.67% of the study population. Most patients belonged to the **50–60-year age group**, which is consistent with previous studies. The higher occurrence of diabetes in middle-aged and older adults may be associated with insulin resistance, reduced physical activity, increasing body weight, dietary habits, and declining pancreatic beta-cell function

Comorbidities were present in 79 patients, with cardiovascular disease being the most common, followed by diabetic neuropathy and renal disease. The high burden of comorbid conditions increases treatment complexity and often requires additional medicines. Renal disease is particularly important because it affects the selection and dosage of several antidiabetic agents, while neuropathy and foot complications require both symptomatic treatment and strict glycaemic control.

A total of 607 medicines were prescribed in 150 prescriptions, giving an average of **4.05 medicines per prescription**. This indicates polypharmacy and a considerable medication burden. The value was higher than the WHO/INRUD reference range, while injectable use was lower than the cited range, with injections prescribed in 13 prescriptions (8.67%). The major prescribing concern in this study was therefore polypharmacy rather than excess use of injections. Regular prescription review is needed to reduce drug interactions, adverse effects, and poor adherence.

Table 1. Pattern of antidiabetic therapy

Sr. No.	Type of therapy	Number of patients	Percentage

1	Single-drug therapy	29	19.33%
2	Double-drug therapy	58	38.67%
3	Triple-drug therapy	33	22.00%
4	Multidrug therapy	27	18.00%
5	Insulin-only therapy	3	2.00%
Total		150	100.00%

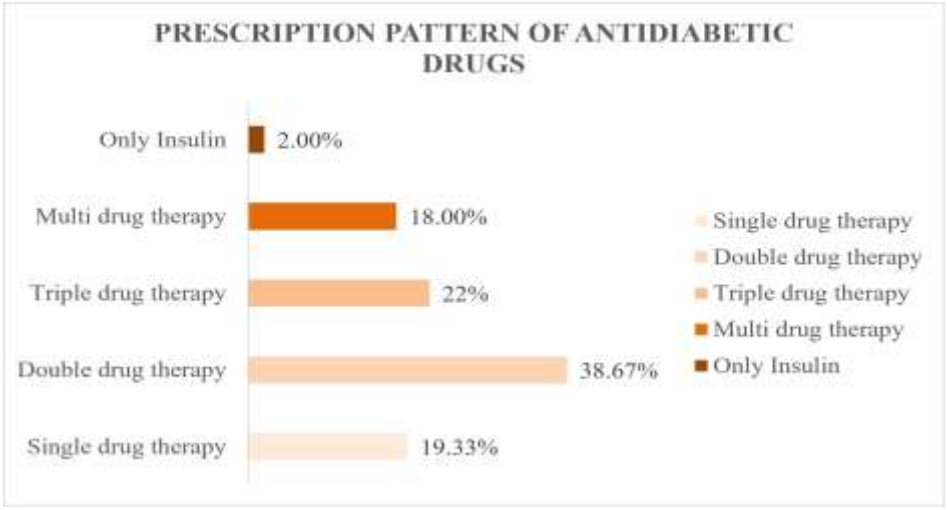

Fig 1: Pattern of Antidiabetic Therapy

As shown in **Table no. 1 and Figure no. 1**, combination therapy was prescribed more frequently than monotherapy. Double-drug therapy was the most common regimen, followed by triple-drug and multidrug therapy. This pattern suggests treatment intensification in patients who may not have achieved adequate glycaemic control with a single agent. Combination therapy should be selected carefully according to age, renal function, liver function, cardiovascular status, and risk of hypoglycaemia.

Table 2. Oral antidiabetic medicines documented in the study

Sr. No.	Oral antidiabetic medicine	Number recorded	Percentage
1	Metformin	36	38.29%
2	Glimepiride	9	9.57%
3	Sitagliptin	8	8.51%
4	Dapagliflozin	8	8.51%
5	Vildagliptin	7	7.45%
6	Gliclazide	5	5.32%
7	Voglibose	5	5.32%
8	Glipizide	4	4.26%
9	Empagliflozin	4	4.26%
10	Glibenclamide	2	2.13%
11	Remogliflozin	2	2.13%
12	Teneligliptin	2	2.13%
13	Acarbose	1	1.06%
14	Linagliptin	1	1.06%
Total		94	100.00%

Table 2 show that metformin was the most frequently prescribed antidiabetic drug. Its frequent use may be due to its effectiveness, affordability, established safety, low risk of hypoglycaemia, and favourable effect on body weight.

Table 3. Classification of monotherapy according to pharmacological class

Sr. No.	Pharmacological class	Number of prescriptions	Percentage
1	Biguanides	36	38.30%
2	Sulfonylureas	20	21.28%
3	DPP-4 inhibitors	18	19.15%
4	SGLT2 inhibitors	14	14.89%
5	Alpha-glucosidase inhibitors	6	6.38%
Total		94	100.00%

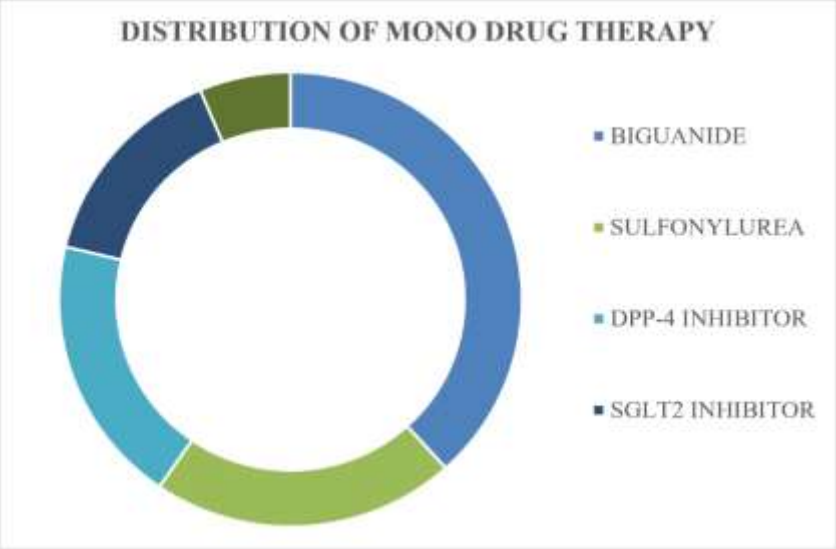

Fig 2: Distribution of Mono Drug Therapy

Table 4. Classification of dual-drug therapy

Sr. No.	Drug-class combination	Number of prescriptions	Percentage
1	Biguanide + sulfonylurea	61	70.93%
2	Biguanide + DPP-4 inhibitor	15	17.44%
3	Biguanide + SGLT2 inhibitor	4	4.65%
4	Biguanide + thiazolidinedione	2	2.33%
5	SGLT2 inhibitor + DPP-4 inhibitor	3	3.49%
6	DPP-4 inhibitor + SGLT2 inhibitor	1	1.16%
Total		86	100.00%

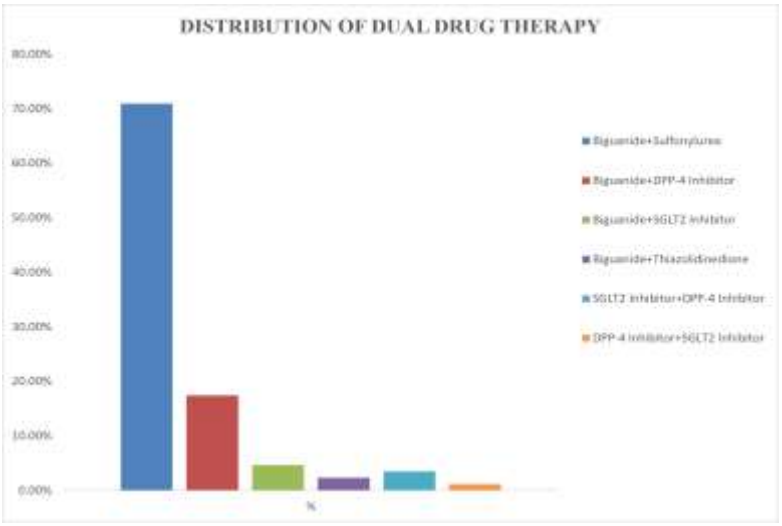

Fig 3: Distribution of Dual Drug Therapy

Table 4 and Figure no. 3 show that metformin plus glimepiride was the most common dual combination. This combination offers complementary mechanisms of action, but careful monitoring is required because sulfonylureas may cause hypoglycaemia and weight gain, especially in elderly patients and those with renal impairment.

Table 5. Classification of triple-drug therapy

Sr. No.	Drug-class combination	Number of prescriptions	Percentage
1	Biguanide + sulfonylurea + alpha-glucosidase inhibitor	15	38.46%
2	Biguanide + sulfonylurea + thiazolidinedione	11	28.21%
3	Biguanide + DPP-4 inhibitor + SGLT2 inhibitor	7	17.95%
4	Biguanide + sulfonylurea + DPP-4 inhibitor	6	15.38%
Total		39	100.00%

Table 3, Table no. 4, Figure no. 2, and Figure no. 3 also show the use of DPP-4 inhibitors and SGLT2 inhibitors in some prescriptions, indicating the use of newer therapeutic options. **Table no. 5** shows that triple-drug and multidrug regimens were used in several patients, suggesting inadequate control, longer disease duration, or progressive beta-cell dysfunction. Insulin was prescribed in 13 prescriptions, either alone or with oral agents, mainly in patients with severe hyperglycaemia or complications. However, full assessment of treatment appropriateness was limited by incomplete clinical data.

Overall, the study shows that metformin-based combination therapy was the main prescribing pattern, with polypharmacy and comorbidities being important features. The findings support the need for regular auditing, pharmacist involvement, individualized treatment, and patient counselling to promote rational and safe antidiabetic drug use.

Conclusion

The present prospective observational study of 150 diabetic patients showed that combination therapy was more commonly prescribed than monotherapy, with metformin being the most frequently used antidiabetic drug and metformin–glimepiride the most common dual-drug combination. Polypharmacy was observed, with an average of 4.05 medicines per prescription, highlighting the need to minimize medication-related risks. The findings support individualized treatment based on glycaemic control, comorbidities, renal and hepatic function, hypoglycaemia risk, and adherence. Regular prescription review, pharmacist involvement, patient counselling, renal-function monitoring, lifestyle modification, and periodic prescription audits may promote rational and safe use of antidiabetic medicines.

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